

Australasian (iron and steel) Slag Association Inc.

Material Classification (Iron and Steel Slag) Monitoring Report 2010

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Glossary

Term	Definition
AS	Australian Standard
ASA	Australasian (iron & steel) Slag Association
Chain of Custody (COC)	Documentation which accompanies samples to reduce the potential for loss or erroneous labelling or analysis reporting
DECCW	Department of Environment, Climate Change and Water of New South Wales.
EQL	Estimated Quantitation Limit – the minimum concentration the laboratory can analyse.
ISO	International Standards Organisation
Leachate	The water solution containing the released substance.
mg/kg	Milligrams per kilogram or 1×10^{-6} (i.e. one in one-million)
mg/L	Milligrams per litre or 1×10^{-6} (i.e. one in one-million)
ug/l	Micrograms per litre or 1×10^{-9} if fluid is assumed to be density of 1mg/mL
NATA	National Association of Testing Authorities
ng/g	Nanograms per gram or 1×10^{-9} (i.e. one in one-thousand-million)
QA / QC	Quality Assurance / Quality Control
TCLP	Toxicity Characteristic Leaching Procedure – a method of determining the release of a substance via exposure to water solution.
TM	Total Metals – a method of determining total elemental characterisation by acid digestion.
USEPA	United States Environment Protection Agency

Executive Summary

The Australasian (iron & steel) Slag Association (ASA) annually undertakes an Environmental Monitoring Program (EMP) to monitor and assess the iron and steel slags produced, processed and sold by its members.

Commencing in 2005, this annual EMP was established in response to recommendations from the “*Material Classification of Iron and Steel Slag By-product Waste Classification Investigation Report 2004*”. Amongst its key recommendations was to establish an annual EMP to increase industry understanding about environmental performance of the iron and steel slag products generated, processed and sold by members.

The EMP methodology involves collecting iron and steel slag samples, where available, from member sites, analyses and report on total metal and selected leachable concentrations against, where established, jurisdictional government regulations. Samples are only subjected to a Toxicity Characteristic Leaching Procedure (TCLP) where required and assessed against specified acceptance criteria.

Since 2004 the referenced assessment methods have evolved through ongoing consultation with regulators. Initially the NSW Environmental Protection Authority’s (EPA) *Environmental Guidelines*¹, were used. These guidelines classifying wastes as either ‘hazardous’, ‘industrial’, ‘solid’ or ‘inert’. All previous reports have classified iron and steel slag (ISS) products as ‘inert’.

This report is the Association’s fourth (4th) EMP, the reference methods and guidelines have evolved slightly to reflect proposed ‘general exemption’ criteria and assessment conditions by the DECCW. Though still in draft these proposed “general exemption/s” guidelines are titled: *The steel furnace slag exemption*, *The electric arc furnace slag exemption* and *The blast furnace slag exemption* (‘the Exemption guidelines’)².

The following report summarises the results of the 2009 EMP report (EMP09). Consistent with past reports, all sources for iron and steel slag are compared against nominated thresholds, where provided, for each jurisdiction.

For the EMP09, the ASA tested a total of sixty three (63) ISS samples from member sites – BlueScope NSW, BIS Industrial SA, Multiserv VIC, Steelstone (Newcastle and Rooty Hill, NSW), Onesteel (Rooty Hill and Newcastle, NSW) and Steelserv based in New Zealand. ISS are co-products of various metallurgical processes, namely Iron Blast Furnace Slag (BFS), Steel Furnace Slag (SFS), Electric Arc Furnace Slag (EAFS), Sinter Slag Fines, Melter Slag and KOBM Slag.

Analysis of their results against the *Exemption* guidelines have confirmed the stable and consistent nature of these slag samples from member sites, and indicate each sample provided would comply with the exemption requirements.

¹ NSW EPA (1999). *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes*. EPA 99/21. Sydney, NSW, Australia, Environment Protection Authority.

² Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A: Draft - The blast furnace slag exemption 2008; Draft – The steel furnace slag exemption 2008; Draft - The electric arc furnace slag exemption 2008

Figure 1 Distribution of Members



1 Introduction

Building on the capstone Research and Development Program conducted in 2004, that is the published report titled – “*Material Classification of Iron and Steel Slag By-product Waste Classification Investigation Report 2004*”, the Australasian (iron & steel) Slag Association Inc. (ASA) implemented one of the key recommendations arising from the report.

The recommendation specifically called for an ongoing monitoring program of iron and steel slag available throughout its membership.

8.1 Develop and implement an annual [Environmental] Monitoring Program

This 2009 Environmental Monitoring Program (EMP09) report represents the fourth (4th) assessment conducted by ASA inline with the above recommendation for ongoing monitoring of iron and steel slag's (ISS) generated, processed and sold.

1.1 Iron and Steel Slag Classification System

In previous studies, and EMP reports, the NSW Environmental Protection Authority's (EPA) *Environmental Guidelines*³ have been a useful aid in established standardise methodology for distinguishing concentrations of substances and their mobility behaviour, and in the determination process for classification of a waste. These *Environmental Guidelines*, whilst not exemptions per se, that is, classifying materials which meet these requirements from the waste reporting requirements, have however provided for sound and consistent basis for characterisation under extreme assessment conditions.

Amendments to the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations (Waste) Regulation 2005* took effect on 28 April 2008. These changes, made under the *Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008*, follow consultation in 2007 with industry, organisations and the broader community. Amendments of particular interest to our industry are summarised below:

- Fewer and simpler licensing categories for waste
- A streamlined waste classification system
- New resource recovery licensing categories and resource recovery exemptions
- *Exemption* guidelines providing the process for determination of the waste classification, including analytical tables, which indicate the acceptable concentrations of contaminants in the waste.

During the course of 2008/9, the DECCW in consultation with the ASA undertook to develop exemptions for various ISS. Resulting from the above changes, aspects of this report have been amended to reflect proposed *Exemption*⁴ requirements for each from of iron and steel slag.

³ NSW EPA (1999). *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes*. EPA 99/21. Sydney, NSW, Australia, Environment Protection Authority.

⁴ *Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A: Draft - The blast furnace slag exemption 2008; Draft – The steel furnace slag exemption 2008; Draft - The electric arc furnace slag exemption 2008*

1.2 Objective of Scope of Work

The object of the monitoring system is to collect, analyse, assess and report on the chemical concentration and leachable potential assessed against the *Exemption* requirements for Steel Furnace Slag (SFS), Electric Arc Furnace Slag (EAFS), Blast Furnace Slag (BFS) Melter Slag (MS) and KOBM Slag.

The aim of the EMP is **NOT** to replace or undertake by proxy generator, processor and or consumer responsibilities under the respective legislation and or specific environmental licence requirements, but to have a nationally maintained central database on the chemical concentration and leachable potential of ISS, which supplements and can be combined with member data on a consistent basis.

Accordingly, the data from these reports should not be relied upon to replace member responsibilities as legislated.

A secondary aim for the EMP is to reassess the ongoing stable and consistent nature of these respective metallurgical processes and resulting products.

The chemical characteristics of several types of metallurgical slags will be examined, these being: Iron Blast Furnace Slag (BFS), Steel Furnace Slag (SFS), Electric Arc Furnace Slag (EAFS), Melter Slag (MS) and KOBM Slag (KOBMS).

1.3 Material Selection & Sample Identification

The following table sets out the sample identification coding system used to identify each specific iron and steel slag products into their various categories.

Product Description	Sample Identification range	Number of samples received
Granulated Blast Furnace Slag	101 – 103	3
Blast Furnace Slag – Air cooled aggregates	201 – 206	6
Blast Furnace Slag – Air cooled fines	304 – 306	3
Steel Furnace Slag – Air cooled aggregates	401 – 406	6
Steel Furnace Slag – Air cooled fines	501 – 506	6
Electric Arc Furnace Slag – Air cooled aggregates	601 – 618	15
Electric Arc Furnace Slag – Air cooled fines	701 – 715	15
Sinter Slag Fines	801 – 803	3
Melter Slag	901 – 903	3
KOBM Slag	904 – 906	3

1.4 Material Processes

Each metallurgical slag type can be processed into various forms. For example molten slag material can be poured into cooling pits and allowed to solidify like natural rock. This solid rock material when cooled can then be processed and crushed into aggregates of various sizes like any natural quarried product. Some processes such as the manufacture of granulated iron blast furnace slag (GBFS) requires cooling the molten material instantaneously with high volume water sprays

and will manifest different physical characteristics when compared with air-cooled slag.

Attachment 1 provides an explanation for each of the slag manufacturing processes involved.

1.5 Who is Responsible for Classification/Exemption?

Generally state Environment Protection Authorities (EPA's) do not classify wastes themselves. This task of determining classification is essentially the responsibility of the Generators'. The generator determines waste classifications according to state requirements.

For example in New South Wales, it's proposed that generators assess using the *Exemption* requirements. Once the material is deemed to meet these requirements, the material is exempt for: waste reporting, monitoring and associated levies under section 88 of the PoEA⁵.

This responsibility to assess the material places an additional burden for the generator to both demonstrate the reliability, and to show due diligence in, monitoring co-product stream quality.

To assess the waste, the *Exemption* describes a process which:

- Qualitatively describes the sampling techniques and numbers of samples;
- Establishes chemical thresholds
- Methods for analysing contaminant concentration;
- Assesses concentrations Total and Available (leachable) forms.

As noted above, this report is not intended to replace generators' responsibility to determine the classification or exemption status of their respective co-products. However, should generators choose to rely on data within this report, they should satisfy themselves with regards to the accuracy, limitations (samples assessed - *n*) of the study.

2 Sampling and Analysis Procedures

2.1 Site Sampling Procedures

Slag co-product samples were taken in accordance with the following standards:

- AS 1199 Sampling procedures and tables for inspection by attributes
- AS 1399 Guide to AS 1199
- AS 1141.3.1 – Methods for Sampling and Testing Aggregates 1996 (Method 3.1- Sampling Aggregates: Section 6.9 - Sampling from Stockpiles)

A Chain of Custody (COC) form was completed and despatched with the samples.

2.2 Samples (*n*) collected

The association centrally coordinated the collection of sixty three (63) samples from member sites throughout Australia and New Zealand. The geographic distribution of Association members is illustrated in Figure 1 above.

⁵ Protection of the Environment Operations Act 1997

These samples, along with the COC forms, were delivered to LabMark Pty Ltd, a NATA certified laboratory, for analysis.

2.3 Laboratory Procedures

Laboratory procedures for analysis of Total Metals (TM) and Toxicity Characteristic Leaching Procedure (TCLP), as required, were conducted by LabMark Pty Ltd, a NATA certified laboratory.

2.4 Quality Control / Quality Assurance Procedures

The full breakdown of the analytical results for the QA/QC for these analyses are included within the NATA laboratory reports. All were satisfactory.

3 Assessment and Classification Procedures

3.1 The Classification Process

The assessment and classification process was in accordance with the *Exemption* requirements for collected ISS

4 Comparison of Analytical Results with Environmental Guidelines

4.1 Product Category Assessment Results

Using the *Exemption* requirements, each of the samples was assessed with results shown arithmetic means reported in the following tables.

4.2 Granulated Blast Furnace Slag Assessment

Granulated Blast Furnace Slag						
Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
	mg/L	mg/kg	TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
As		0.5	5	N/A	10	N/A
B		46.7	N/A	N/A	N/A	N/A
Ba		316.7	N/A	N/A	N/A	N/A
Be		7.0	10	N/A	20	N/A
Cd		0.03	0.5	0.5	1	N/A
Co		2.5	N/A	N/A	N/A	N/A
Cr		5.3	50	N/A	100	N/A
Cu		2.3	10	10	20	N/A
Hg		0.1	0.5	N/A	1	N/A
Mo		2.5	5	5	10	N/A
Ni		7.3	10	N/A	20	N/A
Pb		2.5	10	N/A	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn		6.3	25	25	50	N/A
Mn		1593.3	N/A	N/A	N/A	N/A
Al		50866.7	N/A	N/A	N/A	N/A

Legend

Exceeding threshold

Near threshold



Sample Identification 101 to 103 (n=3)

As can be seen from this assessment the co-product **would be considered exempt**.

