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Project Applicant: **Scaw South Africa (Pty) Ltd**

Project: **Electrical Co-generation Power Plant and  
Ash Disposal Facility at Scaw Metals,  
Germiston**

Report Name: **ENVIRONMENTAL SCOPING REPORT**

Report Status: **(Final for Submission)**

Revision No: 01

Report Date: 10 October 2012

Report Number: S0445/SR01

Prepared by: Matthew Hemming

Reviewed by: Matthew Hemming

For Submission to: Department of Environmental Affairs (DEA): Integrated Permitting Systems, as part of the EIA process required in terms of in terms of the National Environmental Management Act, 1998 and the National Environmental Management: Waste Act, 2008  
AND  
Department of Environmental Affairs: Authorisation and Waste Disposal Management, as part of the EIA process required in terms of in terms of the National Environmental Management: Waste Act, 2008.

Reference No: DEA: 14/12/16/3/3/3/37 (Co-generation Power Plant)  
DEA: 12/9/11/L471/3/V1 (Amendment to Cell 4b Licence)  
DEA: 12/9/11/L895/3 (New Ash Disposal Facility)

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# PROJECT INFORMATION SHEET

## PROJECTS:

- 1) Development and Operation of Electrical Co-generation Power Plant at Scaw Metals
- 2) Ash disposal at Cell 4b of the Scaw Metals GLB+ Waste Disposal Site
- 3) Ash disposal to new Ash Disposal Facility at Scaw Metals

## COMPETENT AUTHORITIES:

### **Integrated Environmental Authorisation for Electrical Co-generation Power Plant:**

Department of Environmental Affairs (DEA)

Directorate: Environmental Impact Evaluation, Integrated Permitting Systems

Ref: 14/12/16/3/3/3/37

### **Atmospheric Emissions Licence for Electrical Co-generation Power Plant:**

Ekurhuleni Metropolitan Municipality

Ref: to be confirmed

### **Waste Management Licence for Ash Disposal Facilities:**

Department of Environmental Affairs (DEA)

Directorate: Authorisation and Waste Disposal Management

Ref: 12/9/11/L471/3/V1 and 12/9/11/L895/3

## REPORT DETAILS:

Report Name: **FINAL Environmental Scoping Report**

Report Number: S0445/SR01

Report Status: **for submission**

Revision No: 01

Date: **10 October 2012**

## PROJECT APPLICANT:

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6+ years' environmental management and assessment experience, specifically in the mining and infrastructure development sectors.

SO445/SR01

10 October 2012

**SCAW SOUTH AFRICA (PTY) LTD**  
**Electrical Co-generation Power Plant and Ash Disposal Facility**  
**at Scaw Metals, Germiston**  
**Environmental Scoping Report**  
**(Final)**

**EXECUTIVE SUMMARY**

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**Introduction to the Project**

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Scaw South Africa (Pty) Ltd owns and operates the Scaw Metals facility at Union Junction in Germiston. Scaw Metals produces a range of products from the recycling of scrap steel and iron ore. The Scaw Metals facility has a number of components, including the Directly Reduced Iron Plant (DRI) that produces up to 1050 tons of iron per day from three (3) kilns. Each of the DRI kilns uses ore, dolomite, coal and natural gas as a feedstock. The outputs from the DRI process include coal dust and char (devolatilised coal) and exhaust gas. A portion of scrap material received at Scaw Metals is processed through a shredder plant to remove non-ferrous material. The non-ferrous material includes a metallic stream and a combustible component. These resources, which contain energy, are currently reused, disposed to landfill or released to the atmosphere in terms of permits.

Scaw South Africa has proposed the development of an Electrical Co-generation Power Plant at Scaw Metals. The current conceptual design of the Plant consists of two interlinked phases that can be executed independently of each other. The Plant will make use of the energy contained in the DRI output streams and the combustible component of the shredder waste to generate approximately 68 MW of electricity. The electricity will be utilised primarily by Scaw Metals, but may be available to the grid during low-load periods. The project will improve the overall energy efficiency of Scaw, reduce the emissions footprint for the site, and improve the security of supply. The Co-generation Power Plant may qualify as a Clean Development Mechanism (CDM) project under the Kyoto Protocol.

The Electrical Co-generation Power Plant will trigger a number of activities listed in terms of the National Environmental Management Act, 1998, the National Environmental Management: Waste Act, 2008 and the National Environmental Management: Air Quality Act, 2004. Such listed activities cannot be undertaken without approval from the competent authorities. A scoping and environmental impact assessment process, as stipulated in the Environmental Impact Assessment Regulations (GN R543, 18 June 2010) is required to support the applications for environmental authorisation, waste management licence and atmospheric emissions licence.

Additionally, Phase 2 of the Co-generation Power Plant will produce ash during the combustion process. The ash will require disposal at a licensed waste management facility. Scaw South Africa is currently investigating the feasibility of ash disposal at Cell 4b of the Scaw Metals GLB+ Waste Disposal Facility or the development of a new Ash Disposal Facility.

The disposal of waste to land is a listed activity in terms of the National Environmental Management: Waste Act, 2008 and may not be undertaken without approval from the competent authority. A scoping and environmental impact assessment process, as stipulated in the Environmental Impact Assessment Regulations (GN R543, 18 June 2010) is required to support the application for a waste management licence.

The purpose of this scoping report is to identify the environmental impacts associated with the proposed development of the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw and to present the 'plan of study' for the environmental impact assessment for both.

## **Environmental Legal Requirements and Responsible Authorities**

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Synergistics Environmental Services (Pty) Ltd was appointed by Scaw South Africa as independent environmental assessment practitioner (EAP) to undertake the necessary environmental work to meet the requirements of informing:

### **Integrated Environmental Authorisation**

As the Electrical Co-generation Power Plant requires approval under both the NEMA and NEMWA and the Department of Environmental Affairs is the competent authority under both Acts, an application has been made for an Integrated Environmental Authorisation.

### **Atmospheric Emissions Licence**

Required for phase 1 and phase 2 of the Electrical Co-generation Power Plant. The Ekurhuleni Metropolitan Municipality will administrate the application for the Atmospheric Emissions Licence required in terms of the NEMAQA.

### **Waste Management License(s)**

Both alternatives for ash disposal require a waste management licence in terms of the NEMWA. Applications have been made to amend the waste management licence for the existing Cell 4b and for the development of a new Ash Disposal Facility. The DEA will administrate the applications for waste management licences in terms of the NEMWA and EIA Regulations.

In accordance with EIA sub regulation 28(1f) of GN R 543, all legislation and guidelines that have been considered in the preparation of the scoping report are documented.

## **Structure of the Scoping Report and Study Approach and Methodology**

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The scoping report is structured in accordance with GNR 543 (June 2010) and includes the consolidated results of the public participation and authority consultation processes conducted to date. Table 6 (see main report) provides a summary of the requirements of GNR 543, with cross references to the report sections where these requirements have been addressed.

## Study Objectives

The specific objectives for the scoping phase of the EIA process are to:

- Collate project and baseline environmental information.
- Identify landowners, adjacent landowners, local authorities, environmental authorities, as well as other stakeholders which may be affected by, or that may have an interest in the environmental impacts of the project.
- Inform interested and affected parties (IAPs) about the proposed project.
- Document key I&AP issues and concerns for consideration in the EIA phase.
- Engage with environmental authorities and confirm legal and administrative requirements.
- Identify and describe potential environmental issues associated with the relocation of the rail infrastructure.
- Introduce and evaluate the alternative options at desktop level.
- Identify the nature and extent of further investigations and specialist input required in the EIA phase.

## Baseline information

Baseline information for this scoping report was gathered through visual inspections of the project area and surroundings, desktop studies and review of existing reports.

## Public Participation and Authority Consultation Process

The scoping report provides details of the public participation process followed to date, which included:

- Press advertisements and site notices;
- Identification of interested and affected parties;
- Notification and information document to interested and affected parties;
- Notifications to relevant authorities;
- Registration of interested and affected parties;
- Announcement of public meetings;
- Public meeting on 13 June 2012;
- Receipt of issues and responses from IAPs;
- Focussed authority meetings with DEA, EMM and DWA; and
- **Public and Authority review of the Draft scoping Report.**

## Review of the Draft Scoping Report

The draft scoping report was made available for public and authority review in September 20102. Comments submitted by registered IAPs on the draft scoping report are included in the final scoping report. **Following closure of the review period, the scoping report was updated and the final scoping report was produced for submission and consideration by the competent authorities.**

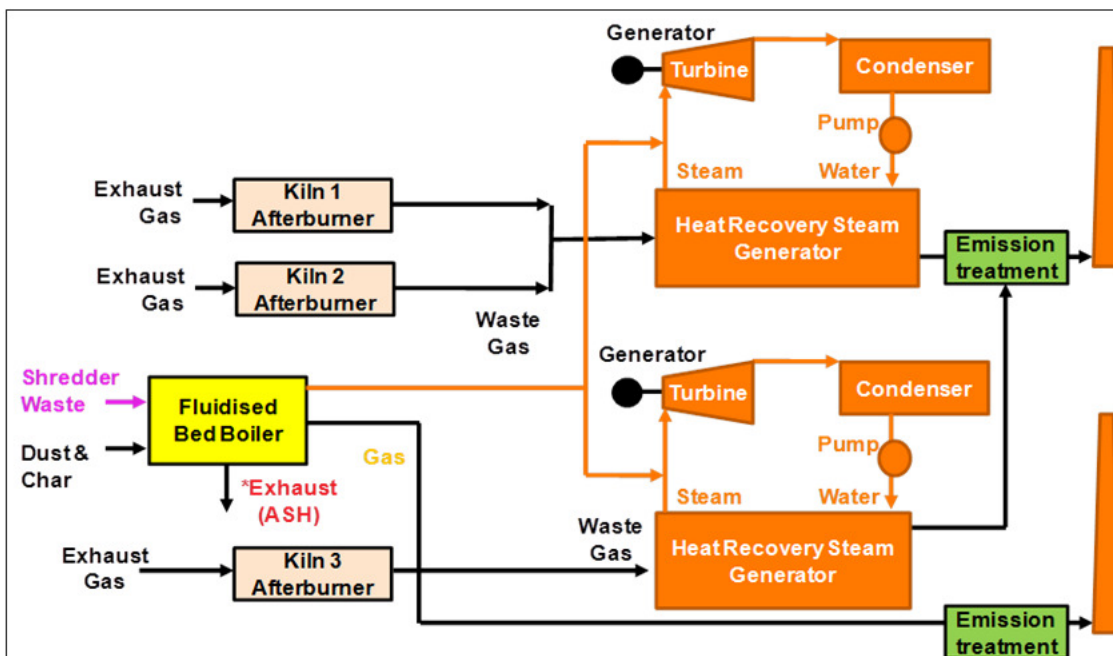
## Project Description: Electrical Co-Generation Power Plant

The Electrical Co-generation Power Plant will utilise energy contained in the DRI output streams and the combustible component of the shredder waste to generate approximately 68 MW of electricity that will be utilised at Scaw Metals. The project will improve the overall energy efficiency of the Scaw Metals Union Junction facility and reduce the emissions footprint for the site. The generation of electricity will improve security of supply, provide electrical capacity for expansion, reduce the amount of electricity required from Eskom and enable Eskom to supply other customers.

A number of alternative technologies and configurations were investigated for the Co-generation Power Plant. The preferred process design will produce up to 68 MW of electricity and can be executed in two interlinked phases that can be executed independently. The Co-generation Power Plant will be located on a site immediately north of the DRI plant and integrated with the DRI infrastructure.

Phase 1: High temperature exhaust gas from the three DRI Kilns will be captured from the current process (post after-burners) and passed through Heat Recovery Steam Generators (HRSG). The Heat Recovery Steam Generators recover heat from the exhaust gas and generates steam. The steam generated in the process will be used to drive the turbine of a Generator which will generate electricity. An air-cooled Condenser will cool the steam after use and enable its re-use. The exhaust gas will pass through a new bag-house before exiting through a new Stack. The HRSG will be designed to operate with varied availability of the DRI Kilns. If the HRSG or Generator are offline then the exhaust gas from the DRI kilns will revert to the existing DRI stack. Atmospheric emissions will lower than the limits set in the NEMAQA for DRI kilns.

Phase 2: A Fluidised Bed Boiler (FBB) will be installed to combust Dust and Shredder waste from the Scrap metal shredder plant (alternative fuels and raw materials) as well as char\*. Natural gas and coal may also be considered as supplementary fuels for the FBB. The heated flue gas will be passed through a Heat Recovery Steam Generator to generate steam. The steam generated will be used to drive the turbine of a Generator which will generate electricity. An air-cooled Condenser cools the steam after use and enable its re-use. The exhaust gas will pass through a dedicated bag-house before exiting through a stack. Various operational and emissions control technologies will be employed to achieve emissions lower than the limits set in the NEMAQA for waste incineration.



**Proposed Process Flow for the Scaw Co-generation Facility**

The electricity produced from both phases of the proposed Co-generation Power Plant will be consumed by operations at the Scaw Union Junction facility. At certain low-load periods excess electricity (if any) may be sold to the National grid.

## Project Description: Ash Disposal Facility

Phase 2 of the Electrical Co-generation Power Plant will combust various wastes, by-products and other energy containing resources. The combustion will generate ash which will require disposal. The current configuration of the plant is anticipated to produce ~ 300 t of ash per day. Because the carbon fraction has been burned out of the waste streams, the volume of ash generated will be 50% - 70% of the wastes that are currently disposed. The bag-houses on both Phase 1 and Phase 2 of the Electrical Co-generation Power Plant will produce fine dusts that require disposal.

Scaw South Africa has proposed to make use of an internally owned and operated facility for the disposal of the waste generated at the Electrical Co-generation Power Plant. Scaw are considering two options for waste disposal including the existing Cell 4b at the Scaw Metals GLB+ Waste Disposal Site or a purpose-built Ash Disposal Facility. Cell 4b may not be able to receive ash and dusts from the Electrical Co-generation Power Plant, either because of the classification of the waste or because of capacity constraints or both. Scaw South Africa has thus proposed the development of a new Ash Disposal Facility at Scaw Metals.

The new Ash Disposal Facility will be designed to cater for the disposal of all ash from the FBB for the proposed life of the Electrical Co-generation Power Plant. The ash is being subjected to waste classification studies which will inform the design of the waste site. The lining system will be in accordance with the Minimum Requirements Guideline Series (2<sup>nd</sup> Edition, DWAF 1998). It is proposed to locate the Ash Disposal Facility to the north east of the DRI Plant and south of Dekema Raod. The Ash Disposal Facility will cover a footprint of approximately 17 ha and be constructed to a final height of 25 m above natural ground level. The side walls will be benched and sloped to 1:3. The Ash Disposal Facility will provide for approximately 1.7 million m<sup>3</sup> of airspace and is primarily for the disposal of ash from the Co-generation Power Plant. The facility may also receive other Scaw production wastes currently disposed to Cell 4b at various times.

## Description of the Affected Environment

The baseline environment described in the scoping report represents the current environmental conditions of the Scaw Metals, Union Junction area. It is indicative of pollution and degradation due to Scaw Metals operations, human, agricultural and industrial activities in the area and naturally occurring phenomena. Baseline information was sourced from desktop studies, site inspections and from on-going monitoring completed at the site. The baseline information serves as a reference point to scientifically measure or professionally judge future changes to the environment that may occur with the development of the Electrical Co-generation Power Plant or Ash Disposal Facility at Scaw Metals.

## Issued Raised During Consultation with Interested and Affected Parties

Questions and issues raised by IAPs during the scoping phase are listed in Table 9 in the main report. Very few IAPs have responded thus far. The most prominent question related to the potential effects of the Co-generation Power Plant on air quality from emissions to atmosphere. Air quality (dust and emissions) is a concern to people living in the area. What emissions will the facility have and how will these be managed?

Comments by IAPs on the draft scoping report were mostly related to the need to adequately assess and address the potential air quality impacts from the ash disposal facility.

## Environmental Impacts and EIA Tasks

The report provides a scoping-level identification of potential environmental impacts (physical, biological, social and economic) associated with the proposed Electrical Co-generation Power Plant and Ash Disposal Facility as well as a strategy of how these impacts will be assessed further in the EIA phase. The key impacts of the Co-generation Power Plant may include:

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>NOISE</b>		
<ul style="list-style-type: none"> <li>Increase in ambient noise levels.</li> <li>Change in type and or distribution of noise</li> <li>Disturbances to sensitive receptors.</li> </ul>	<ul style="list-style-type: none"> <li>Movement of vehicles, machinery and mechanical equipment during construction.</li> <li>Plant operation and specific actions such as steam release.</li> </ul>	<ul style="list-style-type: none"> <li><b>Specialist noise opinion OR assessment</b> to determine the impact of noise on receptors for operations.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>AIR QUALITY</b>		
<ul style="list-style-type: none"> <li>Change in particulate emissions (dust, PM10 and PM 2.5).</li> <li>Fallout dust nuisance.</li> <li>Change in emissions of SO<sub>x</sub>, NO<sub>x</sub> and other gases</li> <li>Impact on ambient air quality.</li> <li>Health impacts due to emissions</li> </ul>	<ul style="list-style-type: none"> <li>Dust generation during construction.</li> <li>Change in particulate and gaseous emissions from DRI stack as a result of phase 1.</li> <li>Potential additional emissions from combustion in FBB during phase 2.</li> </ul>	<ul style="list-style-type: none"> <li><b>Specialist air quality impact assessment</b> to determine the emissions sources, model the emissions, define a dispersion plume and assess impacts on ambient air quality and identified receptors.</li> <li>Plant design and emissions controls to ensure emissions comply with standards or better.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>SOCIAL &amp; ECONOMIC ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Economic benefits</li> </ul>	<ul style="list-style-type: none"> <li>Job creation, employment and skills development (construction and operation).</li> <li>Use of local service providers.</li> </ul>	<ul style="list-style-type: none"> <li>No investigation required.</li> </ul>
<ul style="list-style-type: none"> <li>Impacts on power generation and supply of power to/from the national electricity grid.</li> </ul>	<ul style="list-style-type: none"> <li>Increased security of electrical supply at Scaw.</li> <li>Possibility of additional supply for expansion projects at Scaw.</li> <li>Availability of additional electricity on the Eskom grid.</li> <li>Reduced carbon emissions of electricity generated by the project</li> </ul>	<ul style="list-style-type: none"> <li>Compare carbon footprint of projects energy generation with Eskom supplied electricity.</li> </ul>
<ul style="list-style-type: none"> <li>Impacts on neighbours and landowners.</li> </ul>	<ul style="list-style-type: none"> <li>Cumulative social impacts due to noise, visual impacts, dust and air quality risks.</li> </ul>	<ul style="list-style-type: none"> <li><b>Noise, air quality and groundwater specialist assessments</b> to identify potential impacts on adjacent receptors.</li> <li>Identify measures to safeguard neighbours and landowners from project risks.</li> <li>Mitigation measures to be included in EMP.</li> </ul>



The key impacts of the Ash Disposal Facility may include:

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>AIR QUALITY</b>		
<ul style="list-style-type: none"> <li>Change in particulate emissions (dust, PM10 and PM 2.5).</li> <li>Fallout dust nuisance.</li> <li>Impact on ambient air quality.</li> <li>Health impacts due to emissions</li> </ul>	<ul style="list-style-type: none"> <li>Dust generation during construction.</li> <li>Dust generation during material handling and ash disposal.</li> </ul>	<ul style="list-style-type: none"> <li><b>Specialist air quality impact assessment</b> to determine the emissions sources, model the emissions, define a dispersion plume and assess impacts on ambient air quality and identified receptors.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>GEOLOGY AND SOILS</b>		
<ul style="list-style-type: none"> <li>Loss of soil as vegetation growth medium.</li> <li>Loss of soil productivity.</li> <li>Contamination of soils.</li> <li>Dolerites pose risk to ground stability</li> </ul>	<ul style="list-style-type: none"> <li>Earthworks and grading to allow for the establishment of infrastructure.</li> <li>Compaction of soils.</li> <li>Spillages of contaminants during construction and operations.</li> <li>Sink hole formation</li> </ul>	<ul style="list-style-type: none"> <li><b>Specialist Geotechnical Assessment</b> to determine ground and soil conditions.</li> <li>Review of geological information for Dolerite Risk Assessment.</li> <li>Salvaging of all useable topsoil.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>SURFACE WATER</b>		
<ul style="list-style-type: none"> <li>Contamination of surface water resources.</li> </ul>	<ul style="list-style-type: none"> <li>Dispersion of sediments and contaminants during construction.</li> <li>Spillage of ash during transport.</li> <li>Runoff from ash disposal areas.</li> </ul>	<ul style="list-style-type: none"> <li>Management of storm water during construction.</li> <li>Design of storm water management for ash disposal site.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>GROUNDWATER</b>		
<ul style="list-style-type: none"> <li>Contamination of groundwater resources.</li> </ul>	<ul style="list-style-type: none"> <li>Transport of soluble contaminants from the ash to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li><b>Specialist hydrogeological impact assessment</b> to determine the contaminant sources, model the dispersion plume and assess impacts on groundwater quality and identified receptors.</li> <li><b>Conceptual design of landfill liner</b> and protective measures in terms of the Minimum Requirements.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>SOCIAL &amp; ECONOMIC ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Impacts on neighbours and landowners.</li> </ul>	<ul style="list-style-type: none"> <li>Cumulative social impacts due to noise, visual impacts, dust and air quality risks.</li> </ul>	<ul style="list-style-type: none"> <li><b>Noise, air quality and groundwater specialist assessments</b> to identify potential impacts on adjacent receptors.</li> <li>Identify measures to safeguard neighbours and landowners from project risks.</li> <li>Mitigation measures to be included in EMP.</li> </ul>
<b>VISUAL ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Changes to landscape character, visual appeal and sense of place of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of construction vehicles, equipment and machinery in the landscape during construction.</li> <li>Presence of additional waste disposal facility.</li> </ul>	<ul style="list-style-type: none"> <li>Given industrial setting, impact likely to be of very low significance. No investigation considered necessary.</li> </ul>

## Plan of Study for Environmental Impact Assessment

This plan of study for EIA, Section 9 of the main report, includes a description of the EIA process and tasks, specialist studies and consultation to be undertaken during the EIA phase of Electrical Co-generation Power Plant and Ash Disposal Facility environmental studies as well as an proposed impact assessment methodology and impact assessment and rating criteria.

### EIA Process

The EIA process has been developed to ensure that it complies with GNR 543 Section 26 to 33 and the associated guidelines. The proposed EIA process and public consultation activities are illustrated below, with specific reference to the opportunities for consultation.

Project Phase	Opportunities for Participation by Competent Authorities, IAPs, State Departments and Organs of State	Schedule
Scoping	Receive comment on the Draft Scoping Report Update Scoping report Submit Final scoping Report to Authorities Make Final Report available to IAPS for comment Authorities to Accept Scoping Report and Plan of study	Current to end September October  December 2012
	Undertake EIA as per approved plan of study Undertake Specialist studies Assess impacts and determine management measures. Compile EIA and EMP report Make draft EIA and EMP report available for public review Host EIA feedback meeting Receive comment on the Draft EIA and EMP Report Update EIA and EMP report. Submit Final EIA and EMP Report to Authorities Make Final Report available to IAPS for comment	October  December 2012 January 2013 February February March  April 2013
Approval	Authority to review information in EIA and EMP Authority to issue decision Notify IAPs of decision and Appeal Process	April 2013

### Methodology

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project.

The EIA will consider current impacts, incremental impacts of the project and the incremental impacts. The significance of impacts will be evaluated through a rating system that considers the intensity, duration, frequency, extent and probability of each impact.

### Specialist Studies

Specialist input and studies will be conducted for the following environmental components:

- Air Quality Impact Assessment of the Co-generation Power Plant and Ash Disposal Facility
- Noise Impact Opinion or Assessment
- Geotechnical Assessment of the ash disposal site
- Geohydrological Impact Assessment for the Ash Disposal Facility
- Detailed Conceptual design of the Ash Disposal Facility

The scope of work for these studies are outlined in the main report.

## Study Team

Synergistics Environmental Services (Pty) Ltd (Synergistics) is appointed by Scaw South Africa as independent environmental practitioner to undertake the EIA for the Electrical Co-generation Power Plant and Ash Disposal Facility. Airshed Planning Professionals have been appointed to complete the Air Quality Impact Assessment while Jeffares & Green are appointed to do the geotechnical investigation, the geohydrological Impact Assessment and to provide the conceptual engineering design of the Ash Disposal Facility. A full list of the study team and specialists, with qualifications and role in the project are provided in the main report (Table 15).

## EIA and EMP Report

The EIA Report will be structured in terms of Section 31 of GNR 543. It is anticipated that separate EIA reports will be developed for the Electrical Co-generation Power Plant and Ash Disposal Facility. Separate reports are proposed so that sufficient detail and information can be provided and assessed for each of the facilities.

A draft EMP will be submitted as a supporting part of the EIA Report. The EMP will provide recommendations on how to construct, operate and maintain the Electrical Co-generation Power Plant and Ash Disposal Facility and associated infrastructure. Once approved by the relevant authorities, the provisions of the EMP are legally binding on the project applicant and all its contractors and suppliers.

## Consultation Process

The following opportunities will be provided to IAPs, relevant State Departments and Organs of State for input into the EIA process:

- On-going submission of questions and comment
- Public Feedback Meeting during EIA
- Consultation with Competent Authority, State Departments and Organs of State
- Public Review of the draft and final EIA Report

## Conclusions and Key Findings

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This report concludes the scoping phase of the environmental assessment for the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw Metals. It outlines the results of the public participation and authority consultation processes to date, and defines the Plan of Study for the Environmental Impact Assessment phase.

The Electrical Co-generation Power Plant will have benefits in generating significant amounts of electricity from a variety of energy containing materials and waste streams. Generating electricity from these resources will reduce electricity costs, improve the security of electrical supply, improve energy efficiency and reduce the carbon footprint per unit production at Scaw Metals. The most significant risk of the Electrical Co-generation Power Plant, as raised by responding IAPS and identified by the EAP, is potential effects on air quality from emissions to atmosphere. Phase 1 of the project is likely to function as a 'cleaner technology' project and could reduce atmospheric emissions over current levels. However, Phase 2 requires combustion of energy containing materials and waste and could result in altered or increased emissions to atmosphere. The Air Quality Impact Assessment will be key to predicting the pollutant dispersion concentrations, defining the dust nuisance and health impact areas and determining the required emissions control measures. The project team are investigating various emissions control technologies for the two phases of the project in order that the Electrical Co-generation Power Plant operates within the atmospheric emissions limits set by the National Environmental Management Air Quality Act. If the project can achieve the emissions limits set then the air quality impacts will likely be within the acceptable range.

Ash and bag house dust generated from Phase 2 of the Co-generation Power Plant will require disposal. A preferred site for the Ash Disposal Facility has been identified at the Scaw Metals facility. The project team are facilitating the classification of the ash in terms of the currently endorsed waste classification system. There may be risks to surface and groundwater during the disposal as the ash is potentially hazardous waste. Independent experts will undertake a geotechnical investigation of the site and complete a geohydrological impact assessment of the waste disposal. The ash disposal facility will be designed by experienced engineers with due consideration of the waste classification, geotechnical conditions and the geohydrological setting. Material handling and ash disposal could result in dust generation. The Air Quality Impact Assessment will also consider the potential nuisance and health risks arising from disposal to the Ash Disposal Facility.

There have been no fatal flaws identified during the scoping phase and the project will proceed to the EIA phase. The next step will be to conduct the specialist studies and further consultation processes that will inform the EIA and authority decision-making process. Additional impacts/issues identified during the EIA phase will be addressed accordingly. Separate EIA Reports will be produced for each of the Electrical Co-generation Power Plant and Ash Disposal Facility. The EIA reports will incorporate an environmental management programme that will set out the management and mitigation measures required at each facility to ensure that potential impacts are managed to an acceptable level.

It is deemed that the environmental process followed to date meets the requirements of the legislation to ensure that the regulatory authorities receive sufficient information to enable an informed decision to accept the scoping report and approve the plan of study for EIA as outlined in Section 9 of this report.

**SCAW SOUTH AFRICA (PTY) LTD**  
**Electrical Co-generation Power Plant and Ash Disposal Facility**  
**at Scaw Metals, Germiston**  
**Environmental Scoping Report**  
**(Final)**

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Appendix A:	Public Consultation Documentation
Appendix B:	Authority Documentation

## TERMS AND ABBREVIATIONS

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~	Approximately
<b>AEL</b>	Atmospheric Emissions Licence
<b>AFR</b>	Alternative Fuels and Resources
<b>Airspace</b>	Capacity of a landfill site in cubic metres.
<b>DEA</b>	Department of Environmental Affairs
<b>DWA</b>	Department of Water Affairs
<b>EAL</b>	Environment Assessment Level
<b>EAP</b>	Environmental Assessment Practitioner
<b>ECA</b>	Environment Conservation Act 73 of 1989
<b>EIA</b>	Environmental Impact Assessment
<b>EMM</b>	Ekurhuleni Metropolitan Municipality
<b>EMP</b>	Environmental Management Programme
<b>EPA</b>	United States Environmental Protection Agency
<b>G</b>	General Waste
<b>GDARD</b>	Gauteng Department of Agriculture and Rural Development
<b>GN</b>	Government Notice
<b>H</b>	Hazardous waste
<b>hazardous waste</b>	Waste, which even in low concentrations, can have significant adverse effects on public health and or the environment
<b>H:h</b>	Rating of a disposal facility where waste of a moderate or low hazard rating may be disposed.
<b>IAP</b>	Interested and Affected Parties
<b>kl</b>	Kilo-litres
<b>km</b>	Kilometre
<b>m</b>	Metre
<b>m<sup>3</sup></b>	cubic metre
<b>mamsl</b>	Metres above mean sea level
<b>NEMA</b>	National Environment Management Act, 1998 (Act No. 107 of 1998)

<b>NEM:AQA</b>	National Environment Management: Air Quality Act, 2004 (Act No. 39 of 2004)
<b>NEM:WA</b>	National Environment Management: Waste Act, 2008 (Act No 59 of 2008)
<b>NMOC</b>	Non-methane organic compound
<b>PM2.5</b>	PM2.5 are inhalable particulates with an aerodynamic diameter < 2.5 µm
<b>PM10</b>	PM10 are inhalable particulates with an aerodynamic diameter < 10 µm
<b>RfC</b>	Reference Concentration
<b>Scaw</b>	Scaw South Africa (Pty) Ltd and or Scaw Metals
<b>SMGWDS</b>	Scaw Metals GLB+ Waste Disposal Site
<b>SSGP</b>	Sub-surface gas probe
<b>tpa</b>	Tons per annum
<b>t/day</b>	Tons per day
<b>TSP</b>	Total Suspended Particulates
<b>UK EAL</b>	UK-Environmental Assessment Levels
<b>WML</b>	Waste Management Licence

SO445/SR01

10 October 2012

**SCAW SOUTH AFRICA (PTY) LTD**  
**Electrical Co-generation Power Plant and Ash Disposal Facility**  
**at Scaw Metals, Germiston**  
**Environmental Scoping Report**  
**(Final)**

## 1. Introduction

---

### 1.1 The Project

---

Scaw South Africa (Pty) Ltd owns and operates the Scaw Metals facility at Union Junction in Germiston. Scaw Metals produces a range of products from the recycling of scrap steel and iron ore. The Scaw Metals facility has a number of components, including the Directly Reduced Iron Plant (DRI) that produces up to 1050 tons of iron per day from three (3) kilns. Each of the DRI kilns uses ore, dolomite, coal and natural gas as a feedstock. The outputs from the DRI process include coal dust and char (devolatilised coal) and exhaust gas. A portion of scrap material received at Scaw Metals is processed through a shredder plant to remove non-ferrous material. The non-ferrous material includes a metallic stream and a combustible component. These resources, which contain energy, are currently reused, disposed to landfill (12/9/11/L471/3) or released to the atmosphere (Ref 53/29) in terms of permits.

Scaw South Africa has proposed the development of an Electrical Co-generation Power Plant at Scaw Metals. The Electrical Co-generation Power Plant will make use of the energy contained in the DRI output streams and the combustible component of the shredder waste to generate approximately 68 MW of electricity. The electricity will be utilised primarily by Scaw Metals, but may be available to the grid during low-load periods. The project will improve the overall energy efficiency of Scaw, reduce the emissions footprint for the site, and improve the security of supply. The Co-generation Power Plant may qualify as a Clean Development Mechanism (CDM) project under the Kyoto Protocol.

The current conceptual design of the Electrical Co-generation Power Plant consists of two interlinked phases that can be executed independently of each other. Phase 1 will utilise the waste heat in the DRI kiln exhaust gases to produce steam which will be converted to electricity (40MW). Phase 2 will combust materials with a suitable calorific value to produce heated flue gas. This will be used to produce steam which will be converted to electricity (28MW).

The Electrical Co-generation Power Plant at Scaw Metals will trigger a number of activities listed in terms of the National Environmental Management Act, 1998, the National Environmental Management: Waste Act, 2008 and the National Environmental Management: Air Quality Act, 2004. Such listed activities cannot be undertaken without approval from the respective competent authorities under each Act. A scoping and environmental impact assessment process, as stipulated in the Environmental Impact Assessment Regulations (GN R543, 18 June 2010) of the National Environmental Management Act, 1998 (No 107 of 1998), is required to support the applications for environmental authorisation, waste management licence and atmospheric emissions licence.

Additionally, Phase 2 of the Co-generation Power Plant will produce ~ 300 tons of ash per day during the combustion process. The ash and bag-house dust will require disposal at a licensed waste management facility. Scaw South Africa is currently investigating the feasibility of two disposal options. These are the disposal of the ash at Cell 4b of the Scaw Metals GLB+ Waste Disposal Facility or the development of a new Ash Disposal Facility for the disposal of the ash. The final selection of the preferred alternative will depend on a number of factors.

The disposal of waste to land is a listed activity in terms of the National Environmental Management: Waste Act, 2008 and may not be undertaken without approval from the competent authority. Disposal of the ash to the existing Scaw Metals GLB+ Waste Disposal Facility will require an amendment to that facilities licence, while the development of a new facility would require a waste management licence. A scoping and environmental impact assessment process, as stipulated in the Environmental Impact Assessment Regulations (GN R543, 18 June 2010) of the National Environmental Management Act, 1998 (No 107 of 1998), is required to support the application for a waste management licence.

The purpose of this scoping report is to identify the environmental impacts associated with the proposed development of both the Electrical Co-generation Power Plant and the Ash Disposal Facility at Scaw and to present the 'plan of study' for the environmental impact assessment for both facilities.

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## 1.2 Project Need and Desirability

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The Electrical Co-generation Power Plant will provide electricity to Scaw Metals and will reduce the facilities dependence on Eskom supply. This will enable Scaw to have a better control over electricity costs, which are a significant cost input in the globally competitive steel industry. This also will improve the security of electrical supply and contribute to reduced work stoppages. The additional electricity available to Scaw Metals will enable potential expansion projects to be developed, which could not be considered with the current shortage of Eskom supply. This is important to the growth strategy of Scaw Metals.

The potential replacement of Eskom electricity at Scaw Metals may enable Eskom to redistribute some of the Scaw Metals allocation to other users on the grid. The reduced electrical demand in the Germiston area may also contribute to a better demand/supply balance and contribute to less frequent power cuts. The electricity generated at the co-generation facility will have lower carbon emissions per kW than the Eskom supply and will reduce the carbon footprint of Scaw Metals.

Phase 1 of the project will utilise heat from the exhaust gases of the DRI kiln to generate electricity. This energy is currently lost to the atmosphere. The recovery and use of this heat will improve the overall energy efficiency per unit product of the Scaw Metals facility. The addition of Phase 1 will also necessitate improved control over the flow and quality of the DRI exhaust gas and will therefore result in reduced emissions to atmosphere when compared to the current process.

Phase 2 of the project will involve the recovery of energy from a variety of sources including alternative fuels and resources. Some of these materials are wastes which are currently disposed with the subsequent loss of the embodied energy. The waste management philosophy adopted in South Africa advocates the minimisation, recycling, recovery and treatment of waste prior to disposal. The Electrical Co-generation Facility will enable Scaw Metals to reuse some of the waste it generates. Energy will be recovered from the waste and the total volume of waste requiring disposal to landfill will be reduced by 30 to 50%. This will extend the life of the landfill site.

The motivation for the Electrical Co-generation Power Plant and the main benefits thereof will be:

- Reduction in electricity costs;
- Improved security of electrical supply at Scaw Metals;
- Increased electrical supply at Scaw Metals;
- Improved energy efficiency per unit production;
- Reduced carbon footprint per unit production;
- The recovery of energy from waste; and
- a reduction in the volume of wastes currently requiring disposal.

The ash disposal facility is needed to dispose of waste ash and bag-house dust generated by the Co-generation Power Plant. The benefits of a waste disposal site located at Scaw Metals are:

- Cradle to grave responsibility of the electrical generation project;
- Management of the environmental issues arising from waste disposal;
- Minimal transport requirements for waste;
- Cost controls.

---

### 1.3 Terms of Reference

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Synergistics Environmental Services (Pty) Ltd was appointed by Scaw South Africa as independent environmental assessment practitioner (EAP) to undertake the necessary environmental work to meet the requirements of informing:

- an integrated environmental authorisation and atmospheric emissions licence for the Electrical Co-generation Power Plant;
- the possible amendment of the waste management licence for the existing Cell 4b; and, or
- a waste management licence for the development of a new Ash Disposal Facility at Scaw Metals.



**Figure 1: Locality of the Scaw Metals' Union Junction Facility**

## 1.4 Environmental Assessment and Authorisation Process

The undertaking of a scoping and environmental impact assessment process in support of applications for an integrated environmental authorisation, atmospheric emissions licence and waste management licence for the Electrical Co-generation Power Plant and the Ash Disposal Facility at Scaw Metals commenced in March 2012. The integrated application form was submitted to the Department of Environmental Affairs who acknowledged receipt and provided a reference number on 16 April 2012. Separate applications were also submitted to the Department of Environmental Affairs for a waste management licence and an amendment to a waste management licence. The Department acknowledged receipt and provided reference numbers for both on 23 April 2012. The application for the atmospheric emissions licence has yet to be submitted.

In order to obtain the required authorisations an environmental impact assessment (EIA) process, as stipulated in the environmental impact assessment regulations (GN R 543 – 547 of July 2010) made under section 24(5) of the National Environmental Management Act, 1998 (107 of 1998) (NEMA) must be conducted. This scoping report forms the first phase of the EIA process and documents the initial identification of the environmental issues associated with the proposed development of the Electrical Co-generation Power Plant and the Ash Disposal Facility at Scaw Metals. The scoping report also presents the 'plan of study' for the environmental impact assessment which sets out the scope and method of the investigations required to assess the potential impacts of the projects. The scoping report and plan of study for EIA have been compiled in accordance with the EIA Regulations (GNR 543, June 2010) and will be submitted to DEA for acceptance.

## 1.5 Application for Authorisation of Listed Activities

The activities that will be undertaken at the proposed Electrical Co-generation Power Plant and the Ash Disposal Facility are regulated by various legislation and multiple authorisation/licences are required from the competent authorities prior to the commencement of the project. This section lists the specific activities for which approval/licences have been applied.

### 1.5.1 Electrical Co-generation Power Plant

#### 1.5.1.1 Environmental Authorisation *ito NEMA*

Activities listed in Listing Notices 1, 2 and 3 in terms of the 2010 EIA Regulations (GN R 544, 545 and 546 of June 2010).

**Table 1: Listed Activities Applicable to the Co-generation Facility at Scaw Metals (GNR 544, 545, 546)**

Government Notice	Activity No	Applicability of the listed activity
GNR 544	28) The expansion of existing facilities for any process or activity where such expansion will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	Scaw Metals were issued a Registration Certificate under the Atmospheric Pollution Prevention Act for all of the existing facilities and emissions sources at Union Junction (Ref 53/29). Phase 1 of the Co-generation Power Plant will use heat from the existing exhaust gas stream. The cooled exhaust gas will be directed through a new bag house and released through a new stack. The new configuration will require an amendment to the existing permit (in terms of the NEM:AQA) and is therefore captured under this activity.
GN R 545,	1) The combined electrical output from phase 1 and	The combined electrical output from phase 1 and phase 2 of

	phase 2 of the Scaw Co-generation Facility will be more than 20 MW. The construction of the Scaw Co-generation Facility is therefore captured under this activity.	the Co-generation Power Plant will be more than 20 MW. The construction of the Co-generation Power Plant is therefore captured under this activity.
GNR 545	5) The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 *Act No. 59 of 2008) in which case that Act will apply.	Phase 2 of the Co-generation Power Plant will combust materials of suitable calorific value to generate heated flue gas for the production of steam and then electricity. Materials combusted at the plant may include coal, natural gas and or AFRs from the Scaw Metals facility (char*, dust and shredder waste). a) Installations for the combustion of solid fuels (Subcategory 1.1) and gases (Subcategory 1.4) are listed in GN R 248 (March 2010) under the NEM:AQA as activities which result in atmospheric emissions. As such an Atmospheric Emissions Licence will be required and this activity is triggered. The disposal of waste materials by incineration is also listed as an activity which results in atmospheric emissions (Category 8). As such an Atmospheric Emissions Licence will be required and this activity may be triggered.

### 1.5.1.2 Waste Management Licence ito NEMWA

Waste management activities listed in terms of the NEMWA, 2008 (GN R 718, July 2009)

**Table 2: Waste Management Activities Applicable to the Co-generation Power Plant at Scaw Metals (GNR 718)**

Government Notice	Activity No	Applicability of the listed activity
GNR 718	A(1) The storage including the temporary storage of general waste at a facility that has the capacity to store in excess of 100m <sup>3</sup> of general waste at any one time, excluding the storage of hazardous waste in lagoons.	Wastes from the Scaw Metals facility (char*, dust and shredder waste) will be stored in silos prior to being combusted in the Co-generation Power Plant. The combined storage capacity for these wastes may exceed 100 m <sup>3</sup> .
GNR 718	A(2) The storage including the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 35m <sup>3</sup> of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons.	Wastes from the Scaw Metals facility (char*, dust and shredder waste) will be stored in silos prior to being combusted in the Co-generation Power Plant. Some of these materials may be classified as hazardous wastes and the combined storage capacity for these wastes may exceed 35 m <sup>3</sup> .
GNR 718	A(8) The recovery of waste including the refining, utilisation or co-processing of waste at a facility that has the capacity to process in excess of 3 tons of general waste or less than 500kg of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	Phase 2 of the Co-generation Power Plant will combust materials of suitable calorific value to generate heated flue gas for the production of steam and then electricity. Materials combusted at the plant may include AFR from the Scaw Metals facility (char*, dust and shredder waste).The Co-generation Power Plant will undertake the recovery of energy from wastes to produce electricity. The plant will combust in excess of 3 tons of general waste per day.
GNR 718	A(18) The construction of facilities for activities listed in Category A of this Schedule.	Facilities for the Co-generation Power Plant will be constructed at Scaw Metals for the storage and recovery of wastes.
GNR 718	B(3) The recovery of hazardous waste including the refining, utilisation or co-processing of waste at a facility with a capacity to process more than 500kg of hazardous waste per day excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises or unless the Minister has approved re-use guidelines for the specific waste stream.	Phase 2 of the Co-generation Power Plant will combust materials of suitable calorific value to generate heated flue gas for the production of steam and then electricity. Materials combusted at the plant may include AFR from the Scaw Metals facility (char*, dust and shredder waste).The Co-generation Power Plant will undertake the recovery of energy from wastes to produce electricity. Depending on classification of the particular waste streams used, the plant may trigger the activity for processing more than 500kg of hazardous waste per day.
GNR 718	B(8) The incineration of waste regardless of the capacity of such a facility.	Phase 2 of the Co-generation Power Plant will combust AFR from the Scaw Metals facility (char*, dust and shredder waste) to generate heated flue gas for the production of steam and

		then electricity. Such combustion is considered as the incineration of waste.
GNR 718	B(11) The construction of facilities for activities listed in Category B of this Schedule.	Facilities for the Co-generation Power Plant will be constructed at Scaw Metals for the recovery of energy and the incineration of wastes.
<p>* please note that Scaw is of the opinion (and has sought legal advice) that the neither the coal dust nor the char generated at its operations fall within the definition of "waste" as contemplated in the National Environmental Management: Waste Act, 2008. Both could however fall within the definition of a "by-product" for purposes of that Act. However, based on discussions with the competent authority and views expressed by that authority and in order to proceed with the project, Scaw is including the coal dust and char as wastes for purposes of the waste management application. The inclusion of coal dust and char in this application as a waste does not amount to an acknowledgement that the char is not a by-product and in this regard, such inclusion cannot be used against Scaw in any future regulatory matters.</p>		

**1.5.1.3 Atmospheric Emissions Licence ito NEMAQA**

Activities listed in terms of the NEMAQA, 2004 (GN R 248, March 2010)

**Table 3: Atmospheric Emission Activities Applicable to the Co-generation Power Plant at Scaw Metals (GNR 718)**

Government Notice	Category No	Applicability of the listed activity
GNR 248	Category 1; Subcategory 1.1: Solid fuel combustion installations. Solid fuels (excluding biomass) combustion installations used primarily for steam raising or electricity generation.	Phase 2 of the Co-generation Power Plant will combust materials of suitable calorific value to generate heated flue gas for the production of steam and then electricity. Materials combusted at the plant may include chare and dust from the Scaw Metals facility. Char* and dust are equivalent to coking coal and the facility may be considered as a solid fuel combustion installation.
GNR 248	Category 8: Disposal of hazardous and general waste. Facilities where general and hazardous waste including health care waste, crematoria, veterinary waste, used oil or sludge from the treatment of used oil are incinerated.	Phase 2 of the Co-generation Power Plant will combust materials of suitable calorific value to generate heated flue gas for the production of steam and then electricity. Materials combusted at the plant may include AFR from the Scaw Metals facility (char*, dust and shredder waste). Depending on classification of the materials the facility may be considered to be incinerating wastes.
<p>* please note that Scaw is of the opinion (and has sought legal advice) that the neither the coal dust nor the char generated at its operations fall within the definition of "waste" as contemplated in the National Environmental Management: Waste Act, 2008. Both could however fall within the definition of a "by-product" for purposes of that Act. However, based on discussions with the competent authority and views expressed by that authority and in order to proceed with the project, Scaw is including the coal dust and char as wastes for purposes of the waste management application. The inclusion of coal dust and char in this application as a waste does not amount to an acknowledgement that the char is not a by-product and in this regard, such inclusion cannot be used against Scaw in any future regulatory matters.</p>		

**1.5.2 Ash Disposal Facility**

**1.5.2.1 Environmental Authorisation ito NEMA**

On the basis of current information, neither of the alternatives for the disposal of ash from the Co-generation Power Plant will require environmental authorisation in terms of the 2010 EIA Regulations (GN R 544, 545 and 546 of June 2010).

**1.5.2.2 Waste Management Licence ito NEMWA**

Both of the alternatives for the disposal of ash and bag-house dust from the Co-generation Power Plant will require a waste management licence in terms of the NEMWA, 2008 (GN R 718, July 2009). Table 4 lists the waste management activities triggered by the disposal of ash at Cell 4b of the Scaw Metals GLB+ Waste Disposal Site. Table 5 lists the waste management activities triggered by the development of a new facility for the disposal of ash from the Co-generation facility.