4.3 Blast Furnace Slag Aggregate Assessment

Blast Furnace Slag - Air cooled aggregates

Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
			TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
	mg/L	mg/kg		mg/kg	mg/kg	mg/L
As		0.5	5	N/A	10	N/A
B		33.3	N/A	N/A	N/A	N/A
Ba		193.3	N/A	N/A	N/A	N/A
Be		6.7	10	N/A	20	N/A
Cd		0.03	0.5	0.5	1	N/A
Co		2.5	N/A	N/A	N/A	N/A
Cr		7.3	50	N/A	100	N/A
Cu		1.0	10	10	20	N/A
Hg		0.05	0.5	N/A	1	N/A
Mo		2.5	5	5	10	N/A
Ni		10.8	10	N/A	20	N/A
Pb		2.5	10	N/A	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn		2.5	25	25	50	N/A
Mn		1273	N/A	N/A	N/A	N/A
Al		39183.3	N/A	N/A	N/A	N/A

Legend

Exceeding threshold

Near threshold



Sample Identification 201 to 206 (n=6)

As can be seen from this assessment the co-product **would be considered exempt**.

4.4 Blast Furnace Slag Fines Assessment

Blast Furnace Slag - Air cooled fines

Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
			TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
	mg/L	mg/kg		mg/kg	mg/kg	mg/L
As		0.5	5	N/A	10	N/A
B		70.0	N/A	N/A	N/A	N/A
Ba		273.3	N/A	N/A	N/A	N/A
Be		9.0	10	N/A	20	N/A
Cd		0.03	0.5	0.5	1	N/A
Co		2.5	N/A	N/A	N/A	N/A
Cr		4.7	50	N/A	100	N/A
Cu		1.0	10	10	20	N/A
Hg		0.05	0.5	N/A	1	N/A
Mo		2.5	5	5	10	N/A
Ni		10.3	10	N/A	20	N/A
Pb		2.5	10	N/A	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn		2.5	25	25	50	N/A
Mn		1797	N/A	N/A	N/A	N/A
Al		50267	N/A	N/A	N/A	N/A

Legend

Exceeding
threshold

Near threshold



Sample Identification 304 to 306 (n=3)

As can be seen from this assessment the co-product **would be considered exempt**.

4.5 Steel Furnace Slag Aggregates Assessment

Steel Furnace Slag - Air cooled aggregates

Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
	mg/L	mg/kg	TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
As		0.750	5	N/A	N/A	N/A
B		41.7	N/A	N/A	N/A	N/A
Ba		33.3	N/A	N/A	N/A	N/A
Be		2.5	10	N/A	20	N/A
Cd		0.13	0.5	0.5	1	N/A
Co		2.5	N/A	N/A	N/A	N/A
Cr	0.025	540.2	1000	N/A	2000	0.2
Cu	0.025	10.3	20	N/A	40	0.2
Hg		0.05	0.5	N/A	1	N/A
Mo	0.005	9.1	50	50	100	0.1
Ni		15.5	30	30	60	N/A
Pb		2.5	10	10	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn	0.029	20.5	50	50	100	1
Mn		18633	N/A	N/A	N/A	N/A
Al		14300	N/A	N/A	N/A	N/A

Legend

Exceeding
threshold

Near threshold



Sample Identification 401 to 406 (n=6)

As can be seen from this assessment the co-product **would be considered exempt**.

4.6 Steel Furnace Slag Fines Assessment

Steel Furnace Slag - Air cooled fines

Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
	mg/L	mg/kg	TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
As		0.6	5	N/A	N/A	N/A
B		43.3	N/A	N/A	N/A	N/A
Ba		29.2	N/A	N/A	N/A	N/A
Be		2.5	10	N/A	20	N/A
Cd		0.14	0.5	0.5	1	N/A
Co		3.3	N/A	N/A	N/A	N/A
Cr	0.025	508.5	1000	N/A	2000	0.2
Cu	0.025	14.3	20	N/A	40	0.2
Hg		0.05	0.5	N/A	1	N/A
Mo		3.5	50	50	100	N/A
Ni	0.330	19.5	30	30	60	0.1
Pb		2.5	10	10	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn	0.025	49.0	50	50	100	1
Mn		15617	N/A	N/A	N/A	N/A
Al		78600	N/A	N/A	N/A	N/A

Legend

Exceeding
threshold

Near threshold



Sample Identification 501 to 506 (n=6)

As can be seen from this assessment the co-product **would be considered exempt**.

4.7 Electric Arc Furnace Slag Aggregates Assessment

Electric Arc Furnace Slag - Air cooled aggregates

Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
	mg/L	mg/kg	TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
As		1.3	5	N/A	10	N/A
B		73.3	N/A	N/A	N/A	N/A
Ba		560.7	N/A	N/A	N/A	N/A
Be		2.5	10	N/A	20	N/A
Cd		0.2	1	1	2	N/A
Co		2.5	N/A	N/A	N/A	N/A
Cr	0.337	4046.7	10,000	N/A	20000	0.2
Cu	0.027	94.9	100	100	200	0.2
Hg		0.05	1	N/A	2	N/A
Mo	0.037	15.2	35	35	70	0.2
Ni	0.147	19.8	50	50	100	0.1
Pb		3.8	25	25	50	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.7	N/A	N/A	N/A	N/A
Zn	0.575	209.2	350	350	700	1
Mn		27260	N/A	N/A	N/A	N/A
Al		18960	N/A	N/A	N/A	N/A

Legend

Exceeding threshold

Near threshold



Sample Identification 601 to 618 (n=15)

As can be seen from this assessment the co-product **would be considered exempt**.

4.8 Electric Arc Furnace Slag Fines Assessment

Electric Arc Furnace Slag - Air cooled fines

Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
			TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
	mg/L	mg/kg		mg/kg	mg/kg	mg/L
As		1.6	5	N/A	10	N/A
B		58.7	N/A	N/A	N/A	N/A
Ba		578.0	N/A	N/A	N/A	N/A
Be		2.5	5	N/A	10	N/A
Cd		0.4	0.5	0.5	1	N/A
Co		3.1	N/A	N/A	N/A	N/A
Cr	0.211	4123.3	10,000	N/A	20000	0.2
Cu	0.027	114.5	100	100	200	0.2
Hg		0.05	0.5	N/A	1	N/A
Mo	0.021	16.5	35	35	70	0.2
Ni	0.143	29.8	50	50	100	0.1
Pb		6.1	25	25	50	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.8	2	N/A	5	N/A
Sn		7.0	N/A	N/A	N/A	N/A
Zn	0.512	322.1	350	350	700	1
Mn		27787	N/A	N/A	N/A	N/A
Al		20040	N/A	N/A	N/A	N/A

Legend

Exceeding threshold

Near threshold



Sample Identification 701 to 715 (n=15)

As can be seen from this assessment the co-product **would be considered exempt**.

4.9 Sinter Slag Fines Assessment

Steel Furnace Slag - Sinter Fines						
Element	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
	mg/L	mg/kg	TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
As		1.2	5	N/A	N/A	N/A
B		33.3	N/A	N/A	N/A	N/A
Ba		70.0	N/A	N/A	N/A	N/A
Be		2.5	10	N/A	20	N/A
Cd		0.43	0.5	0.5	1	N/A
Co		6.7	N/A	N/A	N/A	N/A
Cr	0.025	540.7	1000	N/A	2000	0.2
Cu	0.025	22.3	20	N/A	40	0.2
Hg		0.05	0.5	N/A	1	N/A
Mo		9.0	50	50	100	N/A
Ni	0.213	49.7	30	30	60	0.1
Pb	0.005	10.7	10	10	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		6.7	N/A	N/A	N/A	N/A
Zn	0.025	113.0	50	50	100	1
Mn		20600	N/A	N/A	N/A	N/A
Al		11733	N/A	N/A	N/A	N/A

Legend

Exceeding
threshold

Near threshold



Sample Identification 801 to 803 (n=3)

As can be seen from this assessment the co-product **would NOT be considered exempt.**

4.10 Melter Slag Assessment

Element	Melter					
	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
			TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
	mg/L	mg/kg		mg/kg	mg/kg	mg/L
As		0.5	5	N/A	10	N/A
B		220.0	N/A	N/A	N/A	N/A
Ba		110.0	N/A	N/A	N/A	N/A
Be		2.5	10	N/A	20	N/A
Cd		0.1	0.5	0.5	1	N/A
Co		2.5	N/A	N/A	N/A	N/A
Cr		26.7	50	N/A	100	N/A
Cu	0.025	13.0	10	10	20	N/A
Hg		0.05	0.5	N/A	1	N/A
Mo		2.5	5	5	10	N/A
Ni		2.0	10	N/A	20	N/A
Pb		2.5	10	N/A	20	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn	0.025	28.3	25	25	50	N/A
Mn		2027	N/A	N/A	N/A	N/A
Al		8667	N/A	N/A	N/A	N/A

Legend

Exceeding threshold

Near threshold



Sample Identification 901 to 903 (n=3)

As can be seen from this assessment the co-product **would be considered exempt**.

4.11 KOBM Slag Assessment

Element	KOBM					
	NSW ¹					
	Mean TCLP	Mean TM	Table 2 values			
			TM(Chara)	TM(Routine)	TM(Max)	TCLP(Max)
	mg/L	mg/kg		mg/kg	mg/kg	mg/L
As		0.5	5	N/A	10	N/A
B		120.0	N/A	N/A	N/A	N/A
Ba		53.3	N/A	N/A	N/A	N/A
Be		2.5	5	N/A	10	N/A
Cd		0.1	0.5	0.5	1	N/A
Co		8.3	N/A	N/A	N/A	N/A
Cr	0.025	997.7	10,000	N/A	20000	0.2
Cu	0.033	9.0	100	100	200	0.2
Hg		0.05	0.5	N/A	1	N/A
Mo	0.005	2.5	35	35	70	0.2
Ni	0.257	26.0	50	50	100	0.1
Pb		2.5	25	25	50	N/A
Sb		2.5	N/A	N/A	N/A	N/A
Se		0.5	2	N/A	5	N/A
Sn		5.0	N/A	N/A	N/A	N/A
Zn	0.025	14.8	350	350	700	1
Mn		11157	N/A	N/A	N/A	N/A
Al		6600	N/A	N/A	N/A	N/A

Legend

Exceeding threshold

Near threshold



Sample Identification 904 to 906 (n=3)

As can be seen from this assessment the co-product **would be considered exempt**.

5 Discussion of Results

5.1 Summary

From the sixty three (63) ISS samples analysed for their TM concentrations from eight separate process locations throughout Australasia, four (4) ISS types returned results with TM concentrations slightly above for the nominated thresholds specified under Column 2 of Table 2 of the *Exemption* for the elements – Lead, Zinc and Copper.

- Sinter Slag Fines (Pb, Zn)
- EAFS (Cu)

Twenty seven (27) samples were submitted for further analysed using the TCLP method. The majority of results were below the maximum concentration, with three (3) ISS returning results slightly above the nominated thresholds specified under Column 4 of the Table 2 of the *Exemption*.

- Sinter Slag Fines (Ni)
- EAFS (Cr, Ni)
- KOBM Slag (Ni)

The results are discussed in more detail below for each of the slag types.

5.2 Granulated Blast Furnace Slag

As demonstrated by the results in Table 4.2, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*⁶ requirements.

Based on this assessment, the co-product **would be considered exempt**.

5.3 Blast Furnace Slag Aggregates

As demonstrated by the results in Table 4.3, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*⁷ requirements.

Based on this assessment, the co-product **would be considered exempt**.

5.4 Blast Furnace Slag Fines

As demonstrated by the results in Table 4.4, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*⁸ requirements.

Based on this assessment, the co-product **would be considered exempt**.

⁶ Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A: Draft - The blast furnace slag exemption 2008; Draft – The steel furnace slag exemption 2008; Draft - The electric arc furnace slag exemption 2008

⁷ *ibid*

⁸ *ibid*

5.5 Steel Furnace Slag Aggregates

As demonstrated by the results in Table 4.5, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*⁹ requirements.