**Table 4: Waste Management Activities Applicable to Ash Disposal at Cell 4b (GNR 718)**

Government Notice	Activity No	Applicability of the listed activity
GNR 718	A(18) The construction of facilities for activities listed in Category A of this Schedule.	Additional facilities may need to be constructed to facilitate the disposal of ash at Scaw Metals Waste Disposal Site.
GNR 718	A(19) The expansion of facilities or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or licence or a new permit or licence in terms of legislation governing the release of pollution, effluent or waste.	Disposal of ash to Cell 4b of the Scaw Metals Waste Disposal Site will require an amendment of the site's waste management licence to include ash as a permissible waste.

**Table 5: Waste Management Activities Applicable to a new Ash Disposal Facility (GNR 718)**

Government Notice	Activity No	Applicability of the listed activity
GNR 718	B(9) The disposal of any quantity of hazardous waste to land	Depending on classification of the ash stream, its disposal may trigger the activity for disposal of hazardous waste.
GNR 718	B(10) The disposal of general waste to land covering an area in excess of 200m <sup>2</sup> .	Depending on classification of the ash stream, its disposal may trigger the activity for disposal of general waste to an areas greater than 200m <sup>2</sup> .
GNR 718	B(11) The construction of facilities for activities listed in Category B of this Schedule.	Facilities for Ash Disposal will be constructed at Scaw Metals.

## 1.6 Competent Authorities

### 1.6.1 Co-generation: Integrated Environmental Authorisation

The National Department of Environmental Affairs (DEA) is the competent authority for the applications under the National Environmental Management Act, 1998 (as the project involves electricity generation) and under the National Environmental Management: Waste Act, 2008 (as the project potentially involves hazardous wastes). As allowed for in Section 24(L) of the NEMA the applications may be combined into an integrated application.

The Department of Environmental Affairs has established an Integrated Permitting Systems department for handling applications for integrated authorisations. An application form for an integrated licence for the Co-generation facility was submitted to the Department of Environmental Affairs. The Department provided reference numbers for the project:

- NEAS Reference: DEA/EIA/0001129/2012
- Reference: 14/12/16/3/3/37

The assigned case officer at the DEA is:

Ms Nyiko Nkosi  
Tel: 012 395 1694  
Fax: 012 320 7539  
Email: nnkosi@environment.gov.za

### 1.6.2 Co-generation: Atmospheric Emissions Licence

The authority for the issuing of atmospheric emissions licences in terms of the National Environmental Management Air Quality Act, 2004 has been delegated to the municipal level. At the Scaw Metals facility the Ekurhuleni Metropolitan Municipality is the competent authority.

The Air Quality Officer at the Ekurhuleni Metropolitan Municipality has been informed of the project and an application for the atmospheric emissions licence will be completed once the relevant project details have been finalised. The application will be structured as an amendment of the existing registration certificate issued to Scaw under the Atmospheric Pollution Prevention Act, 1965 (No. 45 of 1965).

The relevant official from the Ekurhuleni Metropolitan Municipality is:

Mr Edmund van Wyk  
Assistant Chief: Air Quality & Noise Management  
Tel: (011) 999 2470  
Fax: 0866118357  
Email: Edmund.vWyk@ekurhuleni.gov.za

### 1.6.3 Ash Disposal Facility: Waste Management Licence

Applications for waste management licences for the two alternative ash disposal facilities were submitted to the DEA: Authorisation and Waste Disposal Management. The DEA issued reference numbers for both projects.

- Amendment to Cell 4b Licence: 12/9/11/L471/3/V1
- New Ash Disposal Facility: 12/9/11/L895/3

The assigned case officer at the DEA for both projects is:

Mr Shiba Sebone  
Tel: 012 310 3445  
Fax: 012 310 3753  
Email: ssebone@environment.gov.za

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## 1.7 Structure of the Scoping Report

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The scoping report has been structured in accordance with GNR 543 and includes the consolidated results of the public participation and authority consultation processes conducted to date. Table 6 provides a summary of the requirements of GNR 543, with cross references to the report sections where these requirements have been addressed.

**Table 6: Structuring of the Scoping Report in terms of GNR 543 Requirements**

Legal and Regulatory Requirement	Cross Reference to Report Section
<b>GNR 543 Section 27</b>	
After having submitted an application, the EAP managing the application must:	
(f) Prepare a scoping report in accordance with regulation 28	This Report.
<b>GNR 543 Section 28(1)</b>	
A scoping report must contain all information that is necessary for a proper understanding of the nature of the issues identified during scoping and must include:	
a) Details of: <ul style="list-style-type: none"> <li>(i) the EAP who prepared the report; and</li> <li>(ii) the expertise of the EAP to carry out scoping procedures;</li> </ul>	See Project Information Sheet.
b) A description of the proposed activity;	See Section 4 and Section 5.
c) A description of any feasible and reasonable alternatives that have been identified;	See Section 0 and Section 5.5.

Legal and Regulatory Requirement	Cross Reference to Report Section
d) A description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is: <ul style="list-style-type: none"> <li>(i) a linear activity, a description of the route of the activity; or</li> <li>(ii) an ocean-based activity, the coordinates where the activity is to be undertaken;</li> </ul>	See Sections 1.1, 5.3.1 and 5.4.1.
e) A description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment;	See Section 6 (entire chapter)
f) An identification of all legislation and guidelines that have been considered in the preparation of the scoping report;	See Section 1.
g) A description of environmental issues and potential impacts, including cumulative impacts, that have been identified;	See Section 8.
h) Details of the public participation process conducted in terms of regulation 27(a), including: <ul style="list-style-type: none"> <li>(i) The steps that were taken to notify potentially interested and affected parties of the application;</li> <li>(ii) Proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given;</li> <li>(iii) A list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application; and</li> <li>(iv) A summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;</li> </ul>	See Section 3.5, as well as Appendix A (copies of all relevant documentation and correspondence).
i) A description of the need and desirability of the proposed activity;	See Section 1.2.
j) A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;	See Section 0 and Section 5.5.
k) Copies of any representations, and comments received in connection with the application or the scoping report from interested and affected parties;	See Appendix A.
l) Copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants; and	See Appendix A.
m) Any responses by the EAP to those representations and comments and views;	See Section 7.1 and Appendix A.
n) A plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include:	See Section 0.
(i) A description of the tasks that will be undertaken as part of the environmental impact assessment process, and the manner in which such tasks will be undertaken;	See Section 9.
(ii) An indication of the stages at which the competent authority will be consulted;	See Section 9.6.2
(iii) A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;	See Section 9.3.
(iv) Particulars of the public participation process that will be conducted during the environmental impact assessment;	See Section 9.6.1.
o) Any specific information required by the competent authority; and	No request received to date.
p) Any other matters required in terms of sections 24(4)(a) and (b) of the Act.	None identified.

Legal and Regulatory Requirement	Cross Reference to Report Section
GNR 543 Section 28(2):	
In addition, a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application.	None identified.
GNR 543 Section 28(3):	
The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation (1)(c), exist.	Alternatives are discussed in scoping report. Only feasible alternatives are taken further to the EIA phase.



## 2. Environmental Legal Requirements

In accordance with EIA sub regulation 28(1f) of GN R 543, all legislation and guidelines that have been considered in the preparation of the scoping report are documented. This section lists environmental legislation that has been identified as being pertinent to the proposed introduction of the Electrical Co-Generation Power Plant and the two Ash Disposal options at Scaw Metals.

### 2.1.1 National Environmental Management Act, 1998

The National Environmental Management Act, 1998 (107 of 1998) (NEMA) prohibits the commencement of certain controlled (or 'listed') activities. In terms of Section 24 (1) of NEMA the potential environmental impact associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority for the granting of an environmental authorisation. The Environmental Impact Assessment Regulations (June, 2010), made under Section 24(5) of NEMA, sets out the schedule of listed activities. The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided with the opportunity to consider the potential environmental impacts of a project during the design and development phase. An assessment can then be made whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. For an informed decision regarding the project to be taken, comprehensive, independent environmental investigations must be completed in accordance with the EIA Regulations and this information provided to the competent authority.

#### 2.1.1.1 2010 EIA Regulations

The EIA Regulations define the requirements for the submission, processing, consideration and decision of applications for environmental authorisation of listed activities. Three Listing Notices were published (GN R 544 - 546) to define activities that require either a Basic Assessment process or an Environmental Impact Assessment process. The requirements of the two assessment processes are stipulated in GNR 543 of the Environmental Impact Assessment Regulations (2010).

All waste related activities were omitted from the Listing Notices (GN R 719, July 2009) as they were replaced by waste management activities listed under the NEM:WA (see Section 2.1.3). Non-waste related activities listed in the EIA Regulations, with potential relevance to the Electrical Co-generation Power Plant at Scaw Metals are detailed in Section 1.5.1. The Ash Disposal Facilities do not trigger any activities listed in the EIR Regulations.

#### 2.1.1.2 EIA Guidelines

The EIA Regulations provide clear instructions on the required content of a scoping report and this report has been prepared in accordance with these regulations. In addition, a number of draft guidelines to NEMA and the EIA Regulations have been published to assist in the scoping and EIA process. Guidelines that have been considered include:

- Integrated Environmental Management Guideline Series 7: Public Participation 2010 (DEA, 2010).

## 2.1.2 National Environmental Management: Waste Act, 2008

The requirements of the National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEM:WA) came into effect on 1 July 2009. The Act makes provision for the identification of various waste management activities which may have a detrimental effect on the environment. A waste management activity identified in terms of the Act may not commence, be undertaken or conducted except in accordance with published standards or a Waste Management Licence.

On 3 July 2009 the list of waste management activities requiring a Waste Management Licence from a competent authority were published (GN R 718). Listed waste management activities are divided into Category A and Category B in the schedule. Activities identified in Category B require an Environmental Impact Assessment process, as stipulated in the Environmental Impact Assessment Regulations (GN R543) of the NEMA, in order to inform an application for a waste management licence.

Waste management activities with potential relevance\* to the Electrical Co-generation Power Plant at Scaw Metals are detailed in Table 2 of Section 1.5.1.2. A waste management licence is required and a scoping and environmental impact assessment process is required.

Waste management activities with potential relevance to the alternative Ash Disposal Facilities at Scaw Metals are detailed in Table 5. A waste management licence is required and a scoping and environmental impact assessment process is required.

\* please note that Scaw is of the opinion (and has sought legal advice) that the **neither the coal dust nor the char** generated at its operations fall within the definition of "waste" as contemplated in the National Environmental Management: Waste Act, 2008. **Both could** however fall within the definition of a "by-product" for purposes of that Act. However, based on discussions with the competent authority and views expressed by that authority and in order to proceed with the project, Scaw is including the **coal dust and char as wastes** for purposes of the waste management application. The inclusion of **coal dust and char** in this application as a waste does not amount to an acknowledgement that the char is not a by-product and in this regard, such inclusion cannot be used against Scaw in any future regulatory matters.

## 2.1.3 National Environmental Management: Air Quality Act, 2004

This National Environmental Management: Air Quality Act, 2004 (No 39 of 2004) has been promulgated with the objective of reforming the law regulating air quality in order to protect the environment. It also aims to comply with general environmental policies and to bring legislation in line with local and international good air quality management practices. All outstanding sections of the Act came into effect on the 1st of April 2010 (Government Gazette, 26 March 2010). The Act has established a National Framework for Air Quality Management with standards. Current emissions standards for dust are considered in terms of SANS 1929.

The National Ambient Air Quality Standards were published in December 2009 (GN R 1210). The standard prescribes limit values for ambient pollution concentrations of Sulphur dioxide, Nitrogen dioxide, PM 10, Ozone, Benzene, Lead and Carbon Monoxide. The standards sets reference concentrations over various averaging periods and allows for a certain frequency of exceedance. The assessment of the ambient pollution concentrations shall be conducted in terms of section 5.2.1.3 of the National Framework for Air Quality Management.

A schedule of Listed Activities and Minimum National Emission Standards was published on the 31st of March 2010 (GN R248, March 2010). Listed activities may only be undertaken after an Atmospheric Emissions Licence has been obtained and must comply with the prescribed emissions standards set for that activity. Scaw Metals has a valid Registration Certificate issued under previous legislation. The Co-generation Power Plant will alter and or introduce new emissions at Scaw. These changes will need to be authorised through an Atmospheric Emissions License that details each of the point sources at the facility. Emissions activities with potential relevance to the Co-generation Power Plant at Scaw Metals are detailed in Table 3. An Atmospheric Emissions License is required.

The National Ambient Air Quality standard for particulate matter with aerodynamic diameter less than 2.5 micron meters was published in June 2012 (GN R 486). The standard prescribes limit values for PM 2.5 emissions and sets timeframes for compliance with reference concentrations over 24 hour and 1 year averaging periods. The assessment of all ambient pollution concentrations shall be conducted in terms of section 5.2.1.3 of the National Framework for Air Quality Management.

### **2.1.3.1 Air Quality Management Plan for the EMM (2005)**

The EMM developed an Air Quality Management Plan for the Metropolitan area. The vision of the Air Quality Management Plan was to attain and maintain acceptable air quality in the Metro for the benefit of present and future generations. The Air Quality Management Plan set out an emissions reduction programme with source specific actions. Industry, Fuel burning Appliances and Electricity Generation were identified as a key source which required the reduction of emissions of priority pollutants. The Air Quality Management Plan sets out short and medium-term measures to ensure the reduction of emissions of priority pollutants.

The application for an Atmospheric Emissions Licence for the Co-generation Power Plant will need to ensure that the methodological approaches used in the estimation, modeling and calculation of emissions are in line with accepted international practices.

## **2.1.4 Environment Conservation Act, 1989**

The original waste permit for the Scaw Metals Waste Disposal site was issued in terms of Section 20(1) of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA), by the Department of Water Affairs and Forestry (DWAF). Although Section 20 of the ECA has been repealed by the National Environmental Management: Waste Act, 2008 (Act 59 of 2008)(NEM:WA) the NEM:WA specifically states, in Section 81(1), that "Despite the repeal of section 20 of the ECA by this Act, a permit issued in terms of that section remains valid subject to subsection (2) and (3).

However, Cell 4b of the Scaw Metals Waste Disposal Site was recently licensed in terms Section 49 of the National Environmental Management: Waste Act, 2009. The ECA thus has no relevance to current or future waste disposal at Scaw Metals and there are no requirements for authorisation of either the Electrical Co-generation Power Plant or the Ash Disposal Facility at Scaw Metals.

## **2.1.5 EMM By-laws**

### **2.1.5.1 Waste Water By-Laws (6 March 2002)**

The EMM by-law prevents the disposal of any substance into the sewage disposal system which does not comply with the standards and criteria set out in the by-law. The by-law makes provision for the discharge of industrial effluent into the sewage disposal system, subject to written permission from the council.

A discharge permit will be required from the EMM to dispose of any effluent from the Electrical Co-generation Power Plant into the sewage disposal system. The permit will set the permissible standards for such effluent and specify the charges if any.

### **2.1.5.2 Solid Waste By-Laws (6 March 2002)**

The EMM by-law requires that any person generating industrial or hazardous waste notify the council of such generation. The storage of such industrial or hazardous waste on the premise must be done stored in such manner that it cannot become a nuisance, safety hazard or pollute the environment. In addition such industrial or hazardous waste may not be removed from a premises without the Council's written approval of conditions of such removal.

### **2.1.5.3 EMM Environmental Policy (2006)**

EMM developed an environmental policy to ensure that environmental issues and environmental sustainability form part of all decision making processes, the development of strategies and programmes, the development and planning of land use and the management of resources and activities.

## **2.1.6 Other Applicable Legislation**

### **2.1.6.1 National Water Act, 1998**

Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA) lists water uses for which a water use licence must be obtained. In terms of section 21 (g) of the NWA 'disposing of waste in a manner which may impact on a water resource (including storage of water containing waste)' is a restricted activity which may only be undertaken in terms of a water use licence.

As waste disposal at the Ash Disposal Facilities will be undertaken in terms of a waste management licence there would be duplication if a water use licence was also obtained. Section 22(3) of the National Water Act, 1998 indicates that 'A responsible authority may dispense with the requirement for a licence for water use if it is satisfied that the purpose of this Act will be met by the grant of a licence, permit or other authorisation under any other law'. The Department of Water Affairs and the Department of Environmental Affairs have a memorandum of understanding whereby the DWA provide input into waste management licence for a disposal facility and dispense with the requirements for a water use licence.

In terms of section 21(f) of the NWA 'discharging of water containing waste into a water resource' is a restricted activity which may only be undertaken in terms of a water use licence. Waste water from the Electrical Co-generation Power Plant will not be discharged to a water resource, but may possibly be discharged to the municipal sewer. The sewer is not considered as a water resource and a water use licence is not required. Permission for the discharge to sewer will be obtained from the Ekurhuleni Metropolitan Municipality (see Section 2.1.5).

In terms of section 21(h) of the NWA 'disposing of water which contains waste from, or which was heated in any industrial or power generation process' is a restricted activity which may only be undertaken in terms of a water use licence. Waste water from the Electrical Co-generation Power Plant will not be discharged to a water resource, but may possibly be discharged to the municipal sewer or disposed to the Ash Disposal Facility. As discussed in the previous paragraphs, neither of these options will require a water use licence.

It is proposed to consult with the Department of Water Affairs to get confirmation of this interpretation. It will be ensured that the DWA conditions are incorporated into the waste management licence and that they then dispense with the requirement for a water use licence.

### **2.1.6.2 National Heritage Resources Act, 1999**

The National Heritage Resources Act, 1999 (25 of 1999) provides for the protection of all archaeological and palaeontological sites and meteorites. Section 38 of the Act defines the categories of development for which the responsible heritage resources authority must be notified. Under Section 38 [(c) 'any development or other activity which will change the character of a site-(i) exceeding 5000 m<sup>2</sup>'] the responsible heritage authority must be informed of a development larger than 0.5 ha.

The footprints of the proposed Electrical Co-generation Facility and of the Ash Disposal Facility are larger than the listed threshold. However, the entire footprint of the Electrical Co-generation Facility and of the Ash Disposal Facility has been disturbed multiple times through industrial activities and no sites or artefacts of heritage value have been recorded. The responsible heritage agency has been notified, and informed that there is no intent to carry out a heritage assessment for these sites.

### **2.1.6.3 National Environmental Management: Biodiversity Act, 2004**

The National Environmental Management: Biodiversity Act, 2004 (No 10 of 2004) provides for the Minister or MEC to list species and ecosystems which are threatened and in need of protection as well as to identify threatening processes within these ecosystems. A list of threatened and protected species and regulations pertaining thereto has been published (GN R 150, 151 & 152, February 2007).

The footprints of the Electrical Co-generation Facility and of the Ash Disposal Facility have been previously disturbed by industrial activities and there is little to no chance of any sensitive species occurring, thus no mitigation or permits are required.

### **2.1.6.4 Conservation of Agricultural Resources, 1983**

The Conservation of Agricultural Resources, 1983 (No 43 of 1983) defines a list of registered weeds and invader plants, categorises them into different classes and introduces restrictions where these plants may occur. The act prohibits the spread of weeds and requires that listed weeds be controlled.

The alien and invasive plant control programme as currently applied at Scaw Metals must continue to be implemented across all sites owned by Scaw South Africa.

### **2.1.6.5 Policies, Plans and Guidelines**

#### **2.1.6.5.1. Minimum Requirements**

The Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (2<sup>nd</sup> edition, DWAF, 1998) and the Minimum Requirements for Waste Disposal by Landfill (2<sup>nd</sup> edition, DWAF, 1998) set out the requirements for waste classification and landfill design and operation. The Minimum Requirements are the guidelines currently endorsed by the DEA. The ash generated by the Co-generation Power Plant will be subjected to waste classification in terms of the Minimum Requirements. The ash disposal facility at Scaw Metals will be designed and operated in terms of the guidelines.

#### **2.1.6.5.2. Revised Waste Classification and Management System for South Africa**

The Minister of Water and Environmental Affairs has published draft documents as part of the Standards and Regulations provided for in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). When finalised, the Standards and Regulations will replace the current 'Minimum Requirements' series published by the DWAF in 1998. The draft Standards and Regulations currently available for review include:

- DRAFT Waste classification and management Regulations
- DRAFT Standard for disposal of Waste to Landfill
- DRAFT Standard for Assessment of Waste for landfill disposal

These new Standards and Regulations will change the manner in which waste is classified and will place restrictions on the nature of wastes disposed to landfill. However, the Department of Environmental Affairs has not confirmed dates for the final publication of these Standards and Regulations. As such the currently enforced Minimum Requirements remain the guidelines on waste classification and waste disposal site design.

## 3. Study Approach and Methodology

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### 3.1 Study Objectives

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The specific objectives for the scoping phase of the EIA process are to:

- Collate project information for
  - Electrical Co-generation Power Plant and
  - Ash disposal facilities.
- Collate baseline environmental.
- Identify landowners, adjacent landowners, local authorities, environmental authorities, as well as other stakeholders which maybe affected by the project, or that may have an interest in the environmental impacts of the project.
- Inform interested and affected parties (IAPs) about the proposed project.
- Engage with IAPs and identify their issues and concerns.
- Document key I&AP issues and concerns for consideration in the EIA phase.
- Engage with environmental authorities and confirm legal and administrative requirements.
- Identify and describe potential environmental issues associated with the relocation of the rail infrastructure.
- Introduce and evaluate the alternative route options at desktop level.
- Identify the nature and extent of further investigations and specialist input required in the EIA phase.

### 3.2 Consideration of Alternatives

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Development alternatives have been considered during the feasibility studies completed for the Electrical Co-generation Power Plant. These are discussed in the project description section. Only the preferred alternative is presented and will be assessed in the EIA.

Two alternatives are proposed for ash disposal, including the use of the existing Cell 4b at the Scaw Metals GLB+ Waste Disposal Site and or the development of a new ash disposal facility. Both the alternatives will be assessed in the EIA. **Although there may be viable alternatives to ash disposal, disposal is being considered as a 'worst-case' scenario for the Electrical Co-generation Power Plant and is key to determining the overall economic feasibility of the project. Opportunities to reuse or recycle portions of the waste will only be investigated as value adding propositions later in the project cycle.**

### 3.3 Study Area

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The study area is defined as the the Scaw Metals property at Union Junction and the area of land within 100 m of the site boundaries. There are 3 distinct sites under investigation:

- Electrical Co-generation Power Plant site,
- Cell 4b at Scaw Metals,
- New Ash Disposal site.

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## 3.4 Baseline Environmental Description

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The baseline environment represents the current prevailing environmental conditions at Scaw South Africa's Union Junction Facility, prior to the introduction of the Electrical Co-generation facility or Ash Disposal. It is indicative of the level of environmental degradation due to current Scaw Metals activities, human activities such as residential development, industry and infrastructure and naturally occurring phenomena.

Baseline information for this scoping report was gathered through visual inspections of the project area and surroundings, desktop studies and review of existing reports.

### 3.4.1 Existing Reports and Monitoring Data

The Scaw Metals facility at Union Junction is a large industrial complex which was established prior to any formal requirements for the compilation of an environmental assessment or the implementation of environmental management. Some of the more recent additions at the Union Junction facility were developed after the undertaking of environmental studies and with management conditions. In addition, Scaw South Africa has implemented an environmental management system for the facility. The monitoring of various environmental parameters is undertaken. There is thus a large body of environmental data and information for the Union Junction site. Sources of relevant information are described below.

Monitoring undertaken at the Scaw Metals Facility includes:

- Surface water (Quarterly);
- Groundwater (Quarterly);
- Dust fallout (Monthly);
- Stack emissions.

Recent environmental reporting includes:

- EIA for the Development of Cell 4b at Scaw Metals Waste Disposal Site (Synergistics, March 2011)
  - Geohydrological Impact Assessment (Jones & Wagener);
  - Dolomite stability report (Jones & Wagener);
- Noise Assessment Report: Scaw Metals (pro acoustic, March 2011)
- Air Quality Impact Assessment for the Scaw UJ Facility (Airshed, October 2011)
- Environmental Noise Impact Assessment (dBAcoustics, March 2012)
- Stack Emissions Measurement Surveys (Levego February to June 2012)
- Monthly Dust Deposition Monitoring Reports (SGS, 2012)
- Quarterly Groundwater Monitoring Reports (JAWs, 2012)

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## 3.5 Public Participation Process

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On-going participation of interested and affected parties at Scaw Metals is facilitated through a Monitoring Committee (MC) which is run by the Environmental Manager at Scaw. The public participation process for the Electrical Co-generation Facility and Ash Disposal Facility was undertaken by Synergistics Environmental Services.



### 3.5.1 Identification and Notification of Potential Interested and Affected Parties

Potential IAPs were identified from the Scaw Metals Monitoring Committee and the existing IAP databases that have been developed through EIA projects since 2006. The existing databases included landowners, neighbouring landowners and people who participated in previous EIA processes. Networking and referrals were used to expand the IAP database. Press advertisements and site posters were used to identify new IAPs (Section 3.5.2).

Potential IAPs were notified about the project and the public participation process by means of:

- Direct letters to MC members and IAPs from previous projects.
- Press advertisements and site notices (Section 3.5.2).
- Delivery of notifications to owners and occupiers of adjacent land.
- Written notifications to the Ekurhuleni Metropolitan Municipality (Mayor and Councillor).

Copies of the notification and proof of distribution are provided in Appendix A1 and A2.

### 3.5.2 Background Information Document

A notification letter and background information document (Appendix A1) on the project was distributed to all persons on the IAP database either via email or registered mail. The BID was hand delivered by the EAP to all adjacent properties. The documents introduced the project and the application for a waste management licence. Stakeholders were requested to register as IAPs, submit issues and concerns and attend the information sharing meeting. The document included a response sheet and a request for written comments by 22 June 2012. The BID was also distributed at the public meeting.

### 3.5.3 Press Advertisements and Site Notices

Press advertisements were placed in the following newspapers on Friday 25 May 2012:

- Beeld Sake 24; and
- Germiston City News.

Site notices (posters) were placed at the following locations during the week of 25 May 2012:

- At the Scaw Metals site entrances (x2);
- At the Scaw Metals Club in Dinwiddie;
- At the Scaw Security Office on Penny Road.

Copies of the advertisements and site notices (with photographs of site notice as proof) are included in Appendix A3.

### 3.5.4 Registration of Interested and Affected Parties

People and/or organisations were registered as IAPs for the project if they:

- Attended the public meeting;
- Responded to notification letters and documentation, press advertisements or site posters;
- Own, operate or administrate infrastructure affected by the project.
- Contacted Synergistics telephonically, or via fax, E-mail or post.

The database of registered IAPs is given in Appendix A4.

### 3.5.5 General Public Meeting

A general public notification meeting was held at the Scaw Metals Club in Dinwiddie on 13 June 2012. Notification of the meeting was included in the press advertisements, site notice and the BID. Presentations were made by the applicant on the proposed project and by the EAP on the environmental impact assessment process. Questions were taken and answered where possible. Copies of the presentations given and minutes of the meeting are included in Appendix A5.

### 3.5.6 Review of the Draft Scoping Report

The draft scoping report will be made available for public review for a 4 week (30 calendar day period). The report will be available at the Scaw Security office in Penny Road and at the Dinwiddie Library from 27 August to 28 September 2012. The report will also be published on the Synergistics website at [www.synergistics.co.za](http://www.synergistics.co.za) from where it can be downloaded. All registered IAPs will be notified in writing of the availability of the document for review and will be requested to comment. Electronic copies of the report will be emailed or made available on CD-ROM to IAPs on request.

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## 3.6 Authority Consultation

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### 3.6.1 Notifications to Relevant Authorities

The following government departments were notified in writing about the project and invited to the general public announcement meeting (Section 3.5.5):

- Ekurhuleni Metropolitan Municipality (Mayor and Councillor);
- Ekurhuleni Metropolitan Municipality (Environmental Department and Air Quality Officer);
- The Gauteng Department of Agriculture and Rural Development (GDARD); and
- The Department of Water Affairs (DWA).

Copies of the notification and proof of distribution are provided in Appendix A8.

### 3.6.2 Authority Meetings

The project team initially met with representatives of various DEA Departments in Pretoria to obtain clarification on the environmental legal requirements and the environmental authorisation and EIA process to be followed. Officials from Integrated Permitting Systems, Waste Authorisation and Air Quality Directorates were present. Records of the meeting are provided in Appendix A10.

After submission of the application forms the following took place:

- Discussions with DWA.
- Meeting with DEA: Integrated Permitting Systems (18 July 2012);
- Meeting with EMM: Air Quality & Noise Management (16 July 2012)
- Meeting with DEA: Waste Authorisation (postponed by the case officer).

### 3.6.3 Review of Draft Scoping Report

Copies of the draft scoping report will be provided to the authorities and government department for a 40 calendar-day review period. The scoping report will be provided to the following authorities:

- DEA - Integrated permitting Systems – Ms P Skepe-Mngcita
- DEA - Authorisation and Waste Disposal Management – Mr S Sebone
- DWA – Mr T Pather
- EMM - Air Quality & Noise Management – Mr E van Wyk
- EMM – Environmental Impact and Planning Management Section – Mrs E van der Merwe
- GDARD – Sustainable Use of the Environment Branch

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### **3.7 Scoping Report Finalisation**

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Following the closure of the draft scoping report review period, modifications will be made to the scoping report. Comments submitted by registered IAPs on the draft scoping report will be included in the final scoping report. For further involvement in the public participation process during the EIA refer to Section 9.6.1.

## 4. Project Description: Co-generation Power Plant

### 4.1 Project Design Criteria

Scaw South Africa is investigating an electrical co-generation project at its Germiston operation (Scaw Metals Union Junction). Scaw Metal's primary objective for the project is to generate electricity at an economically more attractive overall cost than its current electricity costs. The table below summarizes the functional requirements as outlined in the Basis of Design document, 1197-PM-BOD-0001 RevC.

**Main Plant Functional Requirements**

Description	Unit	Value
Design Life	Years	Target is >25
Electrical Demand (for SCAW Junction)	MW	SCAW consumption is - above 57 MW for 75% of the time. - above 95 MW for only 25% of the time
Availability and Maintainability	%	>85%
Operability	%	Load-following 25-75%

Due to the way the current DRI plant is operated the new power plant should be designed to:

- Operate at the minimum exhaust rates where 1 kiln is down for maintenance and 1 kiln is down during the daily 10 minute shut down. This implies the plant should be able to operate at 25% capacity under this scenario.
- The plant should still be able to produce electricity even if one source of energy is interrupted. If for instance the exhaust gases are interrupted the plant should still be able to produce electricity using the char and dust.
- The power plant should operate with at least 85% availability.

### 4.2 Introduction

Scaw South Africa (Pty) Ltd produces a range of steel products from scrap steel at the Scaw Metals Union Junction Facility in Germiston. The Scaw Metals facility has a number of components, including the Directly Reduced Iron (DRI) Plant that produces up to 1050 tons of product per day from 3 kilns. Each of the DRI kilns uses ore, dolomite, coal and natural gas as a feedstock. The wastes from the DRI process include dust and exhaust gas. The DRI also produces char\* (devolatilised coal) as a by-product. These resources, which contain energy, are currently reused, disposed to landfill (Ref: 12/9/11/L471/3) or released to the atmosphere (Ref: 53/29).

*\* please note that Scaw is of the opinion (and has sought legal advice) that the neither the coal dust nor the char generated at its operations fall within the definition of "waste" as contemplated in the National Environmental Management: Waste Act, 2008. Both could however fall within the definition of a "by-product" for purposes of that Act. However, based on discussions with the competent authority and views expressed by that authority and in order to proceed with the project, Scaw is including the coal dust and char as wastes for purposes of the waste management application. The inclusion of coal dust and char in this application as a waste does not amount to an acknowledgement that the char is not a by-product and in this regard, such inclusion cannot be used against Scaw in any future regulatory matters.*

Scaw South Africa has proposed the development of an Electrical Co-generation Power Plant at the Scaw Metals Union Junction facility. The Electrical Co-generation Power Plant will utilise energy contained in the DRI waste streams and in the char\* by-product to produce electricity that will be utilised at Scaw Metals. The project will improve the overall energy efficiency of the Scaw Metals Union Junction facility and reduce the emissions footprint for the site. The generation of electricity will improve security of supply, provide electrical capacity for expansion, reduce the amount of electricity required from Eskom and enable Eskom to supply other customers.

A number of alternative technologies and configurations were investigated for the Co-generation Power Plant. The preferred process design will produce up to 68 MW of electricity and can be executed in two phases:

Phase 1: High temperature exhaust gas from the three DRI Kilns will be captured from the current process (post after-burners) and passed through Heat Recovery Steam Generators (HRSG). The Heat Recovery Steam Generators recovers heat from the exhaust gas and generates steam. The steam generated in the process will be used to drive the turbine of a Generator which will generate electricity. An air-cooled Condenser will cool the steam after use and enable its re-use. The exhaust gas will pass through a new bag-house before exiting through a new Stack. The HRSG will be designed to operate with varied availability of the DRI Kilns. If the HRSG or Generator are offline then the exhaust gas from the DRI kilns will revert to the existing DRI stack.

Phase 2: A Fluidised Bed Boiler (FBB) will be installed to combust Dust and Shredder waste from the Scrap metal shredder plant (alternative fuels and raw materials) as well as char\*. Natural gas and coal may also be considered as supplementary fuels for the FBB. The heated flue gas will be passed through a Heat Recovery Steam Generator to generate steam. The steam generated will be used to drive the turbine of a Generator which will generate electricity. An air-cooled Condenser cools the steam after use and enable its re-use. The exhaust gas will pass through a dedicated bag-house before exiting through a stack.

See the Conceptual Process Flow diagram for Phase 1 and Phase 2 in Figure 2.

The FBB will generate waste ash that requires disposal to the existing Scaw Metals GLB+ Waste Disposal Site or to a dedicated Ash Disposal facility. Blow down water from the condensers and excess water from the process will be co-disposed with the ash or disposed to the sewer in terms of a municipal discharge permit.

The electricity produced from both phases of the proposed Co-generation Power Plant will be consumed by operations at the Scaw Union Junction facility. At certain low-load periods excess electricity (if any) may be sold to the National grid.

**Figure 2: Conceptual Process Flow for the Scaw Co-generation Facility**

**Figure 3: Preliminary Location of Co-generation Power Plant at Scaw Metals**

### 4.3 Plant Location

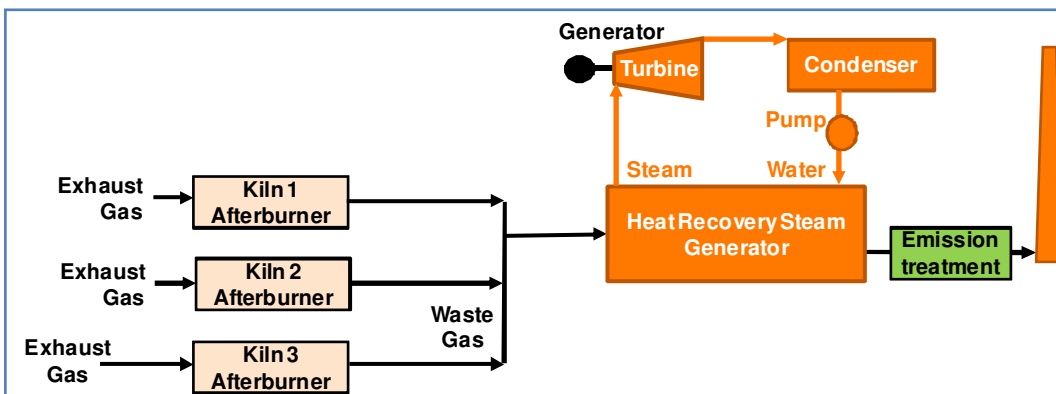
Phase 1 and 2 of the Co-generation Power Plant will be integrated with the DRI plant and will largely be located on a site immediately to the north of the DRI plant. The plant will extend across Erf 632 and Erf 133.



**Plate 1:** View of the site for the Co-generation Power Plant (DRI plant to the left)

### 4.4 Phase 1

Phase 1 of the Electrical Co-generation Power Plant will utilise waste heat from the three DRI kilns to produce up to 40 MW of electricity. Phase 1 is considered relatively simple to engineer and integrate into the existing DRI infrastructure.



**Figure 4:** Proposed Process Flow for the Phase 1 of Co-generation Power Plant



## 4.4.1 DRI Kiln (1 to 3) After-Burners

### 4.4.1.1 Introduction

The existing after-burners are large refractory lined vessels used to thermally oxidize the gas leaving the kilns. Because the kilns operate under reducing conditions, the gas exiting the kilns has high levels of carbon monoxide, volatile organic compounds and carbon rich dust. Fresh air is mixed with the kiln gas as it enters the after-burner. The mixture of air and gas is then maintained at high temperature for a period of time to burn out pollutants, forming carbon dioxide and water.

### 4.4.1.2 Technology

The after-burners are currently used only for the purpose of reducing emissions of carbon monoxide and VOCs. During the destruction of these compounds some heat is released. At present the heat in the gas is not utilized and there is no incentive for optimizing combustion in the after-burner. On implementation of this project the after-burner performance will become very important to the performance of the Co-generation Power Plant. The after-burners themselves will not be changed at all and will continue to function as they do presently. However, additional instrumentation and controls will be installed to improve their performance.

The new instrumentation will consist of flow measuring and gas analysis at the outlet of the after-burner. This will enable the performance of the after-burner to be continuously monitored and optimized. Additional controls, consisting of either variable frequency drive or automatic dampers, will be installed on the combustion air fans. The new instrumentation and controls will be connected to the new plant digital control system.

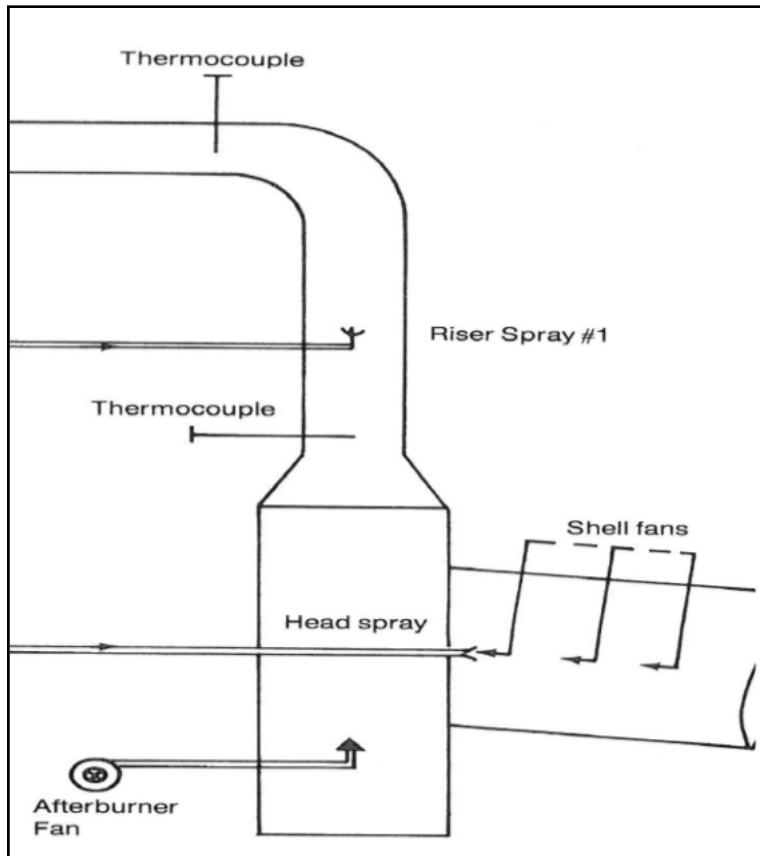


Figure 5: Schematic of the After-burners

#### **4.4.1.3 Process Flow**

Gas from the DRI kiln enters at the bottom of the after-burner where air is mixed in. The mixture then flows up through the refractory lined chamber. The refractory reduces heat loss from the gas mixture and also radiates heat back into the chamber to maintain a stable temperature. With the gas mixture maintained at a stable, high temperature, the combustible constituents react with the oxygen from the air that was added. As the gasses move upwards through the after-burner additional air is added burning out the combustible material. When the burned out gasses reach the top of the after-burner, it exits into a duct which carries it to the cooling system. For the Co-generation Power Plant, the outlet duct will be modified to carry the gasses to the waste heat boiler.

#### **4.4.1.4 Alternatives**

It would also be possible to remove the after-burners and burn out the combustibles from the gas when it reaches the waste heat boiler. Doing this would require the boiler to have a combustion chamber in which additional fuel is burned to initiate the combustion, or would require a large volume of catalyst. Since either of these alternatives would add to the cost of the boiler, and since the after-burners already exist, there is no good reason to consider these alternatives.

### **4.4.2 Fuel and other inputs**

#### **4.4.2.1 Waste Heat**

The energy input comes from the waste heat in the DRI kiln off-gas. The gas exits the kilns at ~800-900°C and contains some combustible constituents. The combustible constituents are burned out in the afterburner so that the energy in the gas which will reach the HRSG will be ~ 1000°C and the energy will be entirely the sensible heat of the gas. The quantity of energy available in the gas is dependent on the production rate of DRI, and is expected to be 580 GJ/Hr at full capacity.

#### **4.4.2.2 Water**

Water is used both for cycle make-up and for cooling. The cycle make-up requires a small quantity of very high quality water to replace losses from the steam cycle. This water will be supplied from Rand Water and processed through a demineralizing system.

Water for cooling is needed in much larger quantities, but the quality requirements are much less. Cooling water will come from reclaimed drains and waste water.

### **4.4.3 Heat Recovery Steam Generators**

#### **4.4.3.1 Introduction**

The heat recovery steam generators (HRSG) (also called waste heat boilers) capture the heat from the gas stream and produce steam. This is the source of the steam which drives the turbine. Their principle of operation is very simple, but because they must handle dust laden gas at high temperature they must be carefully designed and constructed. The HRSGs will be an industrial process type, which differs from the power generation type in being somewhat more robust and having special features for dust removal.

#### 4.4.3.2 Technology

HRSG's comprise a large casing which encloses multiple bundles of tubes. This is essentially a complex heat exchanger, configured with several different sections. The economizer section and the superheater section each consists of discrete tube bundles which are connected in series. Although the gas flow across each bundle is cross-flow, because there are multiple bundles in series the performance very nearly approximates a counter-flow heat exchanger. In the case of the generating section, all the bundles are connected in parallel and collected at the steam drum.

HRSG's can be constructed either vertically or horizontally. A vertical flow HRSG has the gas flowing either up or down, with the tubes arranged perpendicular to the gas flow, in other words horizontally. The horizontal HRSG has vertical tubes and the gas flows horizontally through the HRSG. The selection of vertical or horizontal is made based on the site specific conditions and the application. At Scaw vertical HRSGs will be used as they are best suited for the process gas conditions and the limited space available at the site.

The HRSG can be equipped with catalysts to reduce emissions when required. Catalysts are not required for this application, but the engineers will provide space to add catalyst in the future if it becomes necessary.

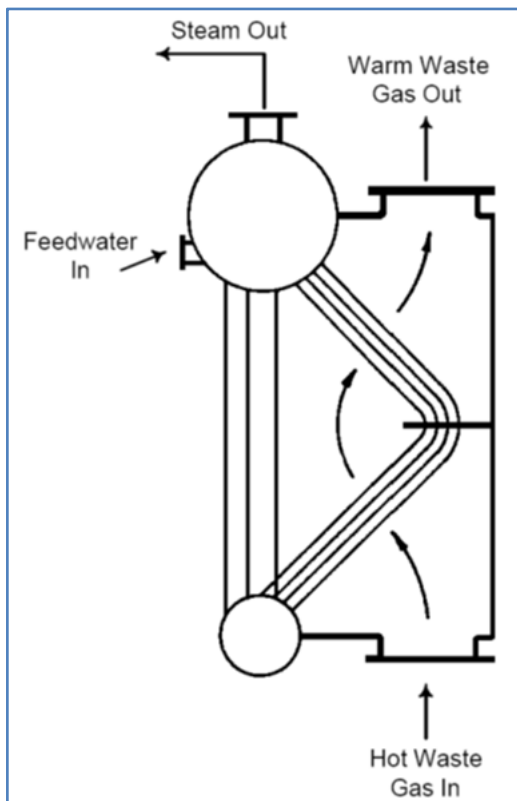


Figure 6: Schematic of the HRSG

#### 4.4.3.3 Process Flow

The hot gas enters at the top and flows downward across the tubes which are filled with water and/or steam. The vertical downward flow of gas reduces the tendency of dust to accumulate on the top surface of the tube. Dust that precipitates out is collected in hoppers at the bottom and removed. The cooled gas exits the HRSG and goes to the bag-house for further cleaning.

Preheated water from the de-aerator enters the HRSG and passes first through the economizer. The purpose of the economizer is to extract as much heat as possible from the gas by heating the water before it actually gets to the boiler section. The heated water then enters the steam drum. The steam drum separates the steam that is generated in the tubes from the water, so that the steam can flow to the super-heaters and the water can continue to circulate. Water from the steam drum flows through downcomers to the bottom headers and is distributed to the generating tubes. Water flowing up through the generating tubes absorbs heat from the hot gas and some of the water is converted to steam. When the steam is separated from the water in the steam drum, it flows into the superheating section where it is raised to a higher temperature. Raising the steam to the highest practical temperature enables the maximum amount of power to be generated in the steam turbine.

#### 4.4.3.4 Alternatives

The HRSG has been specifically designed for this application, there is no suitable alternative. This is the specific solution that was developed for this specific purpose.

### 4.4.4 Turbine Units

#### 4.4.4.1 Introduction

The steam turbine generator is used to convert the energy transported by the steam into electricity, which in turn can be transported to the end users.

#### 4.4.4.2 Technology

The steam turbine will be a well-proven industrial type, which have been used for decades in similar applications. This is a condensing and extraction type which is capable of supplying some process steam at various pressures and exhausting the remainder to the condenser. It drives a three-phase synchronous generator which will be connected through a transformer to the substation at Scaw.