As specified under Table 2 of the *Exemption*, TCLP assessment was required for four (4) elements, namely Chromium, Copper, Molybdenum and Zinc. As demonstrated by the results in Table 4.5, all results are well below the maximum concentration values under Column 4 of the Table.

Based on this assessment, the co-product **would be considered exempt**.

5.6 Steel Furnace Slag Fines

As demonstrated by the results in Table 4.6, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*¹⁰ requirements.

As specified under Table 2 of the *Exemption*, TCLP testing was required for four (4) elements, namely Chromium, Copper, Nickel and Zinc. As demonstrated by the results in Table 4.6, all results are well below the maximum concentration values under Column 4 of the Table 2, with exception for Nickel being slightly above at 0.33mg/L.

Based on this assessment, the co-product **would be considered exempt**.

5.7 Electric Arc Furnace Slag Aggregates

As demonstrated by the results in Table 4.7, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*¹¹ requirements.

As specified under Table 2 of the *Exemption*, TCLP testing was required for five (5) elements, namely Chromium, Copper, Molybdenum Nickel and Zinc. As demonstrated by the results in Table 4.7, the majority of results are well below the maximum concentration values under Column 4 of the Table, in particular Copper which was approximately 8 times below threshold of 0.2 mg/L at <0.027 mg/L, which is below the detection limits. Both Chromium and Nickel were slight above at 0.337 mg/L and 0.147mg/L respectively.

Based on this assessment, the co-product **would be considered exempt**.

5.8 Electric Arc Furnace Slag Fines

As demonstrated by the results in Table 4.8, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption*¹² requirements.

As specified under Table 2 of the *Exemption*, TCLP testing was required for five (5) elements, namely Chromium, Copper, Molybdenum Nickel and Zinc. As demonstrated by the results in table 4.8, the majority of results are well below the maximum concentration values under Column 4 of the Table, in particular Copper which was approximately 8 times below threshold of 0.2 mg/L at <0.027 mg/L, well

⁹ ibid

¹⁰ ibid

¹¹ ibid

¹² ibid

below the detection limits. Both Chromium and Nickel were slightly above at 0.211 mg/L and 0.143 mg/L respectively.

Based on this assessment, the co-product **would be considered exempt**.

5.9 Sinter Slag Fines

As demonstrated by the results in Table 4.9, two (2) elements, Lead and Zinc, reported above at 10.7 mg/kg and 113 mg/kg for the TM characterisation values of 10 mg/kg and 50 mg/kg respectively under Column 2 of the Table 2 the *Exemption*.

As specified under Table 2 of the *Exemption*, TCLP testing was required for five (5) elements, namely Chromium, Copper, Nickel, Lead and Zinc. As demonstrated by the results in Table 4.9, the majority of results are well below the maximum concentration value under Column 4 of the Table. Nickel was slightly above the nominated threshold.

Based on this assessment, the co-product **would NOT be considered exempt due to TM results for Zinc**.

5.10 Melter Slag

As demonstrated by the results in Table 4.10, two (2) elements, Copper and Zinc reported slightly above at 13.0 mg/kg and 28.3 mg/kg respectively for the TM characterisation value of 10 mg/kg and 25 mg/kg respectively under Column 2 of Table 2 of the *Exemption*.

As can be seen from Table 2 of the *Exemption*, TCLP testing is not required for any of the elements, however samples submitted for analysis against Copper and Zinc were well below nominated thresholds.

It is noteworthy that Melter Slag is co-product New Zealand Steel and not currently exported to and sold in Australia.

Based on this assessment, the co-product **would be considered exempt**.

5.11 KOBM Slag

As demonstrated by the results in Table 4.11, each of the elements assessed show TM concentrations well below the maximum values specified under Table 2 of the *Exemption* requirements.

As specified under Table 2 of the *Exemption*, TCLP testing was required for five (5) elements, namely Chromium, Copper, Molybdenum, Nickel and Zinc. As demonstrated by the results in Table 4.11, all results were below the maximum concentration value under Column 4 of the Table. Nickel was slightly above the nominated threshold.

Based on this assessment, the co-product **would be considered exempt**.

5.12 Limitations

This report has been produced by assessing the samples as received, analysed and assessed against the *Exemption* requirements set out in Table 2 of the exemption.

The number and method of samples taken for each co-product was **NOT** consistent with the requirements of Table 3 of the *Exemption*. These results could be considered appropriate where:

- For a screening evaluation of the product range to determine the degree of compliance with the accepted standards;
- When coupled with previous investigations, n = Table 3 requirements, and;

- To investigate the consistency of the product.

From the sixty three (63) iron and steel slag samples collected from across Australasia it can be argued and demonstrated in this and previous reports the overall product quality, consistent nature and low coefficient of variation when assessed in conjunction with the previous studies and reports published. For example

- Ecotoxicity & Chemical Characterisation of Experimentally Generated Leachate from Unbound Rock Blast Furnace Slag – 1994
- Ecotoxicity & Chemical Characterisation of Experimentally Generated Leachate from Unbound Basic Oxygen Steel Slag – 1996
- Ecotoxicity & Chemical Characterisation of Experimentally Generated Leachate from Unbound Electric Arc Furnace Steel Slag – 1997
- Material Classification of Iron and Steel Slag Co-product Waste Classification Investigation Report 2004 by Moeyan Management
- Material Classification (Iron and Steel Slag) Monitoring Report 2006

Despite some sample numbers for selected individual products being low in a statistical significance ($n < 30$), we would argue that the consistency exhibited so far will, coupled with ongoing investigations, only support the findings of this EMP09 report.

6 Conclusions

6.1 Compliance with Acceptance Criteria

Based on the acceptance criteria established in the *Exemptions*, each of the following products are assessed in this report as follows;

- Granulated Blast Furnace Slag (**Exempt**)
- Blast Furnace Slag – Air-cooled aggregates (**Exempt**)
- Blast Furnace Slag – Air-cooled fines (**Exempt**)
- Steel Furnace Slag – Air-cooled aggregates (**Exempt**)
- Steel Furnace Slag – Air-cooled fines (**Exempt**)
- Electric Arc Furnace Slag – Air-cooled aggregates (**Exempt**)
- Electric Arc Furnace Slag – Air-cooled fines (**Exempt**)
- Sinter Slag Fines (**Not Exempt**)
- Melter Slag (**Exempt**)
- KOBM Slag (**Exempt**)

7 Related Documents

1. Golder Associates, **Ecotoxicity & Chemical Characterisation of Experimentally Generated Leachate from Unbound Rock Blast Furnace Slag**, May 1993, 92620109(A).
2. Golder Associates, **Ecotoxicity & Chemical Characterisation of Experimentally Generated Leachate from Unbound Basic Oxygen Steel Slag**, April 1996, 95623062.I.
3. Golder Associates, **Ecotoxicity & Chemical Characterisation of Experimentally Generated Leachate from Unbound Electric Arc Furnace Steel Slag**, January 1997, 96623018.P.
4. Moeyan Management, **Material Classification of Iron and Steel Slag By-product Waste Classification Investigation Report 2004**, 2004.

Attachment 1 Slag co-product Manufacturing Process

Blast Furnace Slag - Air Cooled Slag

The first step in the production of steel is the manufacturing of iron. This process begins by combining Iron ore (a mixture of iron oxides, silica and alumina) with a fuel consisting of coke, natural gas, oxygen and pulverised coal, and limestone – which serves as a fluxing agent in a blast furnace. The furnace consists of a large vertical chamber through which high volumes of hot air are blasted.

The liquid blast furnace slag flows into pits where it is predominantly air-cooled and sprayed with a small quantity of water. The cooled slag is then transported to a crushing and screening plant where it is further processed into various products including aggregates.

Air-cooled slag is produced when molten blast furnace slag is placed into a slag pit. The slag is then permitted to cool for a period of time whilst water is sprayed over the slag for the primary purpose of increasing the rate of solidification. The resulting solidified slag is referred to as “rock slag” or “air-cooled slag”.

Granulated Blast Furnace Slag

Granulated slag is produced when molten blast furnace slag is introduced to a high-pressure water stream. The effect of this process is to blast the slag stream apart, making small globules of slag that are almost instantaneously solidified. The slag created from this process is typically smaller than 6 mm. On examination, the macro components of granulated blast furnace slag are very consistent.

Both air-cooled and granulated slags are reclaimed by loader, transported by truck to the BlueScope Steel Recycling area where it is stockpiled in appropriate areas.

Steel Furnace BOS (Basic Oxygen System process) Slag

In the BOS process, molten iron, steel scrap and lime are placed in an open-top vessel. High pressure oxygen is blown into the vessel and a violent chemical reaction takes place. Upon completion of the reaction, the steel is drained into one ladle and the slag is poured into another. The molten steel furnace slag is then poured into a slag pit where it is allowed to cool.

The steel furnace slag is reclaimed by loader, transported by truck to the BlueScope Steel recycling area where it is reprocessed and stockpiled in appropriate areas for despatch.

BlueScope Steel produces steel furnace slag as a co-product of the steel making process, which is very consistent.

Electric Arc Furnace Slag

In the EAF process, steel scrap and fluxes are added to a refractory lined cup-shaped vessel. This vessel has a lid through which carbon electrodes are passed. An arc is induced between the scrap and electrodes and the resultant heat generated melts scrap and fluxes which react similarly to the BOS process. Steel and slag are also separated similarly.

Melter Slag

Iron is mined using conventional earthmoving equipment before being separated magnetically, by creating a slurry and running it over magnetic drums. This is followed by gravimetric separation through a series of cones and spiral separators, where the heavier iron-bearing materials gravitate towards the centre, while residual

clays and silts gravitate outwards. The slurry is then pumped 18 kilometres to the steel mill through an underground pipeline, where it is finally dewatered and stockpiled.

To convert the iron, a direct reduction process is used, adding coal and limestone to the irons before pre-heating them in four multi-hearth furnaces. This drives off the volatile constituents of the coal. The material then enters one of four rotary kilns where the direct reduction takes place over a period of eight hours.

The directly reduced product is then melted in one of two large electric melters. It is from this stage of the process that SteelServ Ltd obtains about 250,000 tonnes per annum of "melter" slag. The chemistry of New Zealand's melter slag differs from other variants of slag. This product consists of a high percentage of titanium and quantities of magnesium oxide and alumina typically higher than the industry norm. In contrast, the material has a characteristically low amount of silica, calcium oxide and sulphur.

KOBM Slag

New Zealand Steel uses a KOBM Oxygen Steel Converter vessel. The vessel is charged with the molten iron from the melters and a small proportion of scrap before refining begins using a top lance and bottom blown tuyeres to produce. The remaining steel making operation follows conventional practices, apart from the chemistry of the slag, which again differs from international equivalents due to irons and source.

KOBM slag is high in fines and cannot be used as an aggregate for road making or surfacings. KOBM can be used, however, as a lime substitute in stabilising clay sub-bases, as an additive to cement manufacture and as a soil conditioner for horticultural farming.

Attachment 2 Nata Laboratory Reports

Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Quarantine Approved Premises criteria 5.1 for quarantine containment level 1 (QCI) facilities. Class five criteria cover premises utilised for research, analysis and testing of biological material, soil, animal, plant and human products.