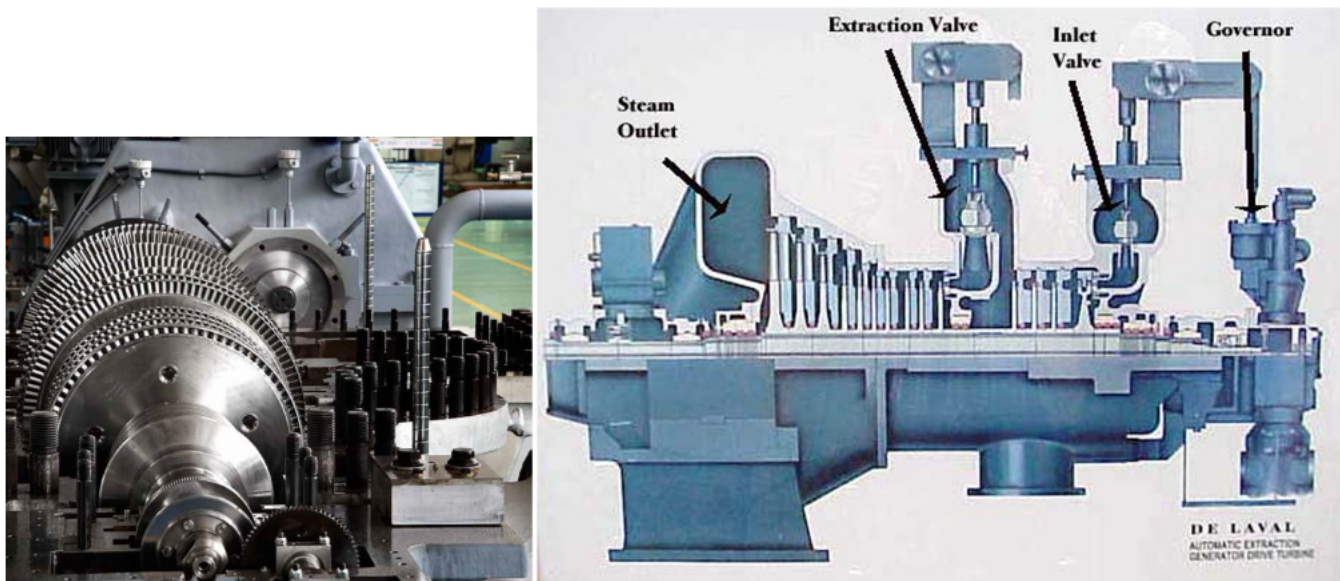


Figure 7: Schematic of the Turbine Unit

#### **4.4.4.3 Process Flow**

Steam enters the turbine through two valves, the first one of which is for safety and the second of which is for control. The first valve, named the Emergency Stop Valve (ESV) is a very fast closing, hydraulically opened and spring closed type. The second valve is the throttle valve which modulates the steam flow according to the demands of the system. After flowing through the valves, the steam enters the inlet nozzles which direct the steam at a specific speed and direction against the rotating blades. After each row of rotating blades is a row of stationary blades to redirect the steam into the next row of rotating blades. The steam moves through multiple stages of blades, continually decreasing in pressure and temperature, until it reaches the turbine exit. At the turbine exit, all possible energy has been extracted from the steam and it then flows to the condenser.

Some steam is extracted from the turbine at intermediate stages, before it has reached the exit. The extraction points are selected according to the desired pressure of steam. Some steam is extracted at about 4 BarA to be used in the de-aerator and other auxiliary systems. Additional steam is extracted at about 0.3 BarA to be used in the first feed water heater.

#### **4.4.4.4 Alternatives**

For generating power from steam there is no practical alternative to a steam turbine. In some situation steam is required for process uses and a steam turbine would not be used. At Scaw there is no need for process steam so all the steam generated will be used in the turbine.

### **4.4.5 Condensers**

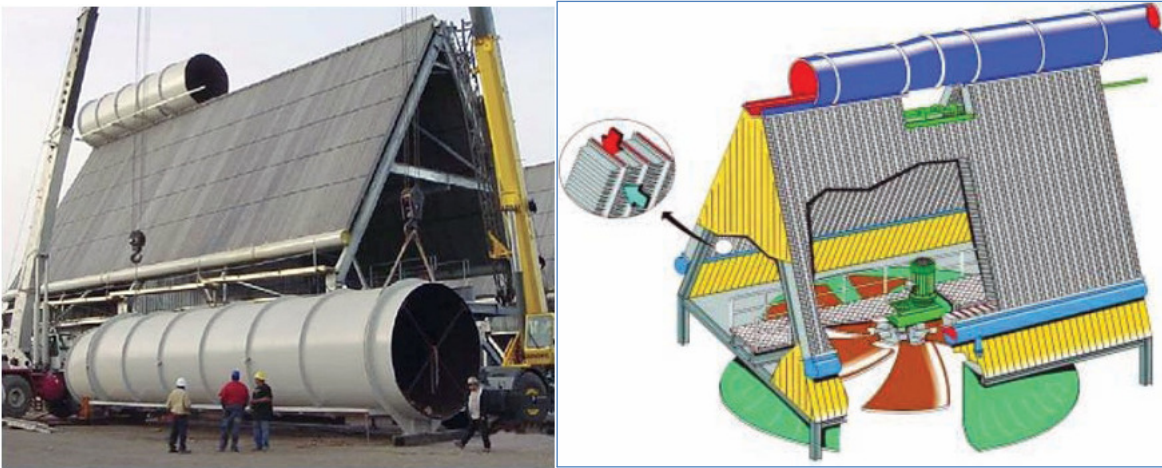
#### **4.4.5.1 Introduction**

The purpose of the condenser is to recover the high purity water that is used as the working fluid in the cycle. The condenser accepts all the steam from the turbine and other users, and condenses it to water by removing the heat of vaporization. The liquid water is then available to be used in the boiler to generate more steam.

#### **4.4.5.2 Technology**

The condenser will be an air cooled type. Diminishing water resources and increased water pollution concerns have led to the explosive growth of dry cooling worldwide. The most popular style of air cooled condenser is the modularized A-Frame design, used on power plants of all sizes as shown in the figure below.

Dry cooling utilizes an air cooled condenser to cool the exhaust steam using a large array of fans that force air over finned tube heat exchangers. The heat is rejected directly to the atmosphere, and no external water supply is needed.



**Figure 8: The Condenser Plant**

#### **4.4.5.3 Process Flow**

Steam from the turbine exhaust is carried through to steam duct to the air cooled condenser. The steam duct runs at the top of the A frame and smaller tubes are connected to a header at the bottom. Air is drawn over the tubes by various fans. The steam that condenses in the tubes flows to the condensate header at the other end. All the condensate is collected from the headers and drained to the condensate tank. The air removal system draws any non-condensable gasses from the condensate tank to maintain the lowest possible operating pressure. Water from the basin is continuously circulated and sprayed over the outside of the tubes. Some fraction of the circulating water is blown down to maintain the correct water chemistry. The water that evaporates is replaced with make-up from the service water system, drains recovery, and other available sources.

#### **4.4.5.4 Alternatives**

Alternatives for this application are wet cooling (utilising natural draught or forced draught air flow) or hybrid systems that use water, but less than conventional cooling towers.

The water cooled condenser and cooling tower combination is the most typical configuration for a power plant. However, this arrangement is very sensitive to water quality and susceptible to plugging tubes when there is a high solids loading in the water. Because of the industrial environment, the circulating water will be heavily loaded with dirt from the air. This would lead to many operational problems and reduced reliability for the system.

### **4.4.6 Emissions Control**

#### **4.4.6.1 Introduction**

Emissions from the DRI kiln are currently regulated in terms of the APPA Registration Certificate. These are set at Particulate Matter of 50 mg/NM<sup>3</sup>, Sulphur Dioxide of 350 mg/NM<sup>3</sup> and Oxides of nitrogen of 500 mg/NM<sup>3</sup>. Recent monitoring of emissions (Levego, 2012) has shown that the DRI Plant is not currently meeting the SO<sub>2</sub> emissions limits. PM levels are also problematic.

Phase 1 of the Co-generation Power Plant will not add or remove any physical material to the exhaust gas, but will remove heat. In terms of NEMAQA Emissions Limits the DRI plant must comply with the new emissions limits for the Metallurgical Industry, specifically subcategory 4.12 for direct reduction processes (GN R248, 2010), as shown in the table below. The NEMAQA emissions limits are in fact higher than the limits currently set for the DRI Plant in the APPA Registration Certificate.

<b>Description</b>	Production of pre-reduced or metallised ore or pellets using gaseous or solid fuels		
<b>Application</b>	All installations.		
<b>Substance or mixture of substances</b>		Plant Status	mg/NM <sup>3</sup> under normal conditions of 10% O <sub>2</sub> , 273 Kelvin and 101.3 kPa
<b>Common name</b>	<b>Chemical symbol</b>		
Particulate Matter	N/A	New	50
Sulphur Dioxide	SO <sub>2</sub>	New	500
Oxides of nitrogen	NO <sub>x</sub> expressed as NO <sub>2</sub>	New	1000

The Co-generation Power Plant will aim to achieve the more conservative limits from the APPA Registration Certificate. Phase 1 of the Co-generation Power Plant will function as ‘cleaner technology’ development and will be required to improve the emissions control equipment on the DRI plant to ensure that the current emissions limits are achieved. It is proposed to make use of new bag houses to achieve the desired emissions control. Test work and the air quality impact assessment will be used to determine if any additional emissions treatment is required to achieve the current emissions limits set in the APPA Registration Certificate (i.e. more conservative than the Category 4.12 limits).

#### 4.4.6.2 Technology

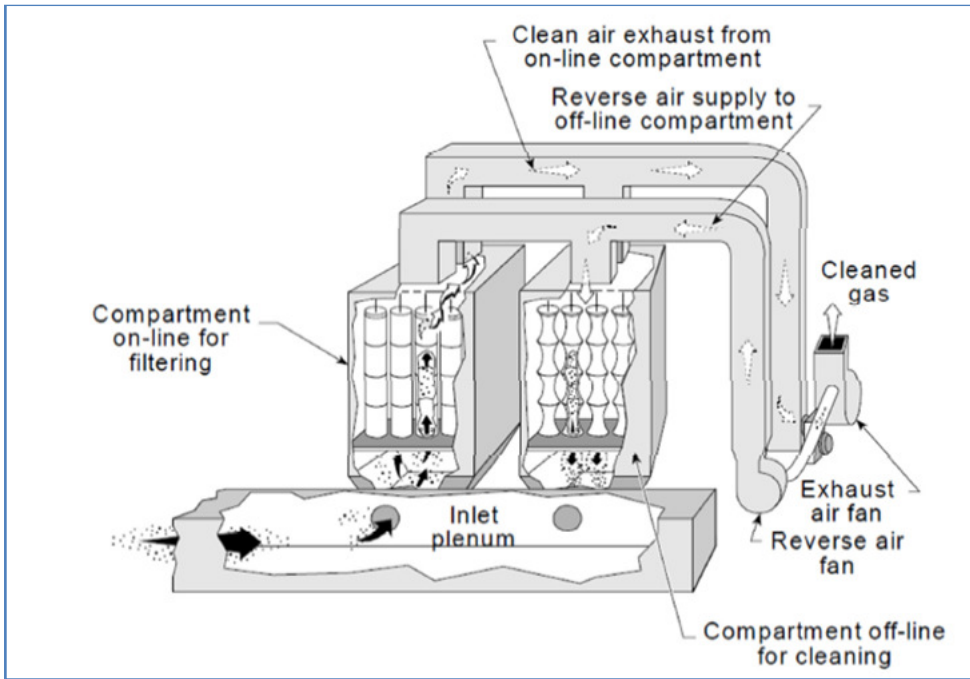
The exhaust gas from the Co-generation Power Plant will be passed through a new bag house before being discharged to the atmosphere through a new stack. The purpose of the bag house is to remove particulates from the gas prior to its release to atmosphere.

Fabric filters, commonly termed “bag filters” or “baghouses,” are collectors in which dust is removed from the gas stream by passing the dust-laden gas through a fabric of some type (e.g., woven cloth, felt, or porous membrane). These devices are “surface” filters in that dust collects in a layer on the surface of the filter medium, and the dust layer itself becomes the effective filter medium.

The gas discharged to the atmosphere will have the approximate properties shown in the table below.

Temperature °C	Volume Flow AM <sup>3</sup> /Hr	%CO <sub>2</sub>	%H <sub>2</sub> O	% O <sub>2</sub>	%N <sub>2</sub> + Ar
90	527635	14.6%	6.6%	4.7%	74.0%

Although the design details of the DRI plant indicate that the plant should operate at SO<sub>2</sub> output levels below the 350 mg/NM<sup>3</sup>, current emissions exceed this. The technical team is investigating improvements in the operational controls and additional emissions technology to ensure that the DRI plant meets the allowable SO<sub>2</sub> emissions levels.



**Figure 9: Schematic of a Bag-house**

The stack size, height and operating parameters will be determined to ensure adequate dispersion of the emissions.





**Plate 2: Example of a Stack**

#### **4.4.6.3 Process Flow**

After the flue gas leaves the HRSG or the Fluidised Bed Boiler at about 200 degrees Celsius it enters the baghouse and passes through the filter bags. As the dust laden gas passes through the filter bags, the dust particles are collected on the outside surfaces of the numerous filter bags. The dust will build up around the bags and is removed by periodic activation of pulsed air. The air causes the bags to shake and expand. This causes the dust layer to fall down into a hopper from where it is removed to the ash disposal site.

The cleaned gas continues up the stack and exits into the atmosphere.

#### **4.4.6.4 Alternatives**

Various technologies exist for the cleaning and treatment of effluent gas streams before release into the atmosphere. Alternative technologies are electrostatic precipitators, gravity settling chambers, mechanical collection (Cyclone) and particulate wet scrubbers.

Fabric filter bags will be used, since they are most reliable cleaning gas streams very high cleanliness levels with only very small particles remaining.

## 4.5 Phase 2

Phase 2 of the Electrical Co-generation Power Plant will combust various energy containing wastes and resources (dust, char and shredder waste) to produce up to 28 MW of electricity. Phase 2 will require the development of new infrastructure and its design is influenced by the type and availability of the fuel stock.

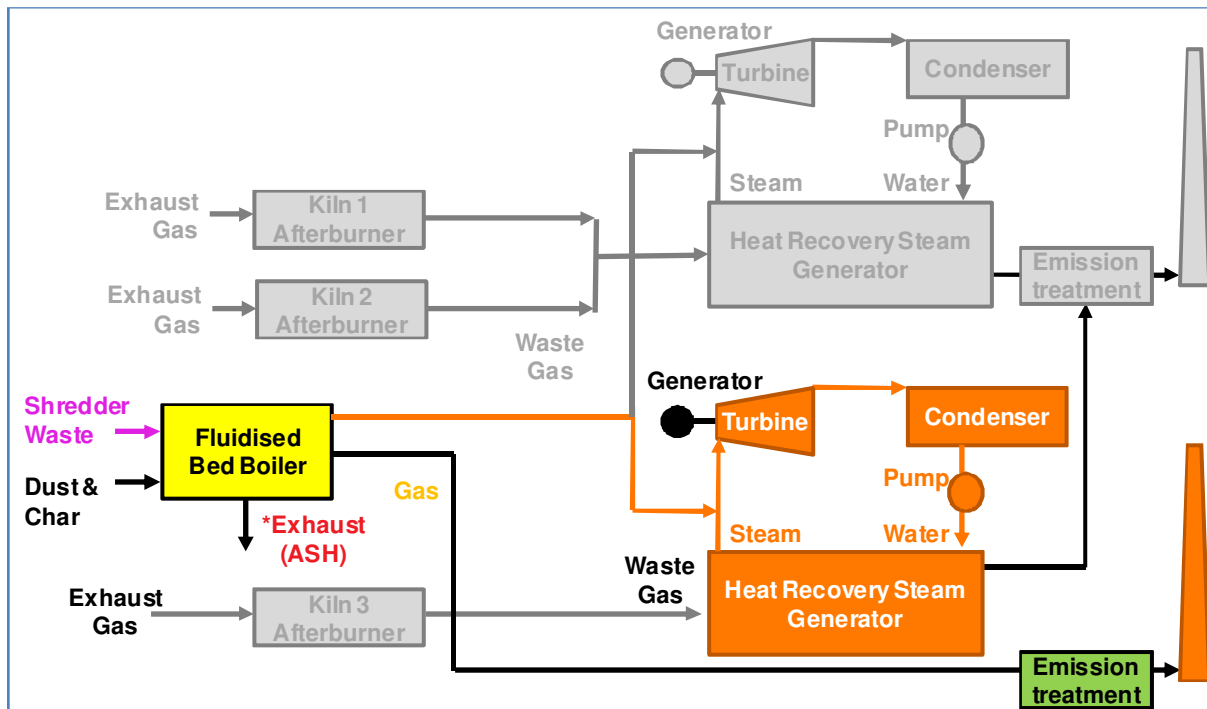


Figure 10: Proposed Process Flow for the Phase 2 of Co-generation Power Plant

### 4.5.1 Fluidised Bed Boiler

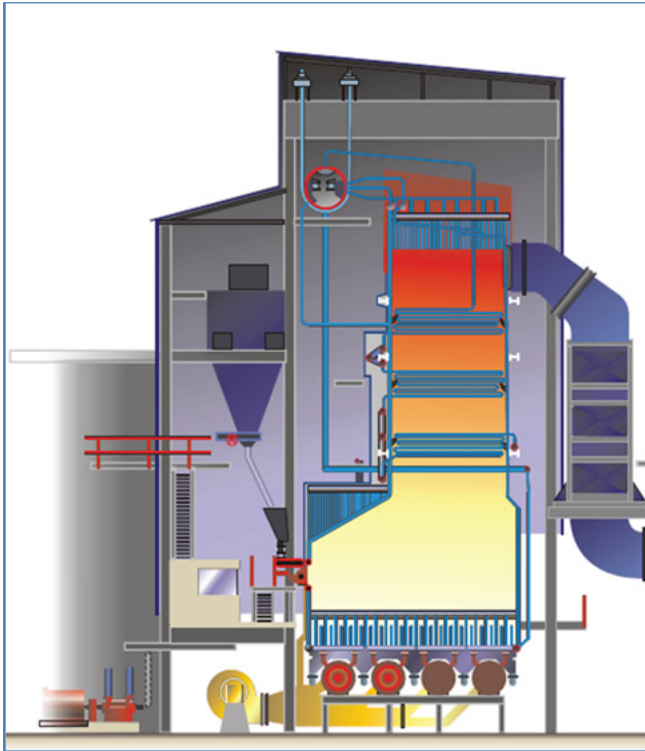
#### 4.5.1.1 Introduction

A fluidised bed boiler (FBB) will be included to burn the shredder waste, dust and char by-products in order to generate more power. Having an independently controlled supply of energy to the waste heat boilers also allows them to be operated more evenly and to keep the steam turbine above its minimum allowable load point. Burning the by-products enables power to be produced from a material that would otherwise be disposed of.

#### 4.5.1.2 Technology

A fluid bed is a type of furnace design where fuel is combusted in a bed of material containing, generally, sand, ash, fuel, and lime. Enough air is introduced under the grate to lift the material and force vigorous mixing of the material in the bed. There are various fluidized bed designs ranging from the “moving bed” to “bubbling bed” and “circulating bed” (see figure below). The difference is in the amount of fluidization that occurs, and the fuel particle sizing required.

The temperature is stabilized by the bed of a large amount of inert material which is fluidized and thoroughly mixed by the flow of air through the bed. The thermal inertia of the bed material facilitates the even and reliable combustion of materials which are difficult to burn in a conventional manner. The stable combustion conditions promotes the complete oxidation of the fuel so that low levels of CO are achieved. In addition, because lower peak combustion temperatures are reached, it reduces the formation of thermal NO<sub>x</sub>. Additionally, limestone can be added into the bed which will absorb sulfur and reduce the emissions of SO<sub>x</sub>.



**Figure 11: Schematic of the FBB**

#### **4.5.1.3 Process Flow**

The fuel is added to the FBB near the top of the bed, or sometimes above the bed, and air is added under the bed. The bed is supported by a perforated grate which prevents the bed material from falling down into the air chamber. Air flows up through the grate and into the bed. Depending on the amount of air added under the grate, the bed will either be partially fluidized as air bubbles rise through it, or fully fluidized and the smaller particles carried out of the furnace. The bubbling bed FBB intended for this project is of the first type. In the second type it is necessary to recapture the bed material with a cyclone and return it back to the bed.

As the air flows up through the bed it burns with the fuel which tends to raise the bed temperature. The bed temperature must be maintained at a level below the ash fusion temperature of the fuel in order to prevent the melted ash from adhering to everything. The bed temperature can be maintained by bed coolers through which steam flows and removes heat from the bed material. In our case, the bed temperature will be controlled by adding some recycle gas to the FBB. The relatively cool recycle gas will remove heat and then flow with the combustion products to the WHB where that heat will be converted to steam.

**4.5.1.4 Alternatives**

An alternative to the fluidised bed boiler is a fluidised bed combustor. The only difference is that it does not have steam generating equipment included and can therefore provide a cheaper solution. However, a secondary boiler will be required to generate the required steam. The combustion process will be exactly the same in both technologies, so there is no difference with the operation or the achievable emissions levels.

**4.5.2 Fuel and other inputs**

**4.5.2.1 Coal Dust and Char**

A portion of the coal which is used for reducing the iron in the DRI process is not completely consumed in the kilns. This is collected as dust in the baghouse and also separated from the iron slag as char from the DRI exiting the cooler. The char and coal dust is equivalent to coke, it is almost entirely carbon with some ash. The quantity of char and coal dust is dependent on the production rate of DRI and is expected to be 287 GJ/Hr at full capacity.

**4.5.2.2 Shredder Waste**

Shredder waste is considered to be an opportunity fuel. It is not considered to be a normal fuel, but it will be used if it is available and if its properties meet the specifications for the FBB. The quantity of shredder waste is dependent on the quantity and source of scrap being shredded. A study conducted in 2010 identified that on average about 1250 tonnes/month of combustible material could be recovered from the shredder waste. This would represent about 2,700 kW of increased electrical power. However, it is anticipated that the shredder waste would not be fed on a continuous basis, but used intermittently when it is available and is needed to maintain the required steam turbine output.

**4.5.2.3 Water**

Water is used both for cycle make-up and for cooling. The cycle make-up requires a small quantity of very high quality water to replace losses from the steam cycle. This water will be supplied from Rand Water and processed through a demineralizing system.

Water for cooling is needed in much larger quantities, but the quality requirements are much less. Cooling water will come from reclaimed drains and waste water to the extent possible. Any additional water that is needed will be supplied from the Rand water authority.

**4.5.3 HRSG, Turbine and Condenser**

Phase 2 will make use of similar technology for the HRSG, Turbine and Condenser as described for Phase 1.

**4.5.4 Emissions Control**

**4.5.4.1 Introduction**

As phase 2 includes the combustion of shredder wastes and alternative fuels in the FBB, the emissions control for Phase 2 will be required to meet the emissions limits for Category 8 (GN R248, 2010) of the NEMAQA listed activities (the disposal of hazardous and general waste) as shown in the table below.

<b>Description</b>	Facilities where general and hazardous waste including health care waste,
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	crematoria, veterinary waste, used oil sludge from the treatment of used oil are incinerated.		
<b>Application</b>	Facilities with an incinerator capacity of 10kg of waste per hour or larger capacity		
<b>Substance or mixture of substances</b>		Plant Status	mg/Nm <sup>3</sup> under normal conditions of 10% O <sub>2</sub> , 273 Kelvin and 101.3 kPa
<b>Common name</b>	<b>Chemical symbol</b>		
Particulate Matter	N/A	New	10
Carbon monoxide	CO	New	50
Sulphur Dioxide	SO <sub>2</sub>	New	50
Oxides of nitrogen	NO <sub>x</sub> expressed as NO <sub>2</sub>	New	200
Hydrogen chloride	HCl	New	10
Hydrogen fluoride	HF	New	1
Sum of lead, arsenic, antimony, chromium, cobalt, copper, manganese, nickel, vanadium		New	0.5
Mercury	Hg	New	0.05
Cadmium Thallium	Cd+Tl	New	0.05
Total organic compounds	TOC	New	10
Ammonia	NH <sub>3</sub>	New	10
		New	ng I-TEQ/ Nm <sup>3</sup> under normal conditions of 10% O <sub>2</sub> , 273 Kelvin and 101.3 kPa
Dioxins and furans	PCDD/PCDF	New	0.1

The emissions limits will be met through accurate control of the combustion conditions, the addition of various additives to capture target compounds and emissions treatment technology. It is proposed to make use of bag house to achieve the desired PM emissions control. Test work and the air quality impact assessment will be used to determine if any additional emissions treatment is required to achieve the Category 8 emissions limits.

The stack size, height and operating parameters will be determined to ensure adequate dispersion of the emissions.