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Client Reference: MCDS/09
Contact Name: Mona Forghani
Chain of Custody No: na
Sample Matrix: OTHER

Cover Page 1 of 3
plus Sample Results

Date Received: 04/11/2009
Date Reported: 11/11/2009

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy: matrix spike: 1 in first 5-20, then 1 every 20 samples
lcs, crm, method: 1 per analytical batch
surrogate spike: addition per target organic method

Precision: laboratory duplicate: 1 in first 5-10, then 1 every 10 samples

laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

Holding Times: soils, waters: Refer to LabMark Preservation & THT table
VOC's 14 days water / soil
VAC's 7 days water or 14 days acidified
VAC's 14 days soil
SVOC's 7 days water, 14 days soil
Pesticides 7 days water, 14 days soil
Metals 6 months general elements
Mercury 28 days

Confirmation: target organic analysis: GC/MS, or confirmatory column

Sensitivity: EQL: Typically 2-5 x Method Detection Limit (MDL)

QUALITY CONTROL

GLOBAL ACCEPTANCE CRITERIA (GAC)

Accuracy: spike, lcs, crm general analytes 70% - 130% recovery
surrogate: phenol analytes 50% - 130% recovery
organophosphorous pesticide analytes 60% - 130% recovery
phenoxy acid herbicides, organotin 50% - 130% recovery

anion/cation bal: +/- 10% (0-3 meq/l),
+/- 5% (>3 meq/l)
Precision: method blank: not detected >95% of the reported EQL
duplicate lab 0-30% (>10xEQL), 0-75% (5-10xEQL)
RPD (metals): 0-100% (<5xEQL)
duplicate lab 0-50% (>10xEQL), 0-75% (5-10xEQL)
RPD: 0-100% (<5xEQL)

QUALITY CONTROL

ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)

Accuracy: spike, lcs, crm analyte specific recovery data
surrogate: <3xsd of historical mean

Uncertainty: spike, lcs: measurement calculated from historical analyte specific control charts

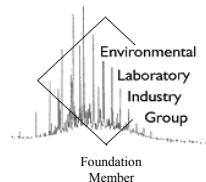
RESULT ANNOTATION

Data Quality Objective	s: matrix spike recovery	p: pending	bcs: batch specific lcs
Data Quality Indicator	d: laboratory duplicate	lcs: laboratory control sample	bmb: batch specific mb
Estimated Quantitation Limit	t: laboratory triplicate	crm: certified reference material	
not applicable	r: RPD relative % difference	mb: method blank	

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NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

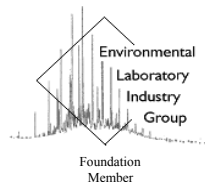
- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. EQL's are matrix dependant and may be increased due to sample dilution or matrix interference.
- C. Laboratory QA/QC samples are specific to this project.
- D. Inter-laboratory proficiency results are available upon request. NATA accreditation details available at www.nata.asn.au.
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomalous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

2. CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

- A. SRN issued to client upon sample receipt & login verification.
- B. Preservation & sampling date details specified on COC and SRN, unless noted.
- C. Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

3. NATA ACCREDITED METHODS

- A. NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer to subcontracted test reports for NATA accreditation status).
- B. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA documents. Corporate Accreditation No. 13542.
- C. Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.



Laboratory Report: E045449

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4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: **OTHER**

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	Metals in Solids and/or Dusts	63	7	11%	0	4	6%
10	Mercury in Solids	63	7	11%	0	4	6%
15	Moisture	63	--	--	--	--	--

GLOSSARY:

- #d number of discrete duplicate extractions/analyses performed.
- %d-ratio NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%).
- #t number of triplicate extractions/analyses performed.
- #s number of spiked samples analysed.
- %s-ratio USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%).

5. ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

- A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, unless indicated below.
- B. Metals; Lab # 234762s matrix spike recovery of molybdenum is 66%.
- C. Metals; Lab # 234782s matrix spike recovery for antimony is 62%.
- D. Metals; Lab # 234821s matrix spike recovery of cobalt is 64% and nickel is 60%.

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.

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Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		234761	234762	234763	234764	234765	234766	234767	234768	234769	234770
Sample Identification		101	102	103	201	202	203	204	205	206	304
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		5/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09
Method : E022.2											
Metals in Solids and/or Dusts		EQL									
Aluminium	100	49200	52700	50700	45100	42800	38400	32100	42300	34400	45100
Antimony	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Barium	50	300	330	320	280	290	250	90	140	110	240
Beryllium	5	7	6	8	6	6	5	5	10	8	8
Boron	20	40	50	50	40	40	30	20	40	30	60
Cadmium	0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	1	5	6	5	3	22	2	10	5	2	4
Cobalt	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	2	2	2	3	<2	<2	<2	<2	<2	<2	<2
Lead	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	10	1400	1680	1700	2100	2030	1890	540	620	460	1510
Molybdenum	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Nickel	1	6	8	8	8	20	7	8	12	10	9
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tin	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Zinc	5	7	5	7	<5	<5	<5	<5	<5	<5	<5

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
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of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		234771	234772	234773	234774	234775	234776	234777	234778	234779	234780
Sample Identification		305	306	401	402	403	404	405	406	501	502
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09	3/9/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09
Method : E022.2											
Metals in Solids and/or Dusts	EQL										
Aluminium	100	53900	51800	8000	7400	32600	4300	11800	21700	19000	11000
Antimony	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	1	<1	<1	2	<1	<1	<1	<1	<1	<1	1
Barium	50	280	300	<50	<50	<50	50	50	<50	<50	<50
Beryllium	5	10	9	<5	<5	<5	<5	<5	<5	<5	<5
Boron	20	80	70	40	50	40	40	40	40	40	50
Cadmium	0.05	0.05	<0.05	0.06	0.1	0.09	0.07	0.08	0.37	0.14	0.16
Chromium	1	6	4	530	510	597	444	518	642	660	661
Cobalt	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5
Copper	2	<2	<2	17	6	5	15	9	10	8	23
Lead	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	10	2010	1870	19800	23500	27100	10900	12700	17800	19300	21900
Molybdenum	5	<5	<5	<5	<5	<5	<5	<5	42	<5	6
Nickel	1	11	11	22	14	13	13	16	15	16	27
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tin	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Zinc	5	<5	<5	10	11	9	32	29	32	15	12

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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This report supercedes reports issued on: N/A

Laboratory Identification		234781	234782	234783	234784	234785	234786	234787	234788	234789	234790
Sample Identification		503	504	505	506	601	602	603	604	605	606
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	2/9/09	2/9/09	2/9/09	13/8/09	13/8/09	13/8/09	18/8/09	18/8/09	18/8/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09
Method : E022.2											
Metals in Solids and/or Dusts	EQL										
Aluminium	100	20500	11100	6600	10400	13300	16700	16600	16600	12200	14900
Antimony	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	1	<1	<1	<1	<1	2	3	2	1	1	2
Barium	50	<50	<50	<50	50	430	560	520	520	370	450
Beryllium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Boron	20	40	50	30	50	130	120	110	130	60	70
Cadmium	0.05	0.14	0.17	0.10	0.12	0.19	0.19	0.24	0.28	0.17	0.14
Chromium	1	678	354	367	331	1330	1650	1650	4960	3910	3860
Cobalt	5	<5	5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	2	9	19	10	17	77	107	152	82	95	88
Lead	5	<5	<5	<5	<5	6	6	6	<5	<5	<5
Manganese	10	18700	11100	10100	12600	16200	20800	19800	42200	27800	36100
Molybdenum	5	<5	<5	5	<5	6	8	7	19	28	24
Nickel	1	17	26	13	18	16	24	27	28	24	22
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tin	10	<10	<10	<10	<10	<10	10	10	<10	<10	<10
Zinc	5	21	125	28	93	115	96	101	291	130	353

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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This report supercedes reports issued on: N/A

Laboratory Identification		234791	234792	234793	234794	234795	234796	234797	234798	234799	234800
Sample Identification		607	608	609	613	614	615	616	617	618	701
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		19/8/09	19/8/09	19/8/09	4/8/09	4/8/09	4/8/09	10/9/09	10/9/09	10/9/09	13/8/09
Laboratory Extraction (Preparation) Date		5/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		6/11/09	6/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09
Method : E022.2											
Metals in Solids and/or Dusts	EQL										
Aluminium	100	26000	21500	20000	25500	28400	23400	15500	14200	19600	18500
Antimony	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	1	1	1	1	2	1	<1	<1	<1	<1	3
Barium	50	700	780	490	850	710	660	430	400	540	630
Beryllium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Boron	20	80	80	40	60	60	50	40	30	40	50
Cadmium	0.05	0.11	0.14	0.14	0.24	0.51	0.13	0.27	0.27	0.27	0.19
Chromium	1	5500	3300	4610	3170	4260	2950	6350	6040	7160	1860
Cobalt	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Copper	2	97	111	75	144	108	86	68	65	68	153
Lead	5	<5	<5	<5	<5	11	<5	<5	<5	<5	5
Manganese	10	32200	26100	24200	23700	30100	26500	26500	23900	32800	22100
Molybdenum	5	11	14	12	12	12	7	25	23	20	8
Nickel	1	16	21	17	24	21	14	14	14	15	28
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tin	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10
Zinc	5	116	121	61	117	310	81	493	459	294	86

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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Laboratory Identification		234801	234802	234803	234804	234805	234806	234807	234808	234809	234810
Sample Identification		702	703	704	705	706	707	708	709	710	711
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		13/8/09	13/8/09	18/8/09	18/8/09	18/8/09	19/8/09	19/8/09	19/8/09	4/8/09	4/8/09
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09
Method : E022.2											
Metals in Solids and/or Dusts	EQL										
Aluminium	100	17000	19000	14600	16100	13000	22900	26500	24500	25300	25900
Antimony	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	1	2	5	2	2	1	<1	2	1	1	3
Barium	50	610	650	410	440	370	640	680	670	690	690
Beryllium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Boron	20	50	80	50	50	40	60	60	60	70	70
Cadmium	0.05	0.19	0.30	0.40	0.34	0.25	0.24	0.29	0.28	0.50	0.58
Chromium	1	1340	2130	4640	4940	4850	3290	3850	3670	4250	4720
Cobalt	5	<5	7	<5	<5	<5	<5	5	<5	<5	5
Copper	2	121	208	81	88	84	73	135	129	108	149
Lead	5	6	8	5	12	<5	<5	<5	<5	8	10
Manganese	10	19700	26900	30600	31900	26900	23800	27500	24800	31500	32200
Molybdenum	5	6	11	19	20	16	8	11	10	11	14
Nickel	1	24	51	27	24	20	20	38	29	29	42
Selenium	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tin	10	10	20	<10	<10	<10	<10	<10	<10	<10	10
Zinc	5	92	136	278	362	238	90	224	362	442	435

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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Laboratory Identification		234811	234812	234813	234814	234815	234816	234817	234818	234819	234820
Sample Identification		712	713	714	715	801	802	803	901	902	903
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		4/8/09	10/9/09	10/9/09	10/9/09	3/9/09	3/9/09	3/9/09	21/8/09	21/8/09	21/8/09
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09
Method : E022.2											
Metals in Solids and/or Dusts	EQL										
Aluminium	100	26200	13700	23400	14000	11900	11600	11700	5100	8200	12700
Antimony	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Arsenic	1	<1	<1	<1	<1	2	1	<1	<1	<1	<1
Barium	50	690	440	620	440	50	90	70	80	170	80
Beryllium	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Boron	20	70	50	70	50	30	40	30	200	230	230
Cadmium	0.05	0.32	0.47	0.46	0.59	0.37	0.59	0.32	0.07	0.15	0.13
Chromium	1	3440	5570	6810	6490	528	491	603	23	16	41
Cobalt	5	<5	<5	<5	<5	8	7	5	<5	<5	<5
Copper	2	182	67	69	70	22	33	12	7	11	21
Lead	5	<5	12	<5	10	6	19	7	<5	<5	<5
Manganese	10	27400	27300	36600	27600	18700	22800	20300	1390	2030	2660
Molybdenum	5	9	39	25	40	12	7	8	<5	<5	<5
Nickel	1	36	23	28	28	63	50	36	2	1	3
Selenium	1	<1	2	2	2	<1	<1	<1	<1	<1	<1
Tin	10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10
Zinc	5	123	928	254	782	1130	1330	113	16	26	43

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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Laboratory Identification		234821	234822	234823	234761d	234761r	234771d	234771r	234781d	234781r	234791d
Sample Identification		904	905	906	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		21/8/09	21/8/09	21/8/09	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	5/11/09	--	5/11/09	--	5/11/09	--	9/11/09
Laboratory Analysis Date		10/11/09	10/11/09	10/11/09	6/11/09	--	6/11/09	--	6/11/09	--	10/11/09
Method : E022.2											
Metals in Solids and/or Dusts		EQL									
Aluminium	100	8200	7600	4000	50700	3%	49100	9%	21600	5%	27900
Antimony	5	<5	<5	<5	<5	--	<5	--	<5	--	<5
Arsenic	1	<1	<1	<1	<1	--	<1	--	<1	--	<1
Barium	50	50	50	60	300	0%	260	7%	<50	--	750
Beryllium	5	<5	<5	<5	7	0%	10	0%	<5	--	<5
Boron	20	160	110	90	50	22%	70	13%	50	22%	80
Cadmium	0.05	0.10	0.18	0.14	<0.05	--	0.05	0%	0.19	30%	0.12
Chromium	1	1120	1230	643	5	0%	6	0%	668	1%	5640
Cobalt	5	12	8	5	<5	--	<5	--	<5	--	<5
Copper	2	15	9	3	2	0%	<2	--	10	11%	94
Lead	5	<5	<5	<5	<5	--	<5	--	<5	--	<5
Manganese	10	13400	13900	6170	1480	6%	1860	8%	19900	6%	35100
Molybdenum	5	<5	<5	<5	<5	--	<5	--	5	>0%	11
Nickel	1	30	26	22	7	15%	11	0%	19	11%	16
Selenium	1	<1	<1	<1	<1	--	<1	--	<1	--	<1
Tin	10	<10	<10	<10	<10	--	<10	--	<10	--	<10
Zinc	5	28	14	<5	5	33%	<5	--	19	10%	132

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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Laboratory Identification		234791r	234801d	234801r	234811d	234811r	234820d	234820r	234762s	234782s	234802s
Sample Identification		QC	QC	QC	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		--	--	--	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		--	9/11/09	--	9/11/09	--	9/11/09	--	5/11/09	5/11/09	9/11/09
Laboratory Analysis Date		--	10/11/09	--	10/11/09	--	10/11/09	--	6/11/09	6/11/09	10/11/09
Method : E022.2											
Metals in Solids and/or Dusts		EQL									
Aluminium	100	7%	16700	2%	32100	20%	11900	7%	#	#	#
Antimony	5	--	<5	--	<5	--	<5	--	70%	62%	104%
Arsenic	1	>0%	4	67%	3	>100%	<1	--	77%	106%	86%
Barium	50	7%	610	0%	740	7%	80	0%	#	#	#
Beryllium	5	--	<5	--	<5	--	<5	--	97%	82%	98%
Boron	20	0%	50	0%	80	13%	210	9%	81%	#	#
Cadmium	0.05	9%	0.22	15%	0.38	17%	0.11	17%	80%	94%	95%
Chromium	1	3%	1440	7%	3890	12%	52	24%	97%	#	#
Cobalt	5	--	<5	--	6	>18%	5	>0%	91%	113%	80%
Copper	2	3%	176	37%	156	15%	21	0%	99%	87%	#
Lead	5	--	6	0%	<5	--	<5	--	76%	77%	83%
Manganese	10	9%	22500	13%	28400	4%	2710	2%	#	#	#
Molybdenum	5	0%	7	15%	12	29%	<5	--	66%	81%	81%
Nickel	1	0%	32	29%	45	22%	4	29%	94%	#	#
Selenium	1	--	<1	--	<1	--	<1	--	76%	85%	83%
Tin	10	--	10	0%	20	>67%	<10	--	73%	##	#
Zinc	5	13%	101	9%	127	3%	42	2%	112%	#	#

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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This report supercedes reports issued on: N/A

Laboratory Identification		234821s	mb	mb						
Sample Identification		QC	QC	QC						
Depth (m)		--	--	--						
Sampling Date recorded on COC		--	--	--						
Laboratory Extraction (Preparation) Date		9/11/09	5/11/09	9/11/09						
Laboratory Analysis Date		10/11/09	6/11/09	10/11/09						
Method : E022.2										
Metals in Solids and/or Dusts		EQL								
Aluminium	100	#	<100	<100						
Antimony	5	##	<5	<5						
Arsenic	1	71%	<1	<1						
Barium	50	#	<50	<50						
Beryllium	5	97%	<5	<5						
Boron	20	#	<20	<20						
Cadmium	0.05	94%	<0.05	<0.05						
Chromium	1	#	<1	<1						
Cobalt	5	64%	<5	<5						
Copper	2	94%	<2	<2						
Lead	5	100%	<5	<5						
Manganese	10	#	<10	<10						
Molybdenum	5	94%	<5	<5						
Nickel	1	60%	<1	<1						
Selenium	1	77%	<1	<1						
Tin	10	##	<10	<10						
Zinc	5	115%	<5	<5						

Results expressed in mg/kg dry weight unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample. ## Percent recovery not available due to interference from the sample.

E022.2: Sample digested with mineral acids. Analysis by ICP-MS/FIMS/ICP-OES.

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Laboratory Identification		234761	234762	234763	234764	234765	234766	234767	234768	234769	234770
Sample Identification		101	102	103	201	202	203	204	205	206	304
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Identification		234771	234772	234773	234774	234775	234776	234777	234778	234779	234780
Sample Identification		305	306	401	402	403	404	405	406	501	502
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09	3/9/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234781	234782	234783	234784	234785	234786	234787	234788	234789	234790
Sample Identification		503	504	505	506	601	602	603	604	605	606
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	2/9/09	2/9/09	2/9/09	13/8/09	13/8/09	13/8/09	18/8/09	18/8/09	18/8/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	6/11/09	9/11/09	9/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Identification		234791	234792	234793	234794	234795	234796	234797	234798	234799	234800
Sample Identification		607	608	609	613	614	615	616	617	618	701
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		19/8/09	19/8/09	19/8/09	4/8/09	4/8/09	4/8/09	10/9/09	10/9/09	10/9/09	13/8/09
Laboratory Extraction (Preparation) Date		5/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		9/11/09	9/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234801	234802	234803	234804	234805	234806	234807	234808	234809	234810
Sample Identification		702	703	704	705	706	707	708	709	710	711
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		13/8/09	13/8/09	18/8/09	18/8/09	18/8/09	19/8/09	19/8/09	19/8/09	4/8/09	4/8/09
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Identification		234811	234812	234813	234814	234815	234816	234817	234818	234819	234820
Sample Identification		712	713	714	715	801	802	803	901	902	903
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		4/8/09	10/9/09	10/9/09	10/9/09	3/9/09	3/9/09	3/9/09	21/8/09	21/8/09	21/8/09
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09	10/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234821	234822	234823	234761d	234761r	234771d	234771r	234781d	234781r	234791d
Sample Identification		904	905	906	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		21/8/09	21/8/09	21/8/09	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	5/11/09	--	5/11/09	--	5/11/09	--	9/11/09
Laboratory Analysis Date		10/11/09	10/11/09	10/11/09	6/11/09	--	6/11/09	--	6/11/09	--	9/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	<0.1	<0.1	<0.1	<0.1	--	<0.1	--	<0.1	--	<0.1

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Identification		234791r	234801d	234801r	234811d	234811r	234820d	234820r	234762s	234782s	234802s
Sample Identification		QC	QC	QC	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		--	--	--	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		--	9/11/09	--	9/11/09	--	9/11/09	--	5/11/09	5/11/09	9/11/09
Laboratory Analysis Date		--	10/11/09	--	10/11/09	--	10/11/09	--	6/11/09	6/11/09	10/11/09
Method : E023.2 Mercury in Solids Mercury	EQL 0.1	--	<0.1	--	<0.1	--	<0.1	--	84%	93%	92%

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
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This report supercedes reports issued on: N/A

Laboratory Identification		234821s	mb	mb						
Sample Identification		QC	QC	QC						
Depth (m)		--	--	--						
Sampling Date recorded on COC		--	--	--						
Laboratory Extraction (Preparation) Date		9/11/09	5/11/09	9/11/09						
Laboratory Analysis Date		10/11/09	6/11/09	10/11/09						
Method : E023.2										
Mercury in Solids										
Mercury	EQL 0.1	96%	<0.1	<0.1						

Results expressed in mg/kg as received unless otherwise specified

Comments:

E023.2: Sample digested with mineral acids. Analysis by FIMS.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234761	234762	234763	234764	234765	234766	234767	234768	234769	234770
Sample Identification		101	102	103	201	202	203	204	205	206	304
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	8	7	1	5	4	5	--	--	--	4

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Identification		234771	234772	234773	234774	234775	234776	234777	234778	234779	234780
Sample Identification		305	306	401	402	403	404	405	406	501	502
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09	3/9/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	4	3	2	2	1	--	--	--	1	3

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234781	234782	234783	234784	234785	234786	234787	234788	234789	234790
Sample Identification		503	504	505	506	601	602	603	604	605	606
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	2/9/09	2/9/09	2/9/09	13/8/09	13/8/09	13/8/09	18/8/09	18/8/09	18/8/09
Laboratory Extraction (Preparation) Date		5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09	5/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	2	1	1	2	2	2	2	--	--	--

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Identification		234791	234792	234793	234794	234795	234796	234797	234798	234799	234800
Sample Identification		607	608	609	613	614	615	616	617	618	701
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		19/8/09	19/8/09	19/8/09	4/8/09	4/8/09	4/8/09	10/9/09	10/9/09	10/9/09	13/8/09
Laboratory Extraction (Preparation) Date		5/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	--	1	--	--	--	--	--	--	--	2

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234801	234802	234803	234804	234805	234806	234807	234808	234809	234810
Sample Identification		702	703	704	705	706	707	708	709	710	711
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		13/8/09	13/8/09	18/8/09	18/8/09	18/8/09	19/8/09	19/8/09	19/8/09	4/8/09	4/8/09
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	1	1	1	1	--	1	1	1	--	--

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Identification		234811	234812	234813	234814	234815	234816	234817	234818	234819	234820
Sample Identification		712	713	714	715	801	802	803	901	902	903
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		4/8/09	10/9/09	10/9/09	10/9/09	3/9/09	3/9/09	3/9/09	21/8/09	21/8/09	21/8/09
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09	9/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	1	--	--	--	2	2	2	2	1	1

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Report No: E045449
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09

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This report supercedes reports issued on: N/A

Laboratory Identification		234821	234822	234823	234761d	234761r	234771d	234771r	234781d	234781r	234791d
Sample Identification		904	905	906	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		21/8/09	21/8/09	21/8/09	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		9/11/09	9/11/09	9/11/09	5/11/09	--	5/11/09	--	5/11/09	--	9/11/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E005.2											
Moisture	EQL										
Moisture	--	1	--	--	7	13%	4	0%	2	0%	--

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Laboratory Identification		234791r	234801d	234801r	234811d	234811r	234820d	234820r			
Sample Identification		QC	QC	QC	QC	QC	QC	QC			
Depth (m)		--	--	--	--	--	--	--			
Sampling Date recorded on COC		--	--	--	--	--	--	--			
Laboratory Extraction (Preparation) Date		--	9/11/09	--	9/11/09	--	9/11/09	--			
Laboratory Analysis Date		--	--	--	--	--	--	--			
Method : E005.2											
Moisture	EQL										
Moisture	--	--	1	0%	1	0%	1	0%			

Results expressed in % w/w unless otherwise specified

Comments:

E005.2: Moisture by gravimetric analysis. Results are in % w/w.

Sample Receipt Notice (SRN) for E045449



Quality, Service, Support

Client Details		Laboratory Reference Information	
Client Name: Australasian (Iron & Steel) Slag Assoc. Client Phone: 02 4225 8466 Client Fax: 02 4228 1777 Contact Name: Mona Forghani Contact Email: mforghani@hbmgroup.com.au Client Address: PO Box 1194 Wollongong NSW 2500 Project Name: MCDS/09 Project Number: - Not provided - CoC Serial Number: - Not provided - Purchase Order: - Not provided - Surcharge: No surcharge applied (results by 6:30pm on due date) Sample Matrix: OTHER		<div>Please have this information ready when contacting Labmark.</div> Laboratory Report: E045449 Quotation Number: Q0718.ES Laboratory Address: Unit 1, 8 Leighton Pl. Asquith NSW 2077 Phone: 61 2 9476 6533 Fax: 61 2 9476 8219 Sample Receipt Contact: Ros Schacht Email: Ros.Schacht@labmark.com.au Reporting Contact: Leanne Boag Email: leanne.boag@labmark.com.au	
Date Sampled (earliest date): 04/08/2009 Date Samples Received: 04/11/2009 Date Sample Receipt Notice issued: 05/11/2009 Date Preliminary Report Due: 11/11/2009 Client TAT Request Date: 11/11/2009		NATA Accreditation: 13542 TGA GMP License: 185-336 (Sydney) APVMA License: 6105 (Sydney) AQIS Approval: NO356 (Sydney) AQIS Entry Permit: 200521534 (Sydney)	

Reporting Requirements: Electronic Data Download required: No

Invoice Number: 09EA6739

Sample Condition: COC received with samples. Report number and lab ID's defined on COC.
Samples received in good order .
Samples received with cooling media: No cooling media .
Samples received ambient.
Security seals not used .
Sample container & chemical preservation suitable .