#### 4.5.4.2 Technology

NO<sub>x</sub> formation in the FBB will be controlled by limiting the bed temperature to <900 °C and by maintaining very low levels of excess air. The bed temperature will be controlled by recirculation of gas from the ID fan outlet. If necessary the oxides of nitrogen will be controlled post combustion with ammonia or urea by selective non-catalytic reduction (SNCR), also called thermal deNO<sub>x</sub>. The System will be designed to limit NO<sub>x</sub> emissions to 200 mg/Nm<sup>3</sup> @10% O<sub>2</sub>. Thermal deNO<sub>x</sub> is most effective in the temperature range of about 900 °C to 1000 °C and can achieve about 40% - 70% reduction of NO<sub>x</sub>. The reagent will be injected at the outlet of each kiln, before the afterburner, via an injection grid. If necessary a static mixer will be installed to ensure adequate dispersion of the reagent in the gas stream prior to the afterburner. As the gas passes through the afterburner the nitrogen oxides will be reduced to nitrogen and water vapour.

The sulphur oxides will be removed from the gas streams by duct injection of alkali (LSD technology). It is expected that finely ground dolomite will be effective at the conditions which exist in the afterburner. The ground dolomite will be injected pneumatically at the entrance to the afterburner. To ensure complete calcination of the dolomite and optimal reaction with SO<sub>2</sub> the afterburner must be maintained between 800 °C and 900 °C. Sulphur emissions from the plant will be reduced significantly.

The FBB outlet gas will also have high levels of carbon monoxide and duct burners running on natural gas can be used to convert the CO to CO<sub>2</sub> and to destroy the VOCs. The gas must however then be cooled before it reaches the baghouse. Another option is an oxidation catalyst before or after the baghouse but then the gas must be heated to ensure sufficient oxidation.

The exhaust gas from the FBB will be passed through a dedicated bag-house before being discharged to the atmosphere through a new stack. Dusts from the bag-house filters will be disposed as wastes.

The gas discharged to the atmosphere will have the approximate properties shown in the table below.

Temperature °C	Volume Flow AM <sup>3</sup> /Hr	%CO <sub>2</sub>	%H <sub>2</sub> O	% O <sub>2</sub>	%N <sub>2</sub> + Ar
90	527635	14.6%	6.6%	4.7%	74.0%

#### 4.5.4.3 Process Flow

As for Phase 1.

#### 4.5.4.4 Alternatives

As for Phase 1. The need for additional emissions control technology is being assessed through the test work and the air quality impact assessment.

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## 4.6 Management of Wastes

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### 4.6.1 Exhaust Gas

As described for each phase, exhaust gases will be passed through bag-houses to achieve emissions control and then released to atmosphere via a stack. Additional control mechanisms are being investigated to ensure that the emissions from the FBB will comply with the NEMAQA emissions limits.

### 4.6.2 Blow Down Water

All water discharged from the plant will be in a single stream, disposed either with the ash or to the municipal sewer. The water composition and properties will meet the discharge standards defined by the municipality. The maximum volume flow is expected to be about 8.9 ML<sup>3</sup>/Hr.

### 4.6.3 Ash

Waste ash from phase 2 of the Co-generation Power Plant will be disposed to either the existing, permitted Scaw Metals GLB+ Waste Disposal Site or to a purpose-built Ash Disposal Facility.

The ash will meet the requirements of the disposal permit/licence for the facility to which it is being disposed. The composition consists of oxides of silica, alumina, iron, potassium, sodium, calcium, and other metals. It is essentially the same material as is currently disposed, with the carbon fraction removed. Because the carbon fraction has been burned out, the volume will be about 50% - 70% of what is currently disposed.

#### 4.6.4 Bag-house dusts

The filters on the bag-houses used to effect emissions control on the exhaust gas will generate fine dust. The dusts from the bag-house filters will be disposed to either the existing, permitted Scaw Metals GLB+ Waste Disposal Site or to a purpose-built Ash Disposal Facility.

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### 4.7 Operations and Safety of Personnel

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Operation of the cogeneration facility will be based on three 8-hour shifts per day. The following personnel will be required to operate the plant:

POSITION	No.
Plant manager	1
Plant operators	4
Operator's Assistants	4
Technicians	4
Technical Apprentice	2
Fitting (crew rate)	2
Cleaners/ Laborers	10
Security	6
Drivers	8
TOTAL	41

Safety is addressed in all aspects of design, engineering, fabrication, construction, commissioning and operations. The design of the cogeneration plant specifically addresses protection of the environment, the public, and operations staff by means of engineered safety systems, environmental monitoring systems, and safety assessment of the design and proposed operations.

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### 4.8 Development Alternatives

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#### 4.8.1 Alternatives

Potential alternative technologies have been discussed in each section of the project description.

#### 4.8.2 No-go Development Alternative

Consequences of the no-go development alternative will be considered more fully in the EIA. Initial assessment of the no-go development alternative includes:

- No on-site electrical generation
  - Scaw remains dependant on Eskom
  - High risk of stoppages due to power outages
  - Limited opportunity for expansion

- Substituted supply not available to other Eskom customers
- Continued loss of heat to atmosphere
- No reduction in carbon emissions of consumed electricity
- No reduction in volume of waste for disposal
- No extension of life of Scaw Metals GLB+ Disposal Facility.

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## 4.9 Project Implementation Schedule

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The Electrical Co-generation Facility at Scaw Metals has been conceived in two phases whose development and operations are closely interlinked, but also separable. The precise schedule of development will only be determined during final feasibility, however it is likely that Phase 1 will be developed and operated initially, with Phase 2 being implemented later in the project cycle.

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## 4.10 Monitoring

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Monitoring of operations and environmental parameters will be required to ensure that the Electrical Co-generation Power Plant is not having a detrimental effect. Operating conditions will be intensively monitored to ensure optimal performance and efficiency as well as to ensure emissions control.

Stack emissions, ambient air quality and dust fallout should be monitored. The site falls largely within the existing dust monitoring network at Scaw Metals, but this will need to be reviewed and extended as required. Ambient air quality and stack emissions monitoring will be done in line with the requirements of the AEL. Details will be provided in the EIA once the site design and air quality impact assessment is complete.

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## 4.11 Decommissioning and Closure

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The Electrical Co-generation Power Plant has been designed for a 25 year life of operation. The need and possibility of decommissioning the facility will be depend on the operation of the DRI kilns and the condition of the equipment.

Decommissioning of the facility will require the dismantling of the equipment, the sale and final disposal of all components, the decontamination of any contaminated areas and the rehabilitation of the site to condition suitable for an end land use. Such end land-use will most probably be industrial. Additional details will be provided in the EIA once the site design and assessment is complete.



## 5. Project Description: Ash Disposal Facility

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### 5.1 Project Design Criteria

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The Electrical Co-generation Power Plant proposed by Scaw South Africa at its Germiston operation (Scaw Metals Union Junction) may include a fluidised bed boiler which will produce ash as a waste. **The bag-houses used for emissions control will produce dust as a waste.** Scaw South Africa requires an on-site facility to dispose of the ash **and bag-house dust** for the potential 25 year life electrical co-generation project. The Ash Disposal Facility will comply with the current design standards for waste disposal facilities as endorsed by the Department of Environmental Affairs.

### 5.2 Waste Generation

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Phase 2 of the Electrical Co-generation Power Plant will combust various energy containing materials, alternative fuels, wastes and by-products. The combustion will generate waste ash which will require disposal. The current configuration of the plant is anticipated to produce ~ 300 t of ash per day. The ash will be recovered directly from the FBB. Additionally the bag houses on both Phase 1 and Phase 2 of the Electrical Co-generation Power Plant will produce fine bag-house dusts. All of this material will require disposal.

Scaw South Africa has proposed to make use of an internally owned and operated facility for the disposal of the waste generated at the Electrical Co-generation Power Plant. Scaw are considering two options for waste disposal including the existing Cell 4b at the Scaw Metals GLB+ Waste Disposal Site or a purpose-built Ash Disposal Facility. It is likely that both options will be required.

In addition, the other waste streams (i.e. foundry sands, fumex dusts etc) and which cannot be combusted in the Electrical Co-generation Power Plant will continue to require disposal. These will be disposed to the Cell 4b site at Scaw Metals for as long as there is airspace capacity. It is noteworthy that the total volume of Scaw production wastes will reduce over current volumes as the char, coal dust and shredder waste are combusted in the Electrical Co-generation Power Plant. This will extend the disposal life of the Cell 4b site and any future waste disposal sites. Scaw will consider and assess the need for any additional waste disposal sites as part of future investigations.

**The Ash Disposal Facility will be built and operated primarily for the disposal of wastes from the Electrical Co-generation Power Plant. However it may also be required to receive other Scaw production wastes (i.e. foundry sands, fumex dusts etc) in the period when Cell 4b reaches capacity and before a further site is developed. This assessment will therefore also consider the disposal of the Scaw production waste streams to the Ash Disposal Facility.**

#### 5.2.1 Waste Classification

The basic composition of the ash and baghouse dust is anticipated to be oxides of silica, alumina, iron, potassium, sodium, calcium, and other metals. It is essentially the same material as is currently disposed to Cell 4b Waste Disposal Site, with the carbon fraction removed.

Scaw South Africa are busy with various trials to generate ash and dusts of a similar type that will result from the FBB. The trial ash has been generated by combusting samples of the various fuels in test facility operated by the CSIR. The resultant ash will then be subjected to a waste classification study to determine the hazard rating of the waste. The waste classification will be undertaken in terms of the methods endorsed by the Department of Environmental Affairs. These are currently the Minimum Requirements Guideline Series (2<sup>nd</sup> Edition, DWAf, 1998).

If the ash and dusts classify as a general waste then it can be disposed of at Cell 4b, although that facility will not have sufficient capacity for the life of the Electrical Co-generation Power Plant. If the ash and dust is classified as hazardous then it will most likely not be suitable for disposal to Cell 4b as the liners in that facility were constructed to GLB+ standards. A purpose-built Ash Disposal Facility will be developed for disposal of ash and bag-house dusts generated over the life of the Electrical Co-generation Power Plant.

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## 5.3 Cell 4b

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Cell 4b is a GLB<sup>+</sup> disposal site, designed in accordance with the Department of Water Affairs and Forestry's Minimum Requirements for Waste Disposal by Landfill, 2<sup>nd</sup> Edition, 1998. Development and operation of the cell was approved through a waste management licence issued by the Department of Environmental Affairs (12/9/11/L471/3).

Cell 4b is a pentagon shaped cell, covering an area of approximately 9 ha and having a disposal capacity of 1.7 M m<sup>3</sup>. The cell basin slopes at 1:50 with side slopes sloping at 1:3. The cell will be filled against Cell 4a resulting in a final landform of a joined cell. Lined storm water catchment paddocks were provided around the toe of the cell. As a result of the shallow groundwater level, the design of Cell 4b was altered to lift the base of the cell to ensure a 2 m separation to the groundwater table. The lining system is in accordance with the Minimum Requirements for Waste Disposal by Landfill GLB<sup>+</sup> standards and comprises of:

- Base preparation;
- 150 mm subsoil drainage system;
- Class 2 Geotextile layer
- 600mm Compacted Clay Liner (compacted in four 150mm lifts); and
- 250 mm Leachate collection layer.

Operations involve disposal of waste from Scaw Metals behind a screening berm ('rising green wall'). The berm is constructed of dry waste material and is covered with topsoil and grassed. Waste is disposed behind the berm until that level is full and a new berm is constructed on the next level. The licence allows for the disposal of general waste from Scaw Metals, Shredder wastes and the treatment and disposal of fumex dust. This involves blending of the fumex dust with cement and the addition of ferrous sulphate. At 2010 disposal rates Cell 4b had capacity for approximately 6 years of disposal.

### 5.3.1 Location

Cell 4b is located at the Scaw Metals GLB+ Waste Disposal Site within the Scaw Metals property. Cell 4b is situated on the remainder of portion 1 of the Farm Roodekop 139 IR, immediately adjacent to Cell 4a.

### 5.3.2 Disposal of Wastes from the Electrical Co-generation Power Plant

The current waste management licence for Cell 4b specifies the permissible wastes for disposal. The site is designed to receive general wastes and low volumes of certain hazardous wastes, which are treated in-situ. Cell 4b could only accept ash from the FBB and dusts from the bag houses if they are classified as a general wastes.

As at July 2012 Cell 4b has its full 1.7M/ m<sup>3</sup> of airspace remaining. In the absence of any other disposal, Cell 4b could therefore accommodate approximately 15 years of ash disposal, which is not sufficient for the proposed life of the Electrical Co-generation Power Plant. In addition there would be other wastes from the Scaw Metals facility that would require disposal and consume airspace. Although Cell 4b may be suitable for the disposal of general ash waste, it would only provide a temporary solution.

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## 5.4 New Ash Disposal Facility

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Cell 4b may not be able to receive ash and bag-house dusts from the Electrical Co-generation Power Plant, either because of the classification of the waste or because of capacity constraints or both. Scaw South Africa has thus proposed the development of a new Ash Disposal Facility at Scaw Metals.

The new Ash Disposal Facility has been designed to cater for the disposal of all ash and bag-house dust from the FBB for the proposed life of the Electrical Co-generation Power Plant. The Ash Disposal Facility will cover a footprint of approximately 17 ha and be constructed to a final height of 25 m above natural ground level. The side walls will be benched and sloped to 1:3. The Ash Disposal Facility will provide for approximately 1.7 million m<sup>3</sup> of airspace. The new Disposal Facility will be required as Cell 4b has limited airspace capacity.

### 5.4.1 Location

The new Ash Disposal Facility will be located within the Scaw Metals property, between the DRI plant and Dekema road. The new Ash Disposal Facility will be located across three properties (Erf 632, Erf 133 and Erf 634) within the Scaw Metals property.

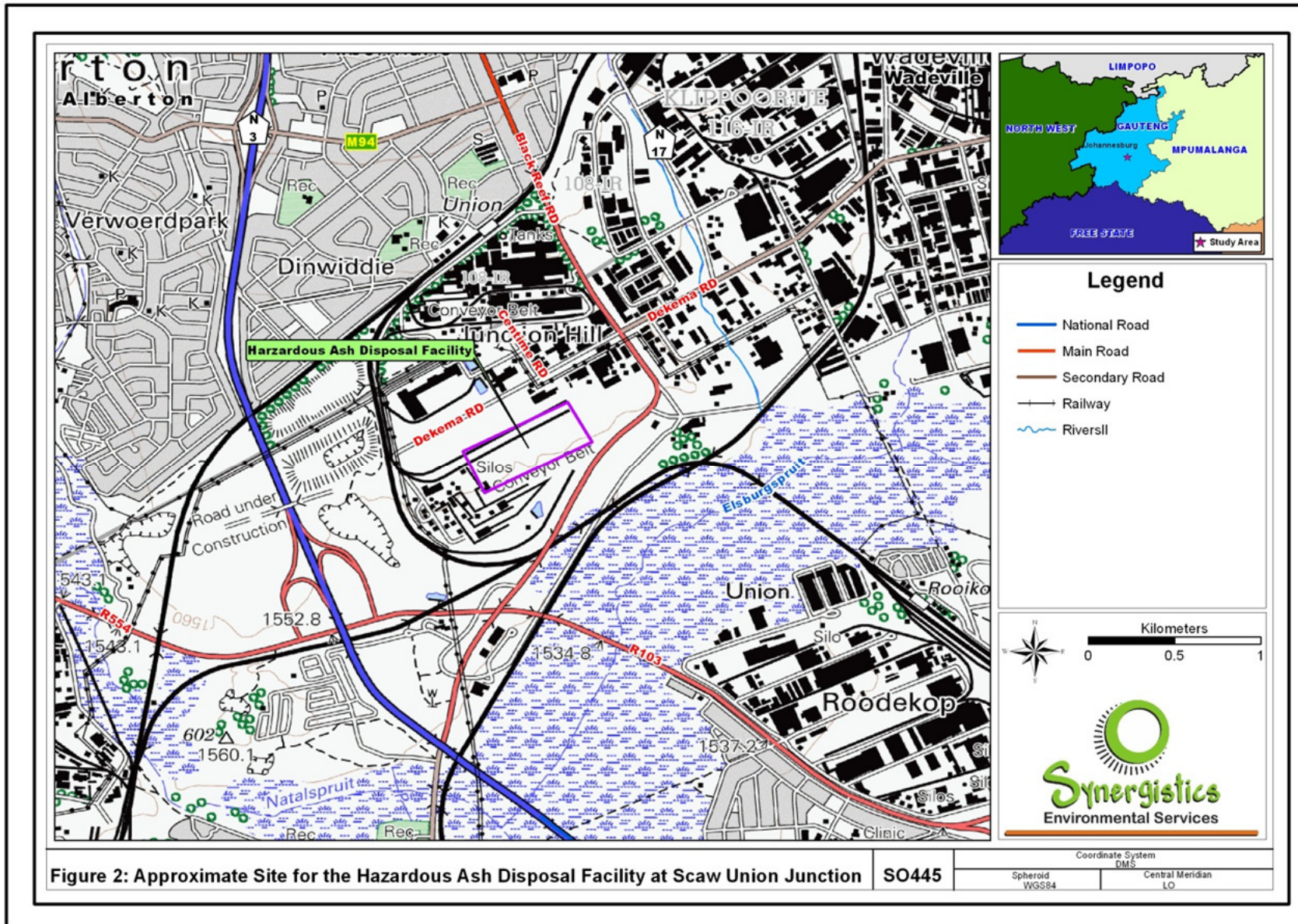


Figure 12: Location of preferred Site for Ash Disposal Facility



**Plate 3: View of and toward the site for the Ash Disposal Facility**

## **5.4.2 Cell Design**

### **5.4.2.1 Design Philosophy**

The new Ash Disposal Facility will be designed in accordance with standards endorsed by the Department of Environmental Affairs. Currently the Minimum Requirements Guideline Series (2<sup>nd</sup> Edition, DWAF 1998) are the enforced standards. The implementation of new standards is in progress, but has been subject to numerous delays. Should the new standards be promulgated before the final design and reporting for the project is completed then the designs will be upgraded.

### **5.4.2.2 Geometry**

Geometry, plan and design details will be provided on the detailed conceptual design drawings to be included in the EIA.

### **5.4.2.3 Liner and Drainage Details**

The lining system will again be in accordance with the Minimum Requirements Guideline Series (2<sup>nd</sup> Edition, DWAF 1998). The design of the liner and drainage layers will be dependent on the waste classification. Details will be provided in the detailed conceptual design drawings to be included in the EIA.

#### **5.4.2.4 Storm water management**

The design of the Ash Disposal Facility will incorporate clean storm water diversion and provision for the capture of contaminated storm water runoff. It is likely that the design will incorporate storm water paddocks at the toe of the facility, as was used at Cell 4b. Details will be provided in the detailed conceptual design drawings to be included in the EIA.

### **5.4.3 Operating Conditions**

#### **5.4.3.1 Transport and Disposal Operations**

Ash and bag house dusts from the Electrical Co-generation Power Plant will be transported by truck along internal roads to the ash disposal facility. **A conveyor system may be considered.** Operations will involve disposal of waste in engineered waste disposal cells. For each filling phase, a screening berm ('rising green wall') will be constructed behind which the waste disposal will take place. Such a berm will be constructed of dry waste material. The outer slope of the berm will be covered with topsoil and grassed. Details will be provided in the operational plans to be included in the EIA.

#### **5.4.3.2 Treatment of hazardous waste**

The pending waste classification will determine if the ash **and bag-house dust** requires any form of treatment during disposal. Details will be provided in the operational plans to be included in the EIA.

### **5.4.4 Monitoring**

Monitoring of operations and environmental parameters will be required to ensure that the Ash Disposal Facility is not having a detrimental effect. Surface water, groundwater and dust fallout should all be monitored. The site falls largely within the existing monitoring networks at Scaw Metals, but these will need to be reviewed and extended as required. Details will be provided in the EIA once the site design and assessment is complete.

### **5.4.5 Labour and Staff Requirements**

The Ash Disposal Facility will be designed and constructed by various external contractors. The waste transport, disposal and management of the Ash Disposal Facility will be undertaken by a combination of Scaw employees and contractors.

### **5.4.6 Decommissioning and Closure**

The Ash Disposal Facility will be operational for as long as the Electrical Co-generation Power Plant produces waste requiring disposal and the site has airspace available. The facility has been designed for a 25 year life of operation.

Final closure and end use plans will be prepared in terms of the standards endorsed by the Department of Environmental Affairs. A closure and rehabilitation plan will be developed as the Ash Disposal Facility nears the end-of-life. Information for this will be drawn from the monitoring data collected during cell operations and the rehabilitation of previous waste disposal cells. As a minimum the decommissioning and closure will include shaping of the surface, installation of a cap and final cover layers, provision for storm water flow and surface rehabilitation. In addition the management of leachate and storm will occur for a number of years post-closure. Additional details will be provided in the EIA once the site design and assessment is complete.

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## 5.5 Development Alternatives

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### 5.5.1 Alternatives

Two potential alternative waste disposal sites are being considered in the EIA process. Off-site waste disposal alternatives were not considered economically feasible due to the costs of acquiring land and the cost of transport.

The disposal of the ash to land is being considered as a 'worst-case' scenario for the Electrical Co-generation Power Plant and is key to determining the overall economic feasibility of the project. Opportunities may exist to reuse or recycle portions of the waste, but these will only be investigated as value adding propositions later in the project cycle. The project must be feasible with all waste requiring disposal.

### 5.5.2 No-go Development Alternative

Consequences of the no-go development alternative will be considered more fully in the EIA. Initial assessment includes:

- No on-site disposal for wastes from the Electrical Co-generation Power Plant
- Utilisation of a commercial waste disposal site; or
- Development of an off-site disposal facility;
- Transport of waste to selected site;
- Increased 'environmental footprint' of waste disposal; and
- Reduction in 'cradle to grave' control and responsibility for wastes.

## 6. Description of the Affected Environment

The baseline environment described here represents the current environmental conditions of the Scaw Metals, Union Junction area. It is indicative of pollution and degradation due to Scaw Metals operations, human, agricultural and industrial activities in the area and naturally occurring phenomena. Baseline information was sourced from desktop studies, site inspections and from on-going monitoring completed at the site. The baseline information serves as a reference point to scientifically measure or professionally judge future changes to the environment that may occur with the development of the Electrical Co-generation Power Plant or Ash Disposal Facility at Scaw Metals.

Where the specifics of one of the proposed sites is different from the general overview provided of the environmental aspects, then such additional information is detailed as a sub-section.

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### 6.1 Physical Environment

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#### 6.1.1 Climate

The Scaw Metals site falls within the summer rainfall area of South Africa and is characterised by thunderstorms in summer, combined with winters that are typified by drought, severe night frost, and marked diurnal temperature variations. Climate conditions are typical of the Highveld region where rates of average annual evaporation exceed that of average annual precipitation.

##### 6.1.1.1 Temperatures

The average daily maximum temperature for the area is approximately 24°C in midsummer and 18°C in midwinter. The average daily minimum temperature for the area is 14°C in midsummer and 6°C in midwinter.

##### 6.1.1.2 Precipitation

Rainfall data were sourced from on-site measurements and the South African Weather Bureau Station, located at Or Tambo Airport, Johannesburg. The mean annual precipitation is in the region of 713 mm and the mean annual A-pan evaporation is approximately ~ 2200 mm. Rainfall occurs in high-intensity events that are largely confined to the summer months. Average monthly rainfall is less than 20mm between April and September.

##### 6.1.1.3 Wind Patterns

The local wind field is characterised by dominant north westerly to north-north easterly winds. Moderate wind speeds prevail with 25% of hourly wind speeds between 3 and 4 m/s. Calm conditions occur 15% of the time. During the winter months there is an increase in the frequency of southerly winds.