Comments:

Holding Times: Date received allows for insufficient time to meet Technical Holding Times.
Note: There are Samples within this batch that have been received by the laboratory 78 day(s) after Technical Holding Times expire. LabMark cannot guarantee THT compliance, refer to the extraction dates detailed in the sample grid for confirmation.

Preservation: Chemical preservation of samples satisfactory for requested analytes.

Important Notes:

LabMark shall responsibly dispose of spent customer soil and water samples which includes the disintegration of the sample label. A sample disposal fee of \$1.00 is applicable on all samples received by the laboratory regardless of whether they have undergone analytical testing. Sample disposal of environmental samples shall be 31 days (water) and 3 months (soil, HN03 preserved samples) after laboratory receipt, unless otherwise requested in writing by the client. Samples requested to be held in non-refrigerated storage shall incur \$5.00/ sample/ 3 months. Additional refrigerated storage shall incur \$30/ sample/ 3 months. Combination prices apply only if requested. Transfer of report ownership from LabMark to the client shall occur once full and final payment has been settled and verified. All report copies may be retracted where full payment does not occur within the agreed settlement period.

Analysis comments:

Subcontracted Analyses:

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

Sample Receipt Notice (SRN) for E045449



Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

GRID REVIEW TABLE				Requested Analysis															
No.	Date	Depth	Client Sample ID	Mercury in Solids	Metals in Solids and/or Dusts	Moisture	PREP Not Reported												
234761	03/09		101	●	●	●	●												
234762	03/09		102	●	●	●	●												
234763	03/09		103	●	●	●	●												
234764	03/09		201	●	●	●	●												
234765	03/09		202	●	●	●	●												
234766	03/09		203	●	●	●	●												
234767	02/09		204	●	●	●	●												
234768	02/09		205	●	●	●	●												
234769	02/09		206	●	●	●	●												
234770	03/09		304	●	●	●	●												
234771	03/09		305	●	●	●	●												
234772	03/09		306	●	●	●	●												
234773	03/09		401	●	●	●	●												
234774	03/09		402	●	●	●	●												
234775	03/09		403	●	●	●	●												
234776	02/09		404	●	●	●	●												
234777	02/09		405	●	●	●	●												
234778	02/09		406	●	●	●	●												
234779	03/09		501	●	●	●	●												
234780	03/09		502	●	●	●	●												
234781	03/09		503	●	●	●	●												
234782	02/09		504	●	●	●	●												
234783	02/09		505	●	●	●	●												
234784	02/09		506	●	●	●	●												
234785	13/08		601	●	●	●	●												
234786	13/08		602	●	●	●	●												
234787	13/08		603	●	●	●	●												
234788	18/08		604	●	●	●	●												
234789	18/08		605	●	●	●	●												
234790	18/08		606	●	●	●	●												
234791	19/08		607	●	●	●	●												
234792	19/08		608	●	●	●	●												

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

Sample Receipt Notice (SRN) for E045449



Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

GRID REVIEW TABLE				Requested Analysis															
No.	Date	Depth	Client Sample ID	Mercury in Solids	Metals in Solids and/or Dusts	Moisture	PREP Not Reported												
234793	19/08		609	•	•	•	•												
234794	04/08		613	•	•	•	•												
234795	04/08		614	•	•	•	•												
234796	04/08		615	•	•	•	•												
234797	10/09		616	•	•	•	•												
234798	10/09		617	•	•	•	•												
234799	10/09		618	•	•	•	•												
234800	13/08		701	•	•	•	•												
234801	13/08		702	•	•	•	•												
234802	13/08		703	•	•	•	•												
234803	18/08		704	•	•	•	•												
234804	18/08		705	•	•	•	•												
234805	18/08		706	•	•	•	•												
234806	19/08		707	•	•	•	•												
234807	19/08		708	•	•	•	•												
234808	19/08		709	•	•	•	•												
234809	04/08		710	•	•	•	•												
234810	04/08		711	•	•	•	•												
234811	04/08		712	•	•	•	•												
234812	10/09		713	•	•	•	•												
234813	10/09		714	•	•	•	•												
234814	10/09		715	•	•	•	•												
234815	03/09		801	•	•	•	•												
234816	03/09		802	•	•	•	•												
234817	03/09		803	•	•	•	•												
234818	21/08		901	•	•	•	•												
234819	21/08		902	•	•	•	•												
234820	21/08		903	•	•	•	•												
234821	21/08		904	•	•	•	•												
234822	21/08		905	•	•	•	•												
234823	21/08		906	•	•	•	•												
Totals:				63	63	63	63												

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Sample
Receipt
Notice (SRN) for **E045449**



Quality, Service, Support

				Requested Analysis																																			
				HG_O	Mercury	MET_O	Aluminium	MET_O	Antimony	MET_O	Arsenic	MET_O	Barium	MET_O	Beryllium	MET_O	Boron	MET_O	Cadmium	MET_O	Chromium	MET_O	Cobalt	MET_O	Copper	MET_O	Lead	MET_O	Manganese	MET_O	Molybdenum	MET_O	Nickel	MET_O	Selenium	MET_O	Tin	MET_O	Zinc
No.	Date	Depth	Client Sample ID																																				
234761	03/09		101	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234762	03/09		102	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234763	03/09		103	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234764	03/09		201	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234765	03/09		202	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234766	03/09		203	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234767	02/09		204	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234768	02/09		205	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234769	02/09		206	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234770	03/09		304	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234771	03/09		305	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234772	03/09		306	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234773	03/09		401	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234774	03/09		402	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234775	03/09		403	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234776	02/09		404	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234777	02/09		405	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234778	02/09		406	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234779	03/09		501	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234780	03/09		502	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234781	03/09		503	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234782	02/09		504	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234783	02/09		505	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234784	02/09		506	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234785	13/08		601	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234786	13/08		602	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234787	13/08		603	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234788	18/08		604	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234789	18/08		605	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234790	18/08		606	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234791	19/08		607	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234792	19/08		608	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
234793	19/08		609	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●																

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Sample Receipt Notice (SRN) for E045449



Quality, Service, Support

No.	Date	Depth	Client Sample ID	Requested Analysis																			
				HG_O Mercury	MET_O Aluminium	MET_O Antimony	MET_O Arsenic	MET_O Barium	MET_O Beryllium	MET_O Boron	MET_O Cadmium	MET_O Chromium	MET_O Cobalt	MET_O Copper	MET_O Lead	MET_O Manganese	MET_O Molybdenum	MET_O Nickel	MET_O Selenium	MET_O Tin	MET_O Zinc		
234794	04/08		613	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234795	04/08		614	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234796	04/08		615	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234797	10/09		616	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234798	10/09		617	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234799	10/09		618	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234800	13/08		701	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234801	13/08		702	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234802	13/08		703	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234803	18/08		704	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234804	18/08		705	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234805	18/08		706	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234806	19/08		707	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234807	19/08		708	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234808	19/08		709	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234809	04/08		710	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234810	04/08		711	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234811	04/08		712	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234812	10/09		713	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234813	10/09		714	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234814	10/09		715	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234815	03/09		801	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234816	03/09		802	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234817	03/09		803	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234818	21/08		901	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234819	21/08		902	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234820	21/08		903	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234821	21/08		904	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234822	21/08		905	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
234823	21/08		906	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
			Totals:	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63		

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Accredited for compliance with ISO/IEC 17025. The results of tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Quarantine Approved Premises criteria 5.1 for quarantine containment level 1 (QCI) facilities. Class five criteria cover premises utilised for research, analysis and testing of biological material, soil, animal, plant and human products.

CUSTOMER CENTRIC - ANALYTICAL CHEMISTS

FINAL CERTIFICATE OF ANALYSIS - ENVIRONMENTAL DIVISION

Laboratory Report No: E046157
Client Name: Australasian (Iron & Steel) Slag Assoc.
Client Reference: MCDS/09 Additional
Contact Name: Mona Forghani
Chain of Custody No: na
Sample Matrix: SOIL

Cover Page 1 of 3
plus Sample Results

Date Received: 16/12/2009
Date Reported: 29/12/2009

This Final Certificate of Analysis consists of sample results, DQI's, method descriptions, laboratory definitions, and internationally recognised NATA accreditation and endorsement. The DQO compliance relates specifically to QA/QC results as performed as part of the sample analysis, and may provide an indication of sample result quality. Transfer of report ownership from Labmark to the client shall only occur once full & final payment has been settled and verified. All report copies may be retracted where full payment has not occurred within the agreed settlement period.

QUALITY ASSURANCE CRITERIA

Accuracy: matrix spike: 1 in first 5-20, then 1 every 20 samples
lcs, crm, method: 1 per analytical batch
surrogate spike: addition per target organic method

Precision: laboratory duplicate: 1 in first 5-10, then 1 every 10 samples

laboratory triplicate: re-extracted & reported when duplicate RPD values exceed acceptance criteria

Holding Times: soils, waters: Refer to LabMark Preservation & THT table
VOC's 14 days water / soil
VAC's 7 days water or 14 days acidified
VAC's 14 days soil
SVOC's 7 days water, 14 days soil
Pesticides 7 days water, 14 days soil
Metals 6 months general elements
Mercury 28 days

Confirmation: target organic analysis: GC/MS, or confirmatory column

Sensitivity: EQL: Typically 2-5 x Method Detection Limit (MDL)

QUALITY CONTROL

GLOBAL ACCEPTANCE CRITERIA (GAC)

Accuracy: spike, lcs, crm general analytes 70% - 130% recovery
surrogate: phenol analytes 50% - 130% recovery
organophosphorous pesticide analytes 60% - 130% recovery
phenoxy acid herbicides, organotin 50% - 130% recovery

anion/cation bal: +/- 10% (0-3 meq/l),
+/- 5% (>3 meq/l)

Precision: method blank: not detected >95% of the reported EQL
duplicate lab 0-30% (>10xEQL), 0-75% (5-10xEQL)
RPD (metals): 0-100% (<5xEQL)
duplicate lab 0-50% (>10xEQL), 0-75% (5-10xEQL)
RPD: 0-100% (<5xEQL)

QUALITY CONTROL

ANALYTE SPECIFIC ACCEPTANCE CRITERIA (ASAC)

Accuracy: spike, lcs, crm analyte specific recovery data
surrogate: <3xsd of historical mean

Uncertainty: spike, lcs: measurement calculated from historical analyte specific control charts

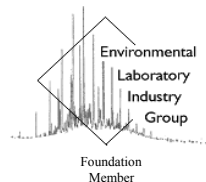
RESULT ANNOTATION

Data Quality Objective	s: matrix spike recovery	p: pending	bcs: batch specific lcs
Data Quality Indicator	d: laboratory duplicate	lcs: laboratory control sample	bmb: batch specific mb
Estimated Quantitation Limit	t: laboratory triplicate	crm: certified reference material	
not applicable	r: RPD relative % difference	mb: method blank	

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Laboratory Report: E046157

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NEPC GUIDELINE COMPLIANCE - DQO

1. GENERAL

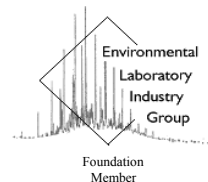
- A. Results relate specifically to samples as received. Sample results are not corrected for matrix spike, lcs, or surrogate recovery data.
- B. EQL's are matrix dependant and may be increased due to sample dilution or matrix interference.
- C. Laboratory QA/QC samples are specific to this project.
- D. Inter-laboratory proficiency results are available upon request. NATA accreditation details available at www.nata.asn.au.
- E. VOC spikes & surrogates added to samples during extraction, SVOC spikes & surrogates added prior to extraction.
- F. Recovery data outside GAC limits shall be investigated and compared to ASAC (historical mean +/- 3sd). If recovery data <20%, then the relevant results for that compound are considered not reliable.
- G. Recovery data (ms, surrogate, crm, lcs) outside ASAC limits shall initiate an investigative action. Anomalous QC data is examined in conjunction with other QC samples and a final decision whether to accept or reject results is provided by the professional judgement of the senior analyst. The USEPA-CLP National Functional Guidelines are referred to for specific recommendations.
- H. Extraction (preparation) date refers to the date that sample preparation was initiated. Note that certain methods not requiring sample preparation (eg. VOCs in water, etc) may report a common extraction and analysis date.
- I. LabMark shall maintain an official copy of this Certificate of Analysis for all traceable reference purposes.

2. CHAIN OF CUSTODY (COC) & SAMPLE RECEIPT NOTICE (SRN) REQUIREMENTS

- A. SRN issued to client upon sample receipt & login verification.
- B. Preservation & sampling date details specified on COC and SRN, unless noted.
- C. Sample Integrity & Validated Time of Sample Receipt (VTSR) Holding Times verified (preservation may extend holding time, refer to preservation chart).

3. NATA ACCREDITED METHODS

- A. NATA accreditation held for each in-house method and sample matrix type reported, unless noted below (Refer to subcontracted test reports for NATA accreditation status).
- B. NATA accredited in-house laboratory methods are referenced from NEPC, ASTM, modified USEPA / APHA documents. Corporate Accreditation No. 13542.
- C. Subcontracted analyses: Refer to Sample Receipt Notice and additional DQO comments.



Laboratory Report: E046157

Cover Page 3 of 3

4. QA/QC FREQUENCY COMPLIANCE TABLE SPECIFIC TO THIS REPORT

Matrix: **SOIL-LEACHATE**

Page:	Method:	Totals:	#d	%d-ratio	#t	#s	%s-ratio
1	TCLP Preparation	51	6	12%	0	4	8%
7	TCLP metals	51	6	12%	0	4	8%

GLOSSARY:

- #d number of discrete duplicate extractions/analyses performed.
- %d-ratio NEPC guideline for laboratory duplicates is 1 in 10 samples (min 10%).
- #t number of triplicate extractions/analyses performed.
- #s number of spiked samples analysed.
- %s-ratio USEPA guideline for laboratory matrix spikes is 1 in 20 samples (min 5%).

5. ADDITIONAL COMMENTS SPECIFIC TO THIS REPORT

A. All tests were conducted by LabMark Environmental Sydney, NATA accreditation No. 13542, unless indicated below.

Laboratory QA/QC data shall relate specifically to this report, and may provide an indication of site specific sample result quality. LabMark DOES NOT report NON-RELEVANT BATCH QA/QC data. Acceptance of this self assessment certificate does not preclude any requirement for a QA/QC review by a accredited contaminated site EPA auditor, when and wherever necessary. Laboratory QA/QC self assessment references available upon request.

Laboratory Report No: E046157
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09 Additional

Page: 1 of 13
plus cover page
Date: 29/12/09

Final
Certificate
of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		241998	242002	242003	242004	242005	242006	242007	242008	242009	242010
Sample Identification		401	402	403	404	405	406	501	502	503	504
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09	3/9/09	3/9/09	2/9/09
Laboratory Extraction (Preparation) Date		21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E019.2											
TCLP Preparation	EQL										
TCLP Fluid No.	--	2	2	1	2	2	2	2	2	2	2
Initial pH (pH units)	--	11.0	10.8	9.9	10.8	10.2	10.1	11.3	11.3	11.4	11.7
pH after HCl (pH units)	--	9.4	10.3	3.2	10.4	11.0	6.9	11.6	11.6	11.6	11.8
Final pH (pH units)	--	5.4	5.3	6.6	5.1	7.1	6.4	11.1	11.2	10.5	10.5

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached for 18 hours with fluid as specified above . Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

Laboratory Report No: E046157
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09 Additional

Page: 2 of 13
plus cover page
Date: 29/12/09

Final
Certificate
of Analysis

This report supercedes reports issued on: N/A

Laboratory Identification		242011	242012	242013	242014	242015	242016	242017	242018	242019	242020
Sample Identification		505	506	801	802	803	601	602	603	604	605
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/9/09	2/9/09	3/9/09	3/9/09	3/9/09	13/8/09	13/8/09	13/8/09	18/8/09	18/8/09
Laboratory Extraction (Preparation) Date		21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E019.2											
TCLP Preparation	EQL										
TCLP Fluid No.	--	2	2	2	2	2	2	2	2	2	2
Initial pH (pH units)	--	11.6	11.7	11.2	11.3	11.1	10.6	10.6	10.5	10.2	10.9
pH after HCl (pH units)	--	11.8	11.1	11.2	11.2	11.4	9.9	9.8	9.2	9.0	9.9
Final pH (pH units)	--	10.8	10.5	11.0	7.2	8.5	6.5	6.4	6.4	5.0	5.3

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached for 18 hours with fluid as specified above . Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

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Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
Client Reference: MCDS/09 Additional

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This report supercedes reports issued on: N/A

Laboratory Identification		242021	242022	242023	242024	242025	242026	242027	242028	242029	242030
Sample Identification		606	607	608	609	613	614	615	616	617	618
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		18/8/09	19/8/09	19/8/09	19/8/09	4/8/09	4/8/09	4/8/09	10/9/09	10/9/09	10/9/09
Laboratory Extraction (Preparation) Date		21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E019.2											
TCLP Preparation	EQL										
TCLP Fluid No.	--	2	2	2	2	2	2	2	1	1	1
Initial pH (pH units)	--	10.6	10.7	10.9	10.6	10.6	10.1	10.2	10.1	10.2	8.4
pH after HCl (pH units)	--	8.6	9.5	8.9	7.1	7.6	7.4	6.9	3.7	3.5	3.5
Final pH (pH units)	--	5.0	4.9	5.0	4.9	4.8	5.0	4.8	6.0	5.8	5.8

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached for 18 hours with fluid as specified above . Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

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This report supercedes reports issued on: N/A

Laboratory Identification		242031	242032	242033	242034	242035	242036	242037	242038	242039	242040
Sample Identification		701	702	703	704	705	706	707	708	709	710
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		13/8/09	13/8/09	13/8/09	13/8/09	18/9/09	18/9/09	19/8/09	19/8/09	19/8/09	4/8/09
Laboratory Extraction (Preparation) Date		21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E019.2											
TCLP Preparation	EQL										
TCLP Fluid No.	--	2	2	2	2	1	1	2	2	1	2
Initial pH (pH units)	--	9.1	10.3	10.3	10.4	10.1	10.2	10.5	10.5	10.4	10.2
pH after HCl (pH units)	--	9.8	9.9	9.5	9.0	4.1	4.8	9.8	5.8	4.1	5.5
Final pH (pH units)	--	6.8	6.6	6.8	5.6	8.4	9.1	5.1	5.4	8.6	6.0

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached for 18 hours with fluid as specified above . Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

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This report supercedes reports issued on: N/A

Laboratory Identification		242041	242042	242043	242044	242045	242046	242047	242048	242049	242050
Sample Identification		711	712	713	714	715	901	902	903	904	905
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		4/8/09	4/8/09	10/9/09	10/9/09	10/9/09	21/8/09	21/8/09	21/8/09	21/8/09	21/8/09
Laboratory Extraction (Preparation) Date		21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09	21/12/09
Laboratory Analysis Date		--	--	--	--	--	--	--	--	--	--
Method : E019.2											
TCLP Preparation		EQL									
TCLP Fluid No.	--	2	1	1	1	1	1	1	1	2	2
Initial pH (pH units)	--	10.2	10.5	10.1	9.1	9.2	9.0	8.8	8.7	12.1	12.2
pH after HCl (pH units)	--	6.4	4.3	3.1	3.8	3.4	3.3	3.1	3.0	12.2	12.2
Final pH (pH units)	--	5.9	9.5	5.3	4.9	4.3	3.6	3.7	3.6	6.8	11.3

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached for 18 hours with fluid as specified above . Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

Laboratory Report No: E046157
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Laboratory Identification		242051									
Sample Identification		906									
Depth (m)		--									
Sampling Date recorded on COC		21/8/09									
Laboratory Extraction (Preparation) Date		21/12/09									
Laboratory Analysis Date		--									
Method : E019.2											
TCLP Preparation	EQL										
TCLP Fluid No.	--	2									
Initial pH (pH units)	--	12.2									
pH after HCl (pH units)	--	12.2									
Final pH (pH units)	--	10.9									

Results expressed in pH units unless otherwise specified

Comments:

E019.2: Soil leached for 18 hours with fluid as specified above . Refer to relevant water method for results. TCLP preparation is equivalent to AS4439.3 (also known as ASLP).

Laboratory Report No: E046157
Client Name: Australasian (Iron & Steel) Slag Assoc.
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This report supercedes reports issued on: N/A

Laboratory Identification		241998	242002	242003	242004	242005	242006	242007	242008	242009	242010
Sample Identification		401	402	403	404	405	406	501	502	503	504
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		3/9/09	3/9/09	3/9/09	2/9/09	2/9/09	2/9/09	3/9/09	3/9/09	3/9/09	2/9/09
Laboratory Extraction (Preparation) Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Laboratory Analysis Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Method : E022.1											
TCLP metals	EQL										
Chromium	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Molybdenum	10	<10	<10	<10	<10	<10	<10	--	--	--	--
Nickel	50	--	--	--	--	--	--	340	370	310	320
Zinc	50	<50	<50	<50	50	<50	<50	<50	<50	<50	<50

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

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Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
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This report supercedes reports issued on: N/A

Laboratory Identification		242011	242012	242013	242014	242015	242016	242017	242018	242019	242020
Sample Identification		505	506	801	802	803	601	602	603	604	605
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		2/9/09	2/9/09	3/9/09	3/9/09	3/9/09	13/8/09	13/8/09	13/8/09	18/8/09	18/8/09
Laboratory Extraction (Preparation) Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Laboratory Analysis Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Method : E022.1											
TCLP metals	EQL										
Chromium	50	<50	<50	<50	<50	<50	<50	<50	<50	790	730
Copper	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Lead	10	--	--	<10	<10	<10	--	--	--	--	--
Molybdenum	10	--	--	--	--	--	40	40	40	10	10
Nickel	50	310	330	230	200	210	220	230	210	120	200
Zinc	50	<50	<50	<50	<50	<50	620	490	470	570	760

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

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This report supercedes reports issued on: N/A

Laboratory Identification		242021	242022	242023	242024	242025	242026	242027	242028	242029	242030
Sample Identification		606	607	608	609	613	614	615	616	617	618
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		18/8/09	19/8/09	19/8/09	19/8/09	4/8/09	4/8/09	4/8/09	10/9/09	10/9/09	10/9/09
Laboratory Extraction (Preparation) Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Laboratory Analysis Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Method : E022.1											
TCLP metals	EQL										
Chromium	50	670	1060	710	490	360	640	490	<50	<50	50
Copper	50	<50	<50	<50	60	<50	<50	<50	<50	<50	<50
Molybdenum	10	<10	<10	<10	<10	<10	<10	<10	20	20	20
Nickel	50	130	160	170	110	100	160	120	100	90	90
Zinc	50	300	410	250	320	270	3030	110	220	300	510

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

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Contact Name: Mona Forghani
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This report supercedes reports issued on: N/A

Laboratory Identification		242031	242032	242033	242034	242035	242036	242037	242038	242039	242040
Sample Identification		701	702	703	704	705	706	707	708	709	710
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		13/8/09	13/8/09	13/8/09	13/8/09	18/9/09	18/9/09	19/8/09	19/8/09	19/8/09	4/8/09
Laboratory Extraction (Preparation) Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Laboratory Analysis Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Method : E022.1											
TCLP metals	EQL										
Chromium	50	<50	<50	<50	100	50	140	560	500	<50	50
Copper	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Molybdenum	10	50	40	40	20	30	30	<10	<10	10	20
Nickel	50	220	240	220	160	90	90	150	160	110	190
Zinc	50	<50	120	160	750	<50	<50	810	770	<50	760