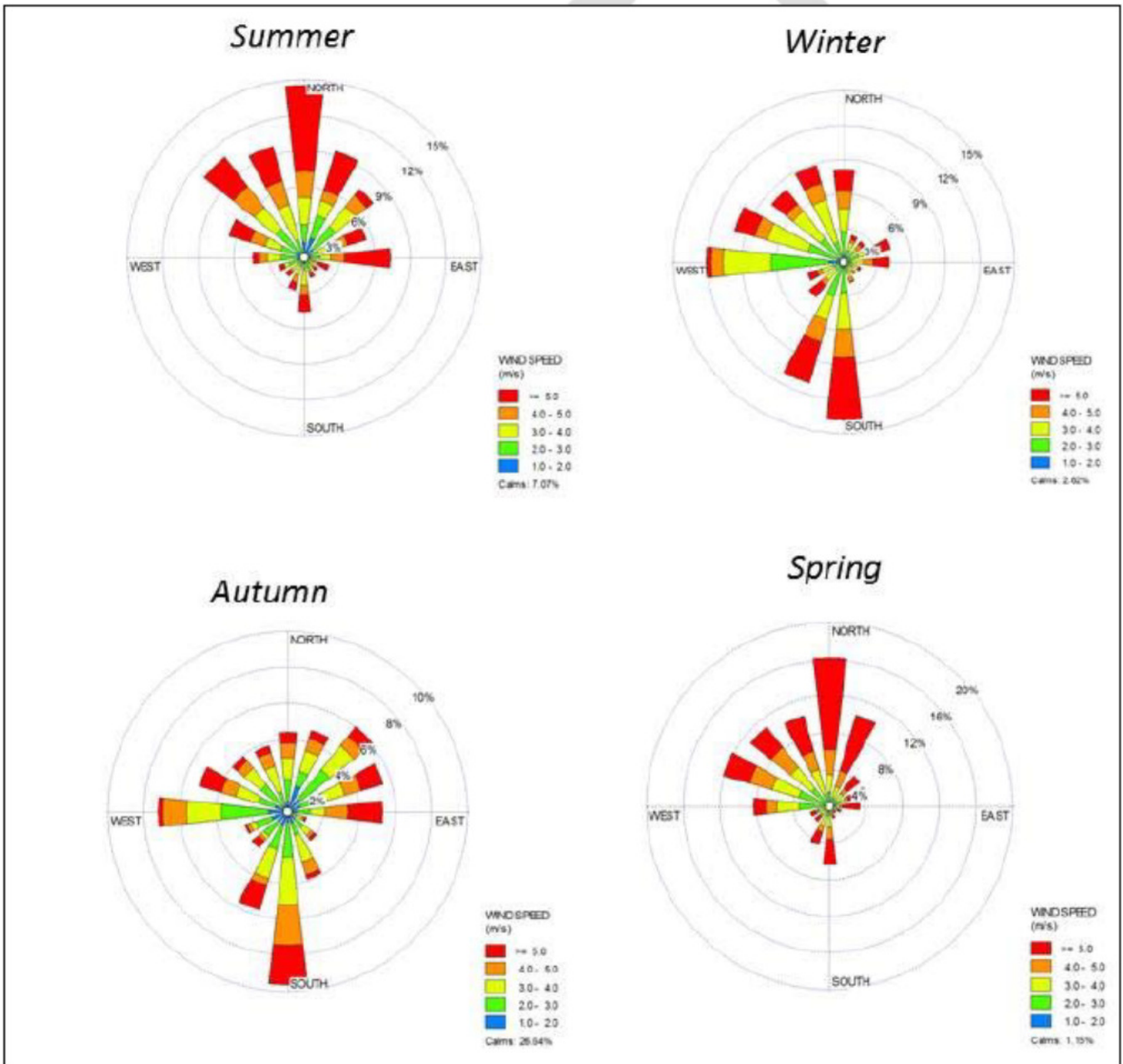


Figure 13: Seasonal average wind roses (Johannesburg 2007)

### 6.1.2 Topography

The region is typical of the Highveld and is characterised by a relatively flat, but undulating topography. The area is relatively low-lying and comprises low hills, natural pans and wetland areas. The site elevation is approximately 1620 mamsl and is generally flat, with a slight fall to the south and west. Drainage is toward the unnamed tributary of the Blesbokspruit River.

### 6.1.3 Soils

Surface soils across the Scaw Metals area consist of clayey colluvial sands of mixed origin. Soil profiles recorded in test pits indicates two basic soil profiles. These include a shallow hardpan ferricrete which is overlain by ferruginised hillwash sands and a deeper profile comprising hillwash and ferruginised hillwash soil profile over a well cemented and ferruginised transition. Underlying the ferricrete horizon are weathered sedimentary rocks.

The soils across the site for the Ash Disposal Facility have not been investigated to date.

### 6.1.4 Geology

The regional surface geology in the vicinity of Scaw Metals consists predominantly of the Ventersdorp Supergroup and the Transvaal Sequence. Most of the Scaw Metals area is underlain by lavas of the Ventersdorp Supergroup. Although acid lavas and sedimentary intercalations occur, the Ventersdorp is composed largely of andesitic lavas and related pyroclastics. The Transvaal Sequence comprises quartzite of the Black Reef Formation and dolomite residuum of the Chuniespoort Group, Malmani Subgroup. The dolomitic ground can pose a risk to surface infrastructure through sinkhole development.

Drilling for geotechnical investigations at Cell 4b of the Scaw Metals Waste Disposal Site indicated no karstification and it is believed that dolomite is not present north of the Cell 4b site. A dolomite risk assessment undertaken for Cell 4b (JAWs, 2011) confirmed that the majority of the Scaw Metals site is located on Ventersdorp Lavas and is thus not underlain by dolomitic land. The Black Reef Quartzite, which may have underlying dolomites is generally located to the south of the Scaw Metals site.

The surface geology and geophysical conditions across the site for the Ash Disposal Facility has not been investigated to date. However it is likely that the proposed site is underlain by lavas and not quartzite or dolomite. This will be investigated during geotechnical and geophysical investigations undertaken to inform the design of the ash disposal facility.

### 6.1.5 Air Quality

#### 6.1.5.1 Regional

Air quality in the Ekurhuleni region is known to be poor as the Ekurhuleni Metropolitan Municipal area is home to a large percentage of the industry in Gauteng. The Germiston area in particular has a high concentration of industries. The largest contributors to air quality pollution levels are industrial activities, household energy consumption, transportation systems and mining. Problem pollutants include carbon monoxide (CO), nitrogen oxide (NO), nitrogen dioxide (NO<sub>2</sub>) nitrogen oxides (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>) and benzene (C<sub>6</sub>H<sub>6</sub>), particulates (PM10) and the secondary pollutant, ozone (O<sub>3</sub>). These criteria pollutants have the potential for human health and environmental effects, contribute to visibility degradation and can be associated with unpleasant odours. According to data recorded by the EMM, PM10 concentrations in the area are elevated and in exceedance with the National Ambient Air Quality Standards (NAAQS).

As a result of the concern over ambient air quality in the region the Highveld Priority Areas was declared in terms of Section 18(1) of the NEMAQA, in 2007. As a result of the declaration a draft Air Quality Management Plan (2011) has been developed for the Highveld which is aimed at co-ordinating air quality management in the area; addressing issues related to air quality in the area; and provides for the implementation of the plan by a committee representing relevant role-players. The EMM has also developed an Air Quality Management Plan for the Metropolitan area. The plan sets out an emissions reduction programme with short and medium-term measures to ensure the reduction of emissions of priority pollutants from certain sectors, including Industry, Fuel burning Appliances and Electricity Generation.

Particulate matter is classified as a criteria pollutant, with ambient air quality guidelines and standards having been established to regulate ambient concentrations. Dust deposition rates are expressed in units of  $\text{mg}/\text{m}^2/\text{day}$  over a 30-day averaging period. Dust deposition is evaluated against a four-band scale as set out in SANS 1929:2005. The standards have four bands for residential, industrial, action and alert levels with 30-day average fallouts set in  $\text{mg}/\text{m}^2/\text{day}$  (see Table below).

**Table 7:** Bands of Dust fall Rates: SANS 1929

Band	Description	Dust fall Rate (D) ( $\text{mg}/\text{m}^2/\text{day}/30\text{-day average}$ )	Comment
1	Residential	$D < 600$	Permissible for residential and light commercial
2	Industrial	$600 < D < 1200$	Permissible for heavy commercial and industrial
3	Action	$120 < D < 2400$	Requires investigation and remediation if two sequential months in this band, or more than 3 in a year
4	Alert	$2400 < D$	Immediate action and remediation required following the first instance. Report to authorities.

South Africa has ambient air quality standards for particulate matter of aerodynamic diameter less than 2.5 micron (GNR 263, March 2009) published in terms of the NEM:AQA. The limit values set for each are based on reducing the harmful effects on human health, and should be attained within a given compliance period and not to exceed the number of permissible exceedances.

There is also an ambient air quality standard (GNR 486, June 2012) for particulate matter with aerodynamic diameter less than 2.5 micron meters published in terms of the NEM:AQA. The limit values set should be attained within a given compliance period and not exceed the 24 hour averaging period more than 4 times in a calendar year.

#### 6.1.5.2 Scaw Metals

Scaw Metals undertakes a number of operations that result in gaseous and particulate emissions to the atmosphere. Scaw South Africa currently holds a Registration Certificate for scheduled processes in terms of the Atmospheric Pollution Prevention Act, 1965 (No 45 of 1965) for activities at their Union Junction Facility. The Registration Certificate (53/29) was issued in 2010 and is valid until September 2012. The certificate was issued for Iron and Steel Processes. The DRI Main stack (Plant 1 and 2) and DRI stack (Plant 3) are registered as point sources in the certificate. DRI Plant 1 and 2 are equipped with Sonic Spray Towers and bag filters. DRI plant 3 has a bag filter. The registration certificate sets out permissible emissions rates for PM,  $\text{SO}_2$  and  $\text{NO}_x$  from the two stacks. These are  $50 \text{ mg}/\text{Nm}^3$  for PM,  $350 \text{ mg}/\text{Nm}^3$  for  $\text{SO}_2$  and  $500 \text{ mg}/\text{Nm}^3$  for  $\text{NO}_x$ .

In terms of the certificate Scaw South Africa was also required to submit a dust management plan for fugitive dusts. An ambient air quality monitoring network (9 points) with monthly measuring of dust fallout is in place. The target levels were set in terms of SANS 1929:2005. Due to the proximity of residential areas to the Scaw Metals facility, management endeavours to adhere to residential limits of dust fallout rather than industrial limits. A register of dust complaints is also maintained.

The Ekurhuleni Metropolitan Municipality is currently undertaking a review of the Registration Certificate held by Scaw South Africa. The review will update the information in terms of the activities undertaken at the Union Junction Facility and bring the emissions limits in line with the NEMAQA.

### 6.1.5.3 Modelled Emissions

In 2010 Airshed Planning Professionals undertook an air quality impact assessment for the development of Cell 4b at the Scaw Metals waste disposal site. This was followed in 2011 by an quality impact assessment of the emissions and predicted air quality impacts associated with operations at Scaw Metals Union Junction. Sources of pollutants were identified and emission rates quantified. In both studies dispersion simulations were undertaken to reflect the air quality impacts as a result of these sources. Predicted pollutant concentrations and dustfall rates were assessed in accordance with National Ambient Air Quality Standards (NAAQS) and dustfall limits. The main findings of the impact assessment were as follows:

- CO emissions from Scaw Metals operations result in ambient CO concentrations well below the NAAQS.
- Taking into account the conservative approach taken in estimating NO<sub>2</sub> impacts, NO<sub>x</sub> emissions from Scaw Metals operations result in ambient NO<sub>2</sub> concentrations that exceed the hourly NAAQS only at the property boundary.
- Incrementally, PM<sub>10</sub> emissions result in concentrations in exceedance with the NAAQS at the boundary, Dinwiddie and Generaal Verwoerdpark. Scaw Metals operations contribute 13% to the estimated cumulative annual average PM<sub>10</sub> concentration and 34% to the estimated cumulative highest daily PM<sub>10</sub> concentration at Dinwiddie.
- SO<sub>2</sub> emissions from Scaw Metals operations result in ambient concentrations below the long and short-term NAAQS.
- Predicted off-site dustfall rates as a result of particulate emissions from Scaw Metals are below the SANS residential dustfall limit.

### 6.1.5.4 Air Management and Monitoring

The Registration Certificate requires quarterly sampling of emissions from the DRI Plant 1 and 2 and continuous monitoring of emissions from Plant 3. Scaw Metals has recently implemented quarterly stack emissions monitoring surveys. Scaw South Africa has commissioned various stack emissions monitoring surveys at the Scaw Metals facility, most recently in February, April and May/June 2012 by Levego. The February survey measured emissions from the DRI 3 stack. The average emissions for the DRI 3 stack were PM of 74.3 mg/Nm<sup>3</sup>, SO<sub>2</sub> of 694.12 mg/Nm<sup>3</sup> and 13.5 mg/Nm<sup>3</sup> for NO<sub>x</sub>. The DRI 3 stack was thus not complying with the emissions limits set for particulate matter or sulphur dioxide. The DRI 3 kiln has been stopped because of damage to the refractory lining. The bags have been replaced pending a restart. DRI Kiln 1 and 2 were then brought into operation. The more recent surveys assessed emissions from the stack for these kilns. The average emissions for the DRI kin 1 were PM of 28.94 mg/Nm<sup>3</sup>, SO<sub>2</sub> of 671.39 mg/Nm<sup>3</sup> and 30.62 mg/Nm<sup>3</sup> for NO<sub>x</sub>. This kiln is exceeding the SO<sub>2</sub> limits but is compliant for PM and NO<sub>x</sub>. The average emissions for DRI Kiln 2 were PM of 76.26 mg/Nm<sup>3</sup>, SO<sub>2</sub> of 1145.23 mg/Nm<sup>3</sup>. Measured levels for NO<sub>x</sub> were below the detetion limits. Kiiln 2 is exceeding the PM and SO<sub>2</sub> limits but is compliant for NO<sub>x</sub>.

Dust fallout monitoring at Scaw Metals has been conducted on a monthly basis by external consultants since 1997. Single Bucket Dust Fallout Monitors are installed at a number of locations within Scaw and in the surrounding residential areas. Receptor locations are indicated as either residential (R) or industrial (I).

At on-site industrial locations such as the DRI plant and Cast Grinding Media Plant dust fall out rates exceeding the residential threshold of 600 mg/m<sup>2</sup>/day are regularly measured. Dust fall levels at these sites also exceed the industrial action threshold level of 1200 mg/m<sup>2</sup>/day in the drier and windier months. The threshold level is exceeded for more than three months per year as specified by the SANS standard at both locations. Exceedances in consecutive months can also be seen, which is in violation of the SANS standard. Investigation and mitigation should be implemented to avoid such high dust fall levels. The dust fall levels at most of the other plant and residential areas are generally within the residential limits (Monthly Dust Deposition Monitoring Reports, SGS).

## 6.1.6 Hydrology

### 6.1.6.1 Catchment

Scaw Metals is situated between the Elsburg Spruit and the Natal Spruit in the catchment of the Vaal River basin and lies within quaternary catchment C22B (Figure 14). The Elsburg Spruit flows south east to join the Natal Spruit which flows east and then southwards through an extensive wetland and reed bed. The river then flows into the Klipspruit which discharges into the Vaal River near Vereeniging.

### 6.1.6.2 Water Use and Management

Limited use of surface water takes place in the immediate surrounds of Scaw Metals. The main use is ecological in both the Elsburg Spruit and the Natal Spruit.

The majority of storm water across the Scaw Metals facility is directed into storm water channels. Clean storm water from the non-production areas of the Scaw Metals facility is channelled and diverted from the property and returned to the environment. One of these storm water channels flows across a portion of the site proposed for the Electrical Co-generation Power Plant.

Scaw Metals has four storm water dams within the facility that are used to contain runoff from within the facility. Process water is also sourced and recycled within these dams. The majority of inflows are into Dam 1 and the water then flows sequentially through the dams to Dam 4. Any overflow into the environment would be from Dam 4.

The Scaw Metals Waste Disposal Site has storm water management systems designed to keep clean and contaminated water separated by diverting clean water from the site and containing contaminated water. Dirty water captured on the active Waste Disposal cells is stored in toe paddocks or dams.

A clean storm water channel from the Dinwiddie suburb enters the Scaw property at the north, flows along the western edge of the Waste Disposal Site and then flows into the Natal Spruit. Clean water departs the site in this channel.

### 6.1.6.3 Monitoring and Surface Water Quality

Scaw Metals undertakes monitoring of the water quality in the 4 storm water dams. Golder reported on water quality in the storm water dams in March 2012. Water quality in Dam 4 is of most relevance as this dam would discharge to the environment in the case of high rainfall events. All parameters, except fluoride, fall within the General Limit Values as required by Permit 1415N and meet the resource water quality objectives for the Klip River. Water quality in Dam 4 is thus generally of an acceptable quality for discharge to the Elsburg Spruit. Toxicity testing of the water Dam 4 indicated that the water quality is of limited to not acute toxicity and would have a limited impact on the aquatic ecosystem.

Surface water quality at the Scaw Metals GLB +Waste Disposal Site is monitored at the following locations:

- SW1 (located in Dinwiddie storm water channel, monitors water quality entering the site);
- SW2 (monitors the water quality upstream of Cell 4a);
- SW3 (monitors quality of water leaving the Scaw property); and
- In the toe paddocks.

Various parameters are monitored on a quarterly basis as required by the permit. Water qualities are compared with the Target Water Quality Ranges of DWAF's Water Quality Guidelines for Domestic Use Guidelines, parameters listed in Annexure V of the Section 20 permit and the Local Council Acceptable Discharge Limits for non-contaminated water.

Surface water quality at the Scaw Metals Waste Disposal Site was assessed from samples taken in 2010. Electrical conductivity values measured in the surface water sample taken from the toe of Cell 4a has an electrical conductivity value which exceeds that of the DWAF domestic use guideline of 70mS/m. This can be attributed to increased concentrations of chloride, calcium, magnesium and sodium. These constituents are present at concentrations that exceed the DWAF drinking water guideline, but do not exceed the SANS 241 Class I guidelines. The analysis also showed elevated TDS (total dissolved solids) of between 821mg/l and 1230mg/l. This dirty water is contained on site in the toe paddocks.

The samples taken from the clean water dam showed electrical conductivity value of 30mS/m, well below the DWAF domestic use guideline. Indicating that dirty water is not affecting water quality.

There is currently no monitoring of surface water arising from the site for the Ash Disposal Facility.

## 6.1.7 Groundwater

### 6.1.7.1 Characterisation of the Aquifers

The Scaw Metals facility and waste site are situated on the Ventersdorp lava and even though the lava is not known to contain economic aquifers, groundwater contributes to stream flow and in some instances high yielding boreholes have been recorded. Further to the south groundwater occurs in the Black Reef quartzite and Malmani dolomite. The following aquifers underlie the area:

**Weathered Aquifer:** A shallow, weathered aquifer in the weathered lava and quartzite. The most consistent water strike is located at the fresh bedrock / weathering interface. Groundwater elevations vary between 1.74m and 3.52m below surface.

**Fractured Aquifer:** A deeper, fresh lava / quartzite aquifer where fracture flows dominate. Groundwater migration within the upper portion of this aquifer appears to be governed by jointing while major faults and intrusions form the significant conduits at depth. The depth to groundwater in this aquifer ranges from artesian to 3.67m below surface. This is indicative of confined conditions.

**Dolomitic Karst Aquifer:** Carbonate rocks are practically impermeable and therefore devoid of any effective primary porosity. During its geological history, however, the dolomite is subjected to karstification and erosion. During this dissolution processes, the carbonate is removed from the dolomite and residual products such as silica, iron and manganese oxides and hydroxides (wad) are left behind. The residual mass spongy, compressible, of low density and has a high void volume. Fissures and caves also develop. Fault zones are preferential zones of weathering and are transformed into groundwater conduits. The potential for large-scale groundwater exploitation depends solely on the extent to which the dolomite has been leached by percolating rainfall and groundwater drainage, as well as the degree to which it has been transformed into aquifers capable of yielding significant quantities of water and sustaining high abstraction capacities.

Only boreholes BH10-26S and BH10-26D, near the southern edge of Cell 4b at the Waste Disposal Site, were drilled into dolomite. No cavities were intersected and only seepage water was encountered. The dolomite aquifer is therefore not expected to be well developed at the Scaw site. The groundwater level in the dolomite aquifer is approximately 2.40m below surface.

#### **6.1.7.2 Groundwater Gradient and Levels**

The groundwater level at the Scaw site generally mimics local topography and the flow is mainly towards the south. Average groundwater depth varies from 10 – 20 m below ground level with a moderate recharge rate. The groundwater levels in the area shows seasonal variations.

#### **6.1.7.3 Groundwater Use and Management**

Groundwater use in the area is limited. Scaw Metals abstracts water from 3 boreholes on the property, located at the Cyclone, Hille Mill and Morgan Mill.

The waste cells at the Scaw Metals Waste Disposal Site are lined in accordance with the parameters as specified in the Minimum Requirements for waste disposal facilities, the closed cells have been capped to reduce the ingress of water. Any leachate derived from Cells 4a and 4b is captured and discharged to sewer.

**Figure 14: Catchments, Rivers and Wetlands at Scaw Metals**  
(Wetlands from WCS and SANBI)



#### **6.1.7.4 Monitoring and Groundwater Quality**

Groundwater monitoring at the Scaw Metals facility is done every two months. Samples are taken from boreholes at Morgan Mill, Hille Mill, Cyclone 3 at the Melt shop and analysed at the Scaw Laboratory. Electrical conductivity in the boreholes are below the SANS 241 drinking water standard of 170mS/m. The water chemistry is dominated by  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions with recorded levels above the DWAF target for drinking water.

Groundwater monitoring at the Scaw Metals GLB+ Waste Disposal Site takes cognisance of the geohydrological setting. Numerous boreholes have been drilled for monitoring purposes over the years although some have been lost or damaged. 17 boreholes are currently monitored on a regular basis. Monitoring is undertaken quarterly and bi-annually for various parameters as defined in terms of the permit conditions.

Groundwater quality in the area is generally good with Total Dissolved Solids ranging from 300 -1000 mg/l and being dominated by  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions. Groundwater quality at the Waste Disposal Site was assessed from samples taken in 2011 from the complete monitoring network. The guidelines that have been used for screening are the Department of Water Affairs and Forestry's Drinking water guidelines as well as the Department of Water Affairs and Forestry's SANS 241 Class I and II guidelines from the Drinking Water Management Guide for Water Services Authorities.

Electrical conductivity in most of the boreholes are below the DWAF drinking water guideline of 70mS/m. Only three boreholes regularly record EC above the 70mS/m. The SANS Class I screening guideline has only been exceeded on 1 occasion. Constituents found to exceed the screening guidelines (SANS 241 Class I) in a number of the boreholes were:

- Iron, Manganese and Lead in most boreholes;
- Calcium in BH-2, BH3, BH09-24S;
- Ammonia in BH-20;
- Magnesium in BH-2, BH09-24S;
- Chlorine in borehole BH09-24S.

Although present in the slag material, iron and manganese are often found within similar geological environments, and thus a portion of these constituents may originate from the natural geology. The elevated lead concentrations in the boreholes may arise from the local geology, but could be derived from operations at Scaw Metals or from the waste material. In general the chemical analyses of the downstream boreholes indicate that there has been no / very little impact on the groundwater chemistry as a result of the waste disposal operations.

There is currently no monitoring of groundwater at the site for the Ash Disposal Facility.

#### **6.1.8 Noise**

Union Junction is an industrial area with a variety of noise sources. Ambient noise levels are expected to be higher than in adjacent residential suburbs. The Scaw Metals site is considered as an industrial district in terms of the SANS 10103 criteria for outdoor noise ratings.