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

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This report supercedes reports issued on: N/A

Laboratory Identification		242041	242042	242043	242044	242045	242046	242047	242048	242049	242050
Sample Identification		711	712	713	714	715	901	902	903	904	905
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		4/8/09	4/8/09	10/9/09	10/9/09	10/9/09	21/8/09	21/8/09	21/8/09	21/8/09	21/8/09
Laboratory Extraction (Preparation) Date		22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09
Laboratory Analysis Date		22/12/09	22/12/09	22/12/09	23/12/09	23/12/09	23/12/09	23/12/09	23/12/09	23/12/09	23/12/09
Method : E022.1											
TCLP metals											
Chromium	EQL	70	<50	110	2400	1460	--	--	--	<50	<50
Copper	50	<50	<50	<50	50	<50	<50	<50	<50	<50	<50
Molybdenum	10	20	10	20	10	10	--	--	--	<10	<10
Nickel	50	200	100	70	90	60	--	--	--	210	250
Zinc	50	1970	<50	280	850	1080	<50	<50	<50	<50	<50

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

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This report supercedes reports issued on: N/A

Laboratory Identification		242051	241998d	241998r	242009d	242009r	242016d	242016r	242025d	242025r	242037d
Sample Identification		906	QC	QC	QC	QC	QC	QC	QC	QC	QC
Depth (m)		--	--	--	--	--	--	--	--	--	--
Sampling Date recorded on COC		21/8/09	--	--	--	--	--	--	--	--	--
Laboratory Extraction (Preparation) Date		22/12/09	22/12/09	--	22/12/09	--	22/12/09	--	22/12/09	--	22/12/09
Laboratory Analysis Date		23/12/09	22/12/09	--	22/12/09	--	22/12/09	--	22/12/09	--	22/12/09
Method : E022.1											
TCLP metals	EQL										
Chromium	50	<50	<50	--	<50	--	<50	--	360	0%	560
Copper	50	50	<50	--	50	>0%	<50	--	<50	--	<50
Molybdenum	10	<10	<10	--	--	--	40	0%	<10	--	<10
Nickel	50	310	--	--	340	9%	220	0%	100	0%	150
Zinc	50	<50	<50	--	<50	--	610	2%	260	4%	810

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

Laboratory Report No: E046157
Client Name: Australasian (Iron & Steel) Slag Assoc.
Contact Name: Mona Forghani
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Laboratory Identification		242037r	242049d	242049r	242002s	242026s	242050s	242010s	lcs	mb	
Sample Identification		QC	QC	QC	QC	QC	QC	QC	QC	QC	
Depth (m)		--	--	--	--	--	--	--	--	--	
Sampling Date recorded on COC		--	--	--	--	--	--	--	--	--	
Laboratory Extraction (Preparation) Date		--	22/12/09	--	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	22/12/09	
Laboratory Analysis Date		--	23/12/09	--	22/12/09	22/12/09	23/12/09	22/12/09	22/12/09	22/12/09	
Method : E022.1											
TCLP metals	EQL										
Chromium	50	0%	<50	--	86%	#	102%	85%	97%	<50	
Copper	50	--	<50	--	102%	90%	97%	105%	117%	<50	
Lead	10	--	--	--	--	--	--	--	96%	<10	
Molybdenum	10	--	<10	--	105%	110%	96%	--	111%	<10	
Nickel	50	0%	210	0%	--	87%	125%	100%	91%	<50	
Zinc	50	0%	<50	--	102%	#	97%	103%	100%	<50	

Results expressed in ug/l unless otherwise specified

Comments: # Percent recovery not available due to significant background levels of analyte in sample.

E022.1: Filtered TCLP leachate acidified with nitric/hydrochloric acid. Analysis by ICP/MS. Results are expressed as in the leachate.

Sample Receipt Notice (SRN) for E046157



Quality, Service, Support

Client Details		Laboratory Reference Information	
Client Name: Australasian (Iron & Steel) Slag Assoc. Client Phone: 02 4225 8466 Client Fax: 02 4228 1777 Contact Name: Mona Forghani Contact Email: mforghani@hbmgroup.com.au Client Address: PO Box 1194 Wollongong NSW 2500 Project Name: MCDS/09 Additional Project Number: - Not provided - CoC Serial Number: - Not provided - Purchase Order: - Not provided - Surcharge: No surcharge applied (results by 6:30pm on due date) Sample Matrix: SOIL		<div>Please have this information ready when contacting Labmark.</div> Laboratory Report: E046157 Quotation Number: Q0718.ES Laboratory Address: Unit 1, 8 Leighton Pl. Asquith NSW 2077 Phone: 61 2 9476 6533 Fax: 61 2 9476 8219 Sample Receipt Contact: Ros Schacht Email: Ros.Schacht@labmark.com.au Reporting Contact: Leanne Boag Email: leanne.boag@labmark.com.au	
Date Sampled (earliest date): 04/08/2009 Date Samples Received: 16/12/2009 Date Sample Receipt Notice issued: 16/12/2009 Date Preliminary Report Due: 30/12/2009 Client TAT Request Date: 30/12/2009		NATA Accreditation: 13542 TGA GMP License: 185-336 (Sydney) APVMA License: 6105 (Sydney) AQIS Approval: NO356 (Sydney) AQIS Entry Permit: 200521534 (Sydney)	

Reporting Requirements: Electronic Data Download required: No

Invoice Number: 09EA7454

Sample Condition: COC received with samples. Report number and lab ID's defined on COC.
Samples received in good order .
Samples received with cooling media: Fridge .
Samples received chilled.
Security seals not applicable. Samples in LabMark's custody .
Sample container & chemical preservation suitable .

Comments: Additional request from LabMark Job E045449.

Holding Times: Date received allows for sufficient time to meet Technical Holding Times.

Preservation: Chemical preservation of samples satisfactory for requested analytes.

Important Notes:

LabMark shall responsibly dispose of spent customer soil and water samples which includes the disintegration of the sample label. A sample disposal fee of \$1.00 is applicable on all samples received by the laboratory regardless of whether they have undergone analytical testing. Sample disposal of environmental samples shall be 31 days (water) and 3 months (soil, HN03 preserved samples) after laboratory receipt, unless otherwise requested in writing by the client. Samples requested to be held in non-refrigerated storage shall incur \$5.00/ sample/ 3 months. Additional refrigerated storage shall incur \$30/ sample/ 3 months. Combination prices apply only if requested. Transfer of report ownership from LabMark to the client shall occur once full and final payment has been settled and verified. All report copies may be retracted where full payment does not occur within the agreed settlement period.

Analysis comments:

Subcontracted Analyses:

Thank you for choosing Labmark to analyse your project samples.
Additional information on www.labmark.com.au

Sample Receipt Notice (SRN) for E046157



Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

GRID REVIEW TABLE				Requested Analysis															
No.	Date	Depth	Client Sample ID	TCLP metals	PREP Not Reported	PREP Not Reported	TCLP Preparation												
241998	03/09		401	●	●	●	●												
242002	03/09		402	●	●	●	●												
242003	03/09		403	●	●	●	●												
242004	02/09		404	●	●	●	●												
242005	02/09		405	●	●	●	●												
242006	02/09		406	●	●	●	●												
242007	03/09		501	●	●	●	●												
242008	03/09		502	●	●	●	●												
242009	03/09		503	●	●	●	●												
242010	02/09		504	●	●	●	●												
242011	02/09		505	●	●	●	●												
242012	02/09		506	●	●	●	●												
242013	03/09		801	●	●	●	●												
242014	03/09		802	●	●	●	●												
242015	03/09		803	●	●	●	●												
242016	13/08		601	●	●	●	●												
242017	13/08		602	●	●	●	●												
242018	13/08		603	●	●	●	●												
242019	18/08		604	●	●	●	●												
242020	18/08		605	●	●	●	●												
242021	18/08		606	●	●	●	●												
242022	19/08		607	●	●	●	●												
242023	19/08		608	●	●	●	●												
242024	19/08		609	●	●	●	●												
242025	04/08		613	●	●	●	●												
242026	04/08		614	●	●	●	●												
242027	04/08		615	●	●	●	●												
242028	10/09		616	●	●	●	●												
242029	10/09		617	●	●	●	●												
242030	10/09		618	●	●	●	●												
242031	13/08		701	●	●	●	●												
242032	13/08		702	●	●	●	●												

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Sample
Receipt
Notice (SRN) for **E046157**



Quality, Service, Support

The table below represents LabMark's understanding and interpretation of the customer supplied sample COC request (refer to SRN comments section on first page for external subcontracting method details). Please confirm that your COC request has been entered correctly. Due to THT and TAT requirements, testing shall commence immediately as per this table, unless the customer intervenes with a correction prior to testing.

[illegible]

'PREP Not Reported' refers to an internal laboratory instruction - client confirmation of this parameter is not required.

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Quality, Service, Support

No.	Date	Depth	Client Sample ID	Requested Analysis															
				MET-TCLP_W Chromium	MET-TCLP_W Copper	MET-TCLP_W Lead	MET-TCLP_W Molybdenum	MET-TCLP_W Nickel	MET-TCLP_W Zinc										
241998	03/09		401	●	●		●		●										
242002	03/09		402	●	●		●		●										
242003	03/09		403	●	●		●		●										
242004	02/09		404	●	●		●		●										
242005	02/09		405	●	●		●		●										
242006	02/09		406	●	●		●		●										
242007	03/09		501	●	●			●	●										
242008	03/09		502	●	●			●	●										
242009	03/09		503	●	●			●	●										
242010	02/09		504	●	●			●	●										
242011	02/09		505	●	●			●	●										
242012	02/09		506	●	●			●	●										
242013	03/09		801	●	●	●		●	●										
242014	03/09		802	●	●	●		●	●										
242015	03/09		803	●	●	●		●	●										
242016	13/08		601	●	●		●	●	●										
242017	13/08		602	●	●		●	●	●										
242018	13/08		603	●	●		●	●	●										
242019	18/08		604	●	●		●	●	●										
242020	18/08		605	●	●		●	●	●										
242021	18/08		606	●	●		●	●	●										
242022	19/08		607	●	●		●	●	●										
242023	19/08		608	●	●		●	●	●										
242024	19/08		609	●	●		●	●	●										
242025	04/08		613	●	●		●	●	●										
242026	04/08		614	●	●		●	●	●										
242027	04/08		615	●	●		●	●	●										
242028	10/09		616	●	●		●	●	●										
242029	10/09		617	●	●		●	●	●										
242030	10/09		618	●	●		●	●	●										
242031	13/08		701	●	●		●	●	●										
242032	13/08		702	●	●		●	●	●										
242033	13/08		703	●	●		●	●	●										

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Sample
Receipt
Notice (SRN) for **E046157**



Quality, Service, Support

				Requested Analysis																
				MET-TCLP_W Chromium	MET-TCLP_W Copper	MET-TCLP_W Lead	MET-TCLP_W Molybdenum	MET-TCLP_W Nickel	MET-TCLP_W Zinc											
No.	Date	Depth	Client Sample ID																	
242034	13/08		704	●	●		●	●	●											
242035	18/09		705	●	●		●	●	●											
242036	18/09		706	●	●		●	●	●											
242037	19/08		707	●	●		●	●	●											
242038	19/08		708	●	●		●	●	●											
242039	19/08		709	●	●		●	●	●											
242040	04/08		710	●	●		●	●	●											
242041	04/08		711	●	●		●	●	●											
242042	04/08		712	●	●		●	●	●											
242043	10/09		713	●	●		●	●	●											
242044	10/09		714	●	●		●	●	●											
242045	10/09		715	●	●		●	●	●											
242046	21/08		901		●				●											
242047	21/08		902		●				●											
242048	21/08		903		●				●											
242049	21/08		904	●	●		●	●	●											
242050	21/08		905	●	●		●	●	●											
242051	21/08		906	●	●		●	●	●											
Totals:				48	51	3	39	42	51											

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