**Table 8: Equivalent Continuous Rating Levels for Outdoor Noise (SANS 10103)**

Type of District	SANS 10103 Table 2: Equivalent Continuous Rating Levels for Outdoor Noise (dBA)		
	Day/Night	Day	Night
Rural districts	45	45	35
Suburban districts with little road traffic	50	50	40
Urban districts	55	55	45
Urban districts with one or more of the following: workshops, business premises and main roads.	60	60	50
Central business districts	65	65	55
Industrial districts	70	70	60

The main contributors to current ambient noise levels in the area include:

- Heavy vehicles delivering materials to Scaw Metals,
- Machinery and equipment handling scrap metal;
- Production activities at the various Scaw Metals facilities;
- Waste disposal operations including:
  - Refuse trucks approaching and leaving site,
  - Refuse trucks dumping their contents,
  - Operation of site equipment (i.e. bulldozer and water truck),
- Traffic on the N3 highway, and
- Trains.

The various residential suburbs in the area (see Section 6.4.2) represent noise sensitive receptors. The noise sensitive receptors are generally located at least 0.5 km away from the Scaw site. Noise impacts are generally correlated with distance and line of sight.

In 2011 a noise complaint was received from a residence in Albermarle suburb, situated 1.4 km to the northwest of Scaw Metals. Pro Acoustic was appointed to undertake a noise assessment to assess the issue. 24 hr noise level measurements were taken concurrently at the Scaw Metals boundary and at the residence in Albermarle. The noise measurements found that the loudest noise at Scaw came from the melt shop but that this elevated noise lasted less than a minute and only exceeded continuous noise levels by 7dB. Continuous noise levels at the Scaw boundary have increased by 3 to 4 dB since a 2005 study. The recorded noise peaks at the Scaw boundary were largely associated with passing trains and trucks. The study concluded that the neither the disturbing noises nor the noise nuisance at the residence were emanating from Scaw Metals.

A further noise survey was conducted by dBAcoustics in March 2012 as part of compliance with the Meltshop 3 authorisation. The noise survey aimed to investigate if noise from normal operations at Workshop 3 (Arc Furnacing activities) resulted in noise levels that exceed the ambient guidelines at the Scaw Metals property boundary or at the residential boundary. The study concludes that noise levels generated were at, or close to, the allowable limits. Weather conditions will play an important role in determining whether the noise was propagated or attenuated.

## 6.2 Biological Environment

### 6.2.1 Vegetation and Habitat Status

Vegetation across almost the entire footprint of the Scaw Metals property (east of the N3 Highway) has been transformed as part of operations. The closed waste disposal sites and areas in between are vegetated and alien plant control is undertaken. The areas are managed as parkland and are of little ecological significance. The likelihood of encountering any species of conservation importance on the site itself is regarded as very low. The footprints of the sites for the Electrical Co-generation Power Plant and Ash Disposal Facility are largely disturbed and unvegetated (see Plates 1 and 2). Where vegetation does occur this comprises pioneer species with a high percentage of alien and invasive plants.



**Plate 4: Storm water channel on the Electrical Co-generation Power Plant footprint**

The adjacent grassland vegetation (mostly west of the N3 highway) is mapped as Carltonville Dolomite Grassland. There are large extents of Eastern Temperate Freshwater Wetlands to the south and west of the site, along the Elsburg Spruit and Natal Spruit. These areas are regarded as sensitive wetlands. All of these natural areas provide potential habitat and refuge for a variety of species, although they have experienced significant disturbances from either physical transformation or pollutants. Low average species diversity and a large number of non-indigenous species are anticipated.

All of the wetland area in the Elsburg Spruit and Natal Spruit has been identified as an irreplaceable site by GDARD (GDACE Conservation Plan, Version 2). Although there are various other important, irreplaceable and protected sites in the Germiston area, the Scaw Metals site falls outside of these areas (Figure 15).

The storm water drainage channel that runs across the Electrical Co-generation Power Plant site provides limited aquatic habitat. The channel is largely vegetated with Phragmites Reeds, typical of wet areas in the region (see Plate 4). During heavy rainfall, low-lying portions of the site are prone to temporary inundation due to an under capacitated culvert in the channel. In the SANBI 2010 database this site is identified as a wetland (see Figure 14), but the validity of this categorisation is questioned as the process water dams at Scaw Metals are also indicated as wetlands.

## **6.2.2 Fauna**

As a result of the disturbed, fragmented and secondary nature of habitats at and surrounding the Scaw Metals site the potential of the site to harbour red data species is regarded as zero.

The grassland to the west and wetlands to the south are likely to host a range of species, largely those tolerant of partially transformed habitats and moderate levels of disturbance.

**Figure 15: Regional Vegetation and Ecological Sensitivity at Scaw Metals**  
(Mucina & Rutherford, GDARD CPlan)

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## 6.3 Land Ownership and Zoning

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The entire Union Junction site is zoned as industrial. The properties within the Scaw Metals facility are owned by Scaw South Africa. The DRI and the proposed sites for the Electrical Co-generation Power Plant and Ash Disposal Facility are surrounded on all sides by properties owned and utilised by Scaw Metals. Afrox operates from a facility that is located toward the eastern edge of the Ash Disposal Facility site

Beyond the Scaw Metals site the adjacent properties to the north, west and south are privately owned (Figure 1).

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## 6.4 Land Use

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### 6.4.1 Scaw Metals Facility

The large majority of land within the Scaw Metals property at Union Junction is utilised for industrial purposes relating to the recycling of scrap metal and the production of steel. The Scaw Metals property is zoned as industrial 2. Some of the land in between the various plants is only partly or temporarily utilised. The main area of unused land within the Scaw Property is to the west of the N3.

The Scaw Metals General Waste Disposal Site now comprises 4 waste cells that have been used for waste disposal by Scaw Metals. Waste cells 1 and 3 have been closed, capped and vegetated. It is expected that the site, with the addition of Cell 4b, will be operational until at least ~ 2018. The end use of the site (future land use after closure) has not yet been defined.

### 6.4.2 Surrounding Land Use

The area surrounding the Scaw Metals property is characterised by industrial use, vacant land and residential suburbs (Figure 16). There are industrial areas to the south east, west and south west of the Scaw property. In relation to existing residential areas, the DRI plant at Scaw Metals is:

- ~ 1 km south of Dinwiddie;
- ~ 1.1 km south east of Verwoerdpark; and
- ~ 1 km north east of Roodekop Extension 31;

### 6.4.3 Regional and Local Land Use Policies and Plans

#### 6.4.3.1 Ekurhuleni Integrated Development Plan and Spatial Development Framework

Ekurhuleni has developed and updated their Integrated Development Plan (IDP) as a guide to all planning, budgeting, resource allocation and decision-making within its area of jurisdiction. The IDP does not specify or outline any planning objectives for the area in which the SMGWDS is located (EMM, 2008a)

The Spatial Development Framework (SDF) is an operational strategy for the development and planning department of Ekurhuleni. The framework manages the use of the land, highlights priority investment and development areas, provides guidelines for development and serves as a guide for decision-makers or investors. Ekurhuleni is subdivided into three (3) management regions with Regional Spatial Development Frameworks compiled for each region (EMM, 2008b). The SMGWDS is located in the Southern Service Delivery Region. The regional framework (EMM, 2008c) demarcates the Alrode-Wadeville Corridor in which the SMGWDS is located as an industrial area, and forms one of municipalities Blue IQ projects. Ekurhuleni Spatial Development Framework

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## **6.5 Land Use Potential**

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The Scaw Metals facility is located in the Alrode-Wadeville industrial area and within an existing industrial site. Land use is thus seen as industrial with limited land capability for purposes other than industry. The agricultural potential of the area is very low (GDACE Conservation Plan, Version 2).

**Figure 16: Land Use at Scaw Metals**  
(Google Earth)



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## 6.6 Cultural and Heritage Resources

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The study area is located on the Highveld, an area which did not see much human occupation in pre-colonial times. This had to do with economic strategies, cultural preferences and climate fluctuations. It was only after white settlers entered the area that population numbers increased significantly.

The great majority of the footprint of the proposed project sites have been subject to years of industrial activity and related disturbance. Any archaeological artefacts or aspects of cultural or historical significance, which may have been on each of the sites, would have been destroyed. It is considered highly unlikely that there are any archaeological artefacts or aspects of cultural or historical significance.

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## 6.7 Traffic

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Heavy trucks frequent the Scaw Metals Facility for the delivery of scrap metals and the transport of products. The majority of heavy motor vehicles make use of Dekema Road to access Scaw Metals and the other industries.

Internally the bulk of the traffic is for the delivery of waste to the waste disposal site. On average, ~60 trucks deliver waste loads on a daily basis. These trucks use transport routes internal to the Scaw Metals property and do not impact on traffic on public roads.

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## 6.8 Socio-Economics

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The Scaw Metals facility is located within Germiston, Gauteng and falls within the boundaries of the Ekurhuleni Metropolitan Municipality (EMM). Ekurhuleni has a total surface area of ~ 2000 km<sup>2</sup> and accommodates ~2.7 million people. This constitutes ~ 5.6 % of the national population and 28 % of Gauteng's population. EMM is one of the most densely populated areas in South Africa, with ~ 1400 people per km<sup>2</sup>. Ekurhuleni has a large and diverse economy, with manufacturing and industry being the primary economic sector, accounting for almost 20 % of the Gauteng Gross Domestic Product (GDP). It has the largest concentration of industry in the whole of South Africa, often being referred to as 'Africa's Workshop'. Scaw Metals is situated in the Alrode-Wadeville Industrial corridor. **The Union Junction area is mostly occupied by the Scaw Metals facility, but there are a number of other industrial sites located along Dekema Road.**

Scaw Metals is situated within ward 39 of EMM with a population of ~ 22 000 residents (Census 2001). The residential areas of Dinwiddie and Verwoerd Park are located north and north-west of the Union Junction site, while the greater Wadeville industrial area lies to the north-east. The majority of the residents (55%) are Afrikaans, followed by 35% English and 3% Zulu speaking. The ratio of males to females is fairly even, with males comprising just over 50% of the residents. The relatively new, low-income, suburb of Roodekop lies to south west.

Employment figures, obtained from the Demarcation Board, indicate that the majority of the population are employed (67%), 7% are unemployed and the remaining 26% are not economically active. Education levels within the ward are fairly high, with 45% having completed matric or higher and only 1.5% having had no formal education. Scaw Metals employs approximately 3300 people at the Union Junction Facility.

Communities living near to industrial sites and waste disposal facilities could experience nuisance as well as other more serious problems such as visual eyesores, dust, pests (e.g. flies), odours, and health problems due to the emissions. Complaints from local communities to Scaw Metals have generally related to dust generation. There has however been a significant decline in complaints over the last few years as the waste disposal cells have moved further from Dinwiddie. Improved management and operations practices at the waste disposal site have also reduced dust generation. In the past 2 years Scaw Metals has also received complaints regarding noise disturbances.

### **6.8.1 Occupational Health**

Scaw Metals personnel are potentially exposed to physical and chemical stressors in the workplace. Scaw South Africa aims to ensure that all employees who are potentially or otherwise exposed to a hazardous chemical substance (HCS) or other occupational injury or illness causing agent, are protected against over exposure. Scaw South Africa has a program of medical surveillance and occupational exposure monitoring for employees at the HHWDS. These tools are used to assess the safety of all employees involved in operations.

### **6.8.2 Public Health**

Public health risks may arise as a result of emissions from Scaw Metals which exceed the National Ambient Air Quality Standards (NAAQS). The 2011 dispersion model by Airshed determined the highest hourly, highest daily and annual average ground level concentrations or dustfall rates for each of the pollutants considered in the study. The potential for exceedances of the NAAQS levels of each pollutant was assessed at the property boundary. Predicted incremental CO concentrations, incremental SO<sub>2</sub> concentrations and incremental highest daily dustfall rates are low and do not present health risks beyond the property boundary. Hourly NO<sub>2</sub> concentrations exceed the NAAQS limit value of 200 µg/m<sup>3</sup> more than the permissible 88 hours per year at the boundary but not at any of the residential areas. Incrementally, emissions from Scaw Metals result in PM<sub>10</sub> concentrations in exceedance of the annual NAAQS of 40 µg/m<sup>3</sup> at the boundary but not at any of the residential areas. Daily PM<sub>10</sub> concentrations exceed the NAAQS limit value of 75 µg/m<sup>3</sup> more than the permissible 4 days per year at the boundary, Dinwiddie and Generaal Albertspark. Scaw Metals operations contribute 13% to the estimated cumulative annual average PM<sub>10</sub> concentration and 34% to the estimated cumulative highest daily PM<sub>10</sub> concentration at Dinwiddie. The PM<sub>10</sub> impacts are the most significant and Scaw Metals must implement feasible air quality management measures for PM<sub>10</sub> emissions.

## 7. Results of Public Consultation

### 7.1 Collation of Issues and Concerns

Issues and concerns relating to the introduction of the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw Metals have been captured by means of:

- Minutes from the public meeting held at the Scaw Club (Appendix 4); and
- Written, email and telephonic responses received following public notification of the project (Appendix 6).

### 7.2 Summary of Issues raised by Interested and Affected Parties

A summary of issues and concerns raised by IAPs is provided in Table 9, with the names of the I&AP and the date the issue or concern was raised. Responses to all concerns are provided.

**Table 9: IAP Issues and Concerns, with Responses and References to Report Sections where Issues and Concerns are addressed**

No	Issues	Response to IAP Issues	Reference to Report Section where IAP Issues are Addressed
1.	Rupert Retief: stated that the project is in an unfortunate location surrounded by residential areas. He asked what would be done for emissions control, as well as what was to be controlled?	<p>The Scaw Facility is operated in terms of Registration Certificate which sets permissible emissions limits. The NEMAQA sets emissions limits for particular industrial activities. These are conservative standards set to minimise nuisance and health risks to the public.</p> <p>The Scaw Co-gen project would target current, legislated emissions standards for all outputs. Measures such as lime injection would be used to control the emission of SOx. Baghouses will limit particulate emissions. An Air Quality Impact Assessment will be undertaken to assess the effectiveness of the proposed emissions controls and consider the potential effects, if any, on adjacent residential areas.</p> <p>It was stated at the public meeting that once Phase 1 of the Co-gen plant is operational, the emissions would be reduced over current levels.</p>	See Project Description (Section 4), specifically sections on Emissions Control, as well as the description of the Air Quality Impact Assessment (Section 9.4.2)

No	Issues	Response to IAP Issues	Reference to Report Section where IAP Issues are Addressed
2.	Rupert Retief asked if anything would be discharged?	There will be emissions to the atmosphere, as explained above. The Co-gen plant will generate blown down water from the cooling cycle. This would be used to quell the ash or disposed to the municipal sewer. Phase 2 of the Co-gen will generate ash that will be disposed to a disposal facility.	See Project Description (Section 4).
3.	Rupert Retief asked what types of hazardous waste are anticipated?	Some parts of the fuel used in phase 2 will remain as waste ash. Various components could be hazardous. Tests are currently being conducted in terms of the currently accepted methods to determine the classification of the waste ash. The design of the waste disposal site will be influenced by the waste classification.	See Section 5.2.1
4.	Michael Kriek asked if there will be follow-up presentations?	Matthew Hemming replied yes, for the review of documents and specialist studies to keep the public informed of the project.	See Section 9.6.1 for details on further public participation
5.	Michael Kriek stated that the project needs to be made more visible to people, such as by placing billboards at shops.	Mr Hemming indicated that the public notification process to date had been done in terms of the legislated requirements. Further notification will continue as the project proceeds.	See Section 3.5 for details of the public participation completed to date.
6.	Mr Hanré Crous of EScience Associates (Pty) Ltd raised the following questions		
7.			

### 7.3 IAP Response on Review of Draft Scoping Report

No	Issues	Response to IAP Issues	Reference to Report Section where IAP Issues are Addressed
1.	Mr Hanré Crous of EScience Associates (Pty) Ltd raised the following questions		
2.	1. Firstly, most of the comments below relate to air quality and the proposed new disposal site, which could be a significant source of dust deposition in the area. However, the draft Scoping Report makes no mention of possible alternatives to the disposal of ash. Worldwide, and in South Africa, ash re-use and recycling activities and technologies are continuously growing and becoming more acceptable. I believe that the EIR should consider the feasibility of alternative options to landfill.	Scaw is very aware of and is constantly considering and implementing alternatives for the re-use and recycling of their waste streams. The potential for the re-use and recycling of the ash from the Co-generation Power Plant will also be investigated in due course. However, for the purpose of assessing the feasibility of the Co-generation Power Plant (economic and environmental) the decision was taken to only consider the 'worst case scenario' where all the ash required disposal. i.e. what will the environmental impacts be if there are no alternatives to disposal?	See Section 5.5.1

	<p>2. Although it is clear that Scaw would be very focussed on managing emissions from the actual co-generation process (i.e. stack emission concentration), it is not as evident in the consideration of potential emissions from the proposed ash disposal facility, and the air quality impact assessment needs to consider this potential source of pollution with the same weight. There are industrial activities in the area (practically adjacent to the proposed disposal facility) that could be affected by increased dust generation, which would interfere with air cleaning systems used in buildings where sophisticated processes requiring a 'clean' environment are conducted.</p>	<p>Scaw is aware of the risks of dust generation from the waste disposal sites. The development of the previous waste disposal sites at Scaw have been subject to air quality impact assessments and dust fallout is monitored around the waste disposal sites.</p> <p>The air quality impact assessment will consider the dust generation potential of the ash disposal site. The specialists will compare the potential emissions in terms of the national ambient air quality standards and will assess the health risks of the dust dispersion.</p>	<p>The description of impacts (section 8) and the plan of study for EIA (section 9) both consider the potential emissions from the ash disposal facility as well as from the Co-generation power plant.</p>
	<p>3. Although the draft SR refers mostly to 'ash' from the co-generation plant, it is clear that the site would also be used for disposal of bag filter dust. Physically and chemically, there could be a notable difference between these two streams, and the EIR should be clear in distinguishing between the physical (e.g. course vs fine) and chemical characteristics (e.g. metals content) of the two waste streams, volumes to be disposed of together, possible interactions between the streams (also see next comment) etc.</p>	<p>The EIR will consider the inherent and distinguishing characteristics of all the waste streams that may be disposed to the Ash Disposal Facility.</p> <p>The description of the air quality impact assessment in the plan of study for EIA sets out the basic scope of work. The impacts of ash and bag-house dusts will be considered (individually and cumulatively).</p>	<p>See section 9.4.2</p>
	<p>4. Linked to the above, the draft SR refers a couple of times to "other waste streams" currently disposed on-site that would also be disposed of at the proposed new site. Details of these streams have to be included in the EIR, in order to accurately assess potential impacts from the disposal facility.</p>	<p>All of the waste streams that may potentially be disposed to the Ash Disposal Facility will be considered in the EIR. The specialist studies will consider the risks of all of the various waste streams (individually and cumulatively).</p>	<p>See section 9.4.2</p>
	<p>5. Incidentally, due to this reference to other waste streams (i.e. not from the proposed co-generation plant) and references to limited capacity at the current Cell 4b, it seems that Scaw may in any event be required to expand their disposal capacity. One should be careful not to motivate a new disposal site based on the benefits of co-generation, where this site may then not be linked with the co-generation process at all (e.g. if Phase 2 does not go ahead), instead just fulfilling a near future need for disposal of current/existing waste streams at Scaw.</p>	<p>Current waste disposal facilities at Scaw have a finite capacity and at some point in the future Scaw will require another disposal site for their production wastes. Any future waste disposal site for production wastes will be considered and assessed separately from this project.</p> <p>The Ash Disposal Facility under consideration in this EIR is being proposed as a direct requirement of the Co-generation Power Plant. It is likely that the ash from the Co-generation Power Plant will be hazardous waste and can therefore not be disposed to general waste disposal sites at Scaw. The feasibility of the Co-generation Power Plant can only be determined with the inclusion of an ash disposal site with disposal capacity for the life of operation. The need for the Ash Disposal Facility is thus entirely motivated by the Co-generation Power Plant.</p> <p>The disposal of the other Scaw production wastes at the Ash Disposal Facility is also included in the assessment as the facility may be utilised for such disposal over short periods. However, the primary purpose of the Ash Disposal Facility remains for disposal of ash from the Co-generation Power Plant.</p>	

	6. I did not notice any reference to consideration of PM2.5 emissions or ambient concentration in the report. Note that the DEA recently (29 June 2012) promulgated a national ambient air quality standard for particulate matter of aerodynamic diameter less than 2.5 micron. The air quality impact assessment should consider this standard, particularly due to the nature of emissions expected and the material to be disposed.	A reference to the Ambient Standard for PM 2.5 has been added to the Scoping Report.  Compliance with the PM2.5 standard will be assessed in the air quality impact assessment. Any operational measures or dust suppression required to manage potential dust emissions will be reflected in the environmental management programme for the Ash Disposal Facility	See Section 2.1.3 and section 9.4.2
	7. The EIR, and EMP specifically, would have to detail measures to suppress and manage all forms of dust, particularly the handling and disposal of ash and bag filter dust. This should include some form of continuous dust suppression at the dump, and/or consideration of pre-treatment options.	The air quality impact assessment will assess potential dust emissions from the handling and disposal of all consider the need for and methods of dust suppression.  Any operational measures or dust suppression required to manage potential dust emissions will be reflected in the environmental management programme for the Ash Disposal Facility	See section 9.8
	8. Lastly, note that the EIR should also address more than the establishment of the disposal site, and include operational aspects (e.g. phased development, phased rehabilitation) and ultimate closure/rehabilitation of the site.	The EIR will consider the various phases of the Ash Disposal Facility. The management requirements of each of these phases will be presented in the environmental management programme.	See section 9.8

## 7.4 Authority Issues and Concerns

A summary of issues and concerns raised by authorities is provided in Table 10, with the project responses to the concerns.

**Table 10: Authority Issues and Concerns, with Project Responses**

No	Authority Issues	Response to Authority Issues	Reference to Report Section where Issues are Addressed
1.	In the acceptance of the application form the DEA: Environmental Impact Evaluation set out a list of requirements that must be addressed in the assessment process and reporting.	Noted. The points raised will be addressed in the assessment process and reporting.	Various sections
2.	Other Authorities including the DWA and DEA: Waste indicated that they would provide comments on receipt of the Scoping Report.	Draft Scoping Report will be provided to competent and commenting Authorities for review and comments.	

## 8. Anticipated Environmental Impacts

A scoping-level identification of potential environmental impacts (physical, biological, social and economic) associated with the introduction of the Electrical Co-generation Power Plant at Scaw Metals is listed in Table 11 below. Also included in the table are mitigations and the requirements for further investigation during the EIA phase. Details of the scope of work to be undertaken during the EIA phase, including the specialist studies listed below, are provided in the Plan of study for EIA, presented in Section 0.

The potential environmental impacts associated with the Ash Disposal Facility are similarly detailed in Table 12 below.

**Table 11: Environmental impact identification for the Electrical Co-generation Power Plant**

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>CLIMATE</b>		
<ul style="list-style-type: none"> <li>Greenhouse gas emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in current heat and gaseous emissions from DRI.</li> <li>Reduced carbon emissions from replacement of Eskom generated electricity.</li> <li>Additional emissions from combustion in the FBB.</li> </ul>	<ul style="list-style-type: none"> <li>Air Quality Impact Assessment to assess emissions from phase 1 and phase 2.</li> <li>Compare carbon footprint of projects energy generation with Eskom supplied electricity.</li> <li>Plant design and emissions controls to ensure minimum emissions.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>TOPOGRAPHY</b>		
<ul style="list-style-type: none"> <li>Change in the natural topography</li> </ul>	<ul style="list-style-type: none"> <li>Cut and fill areas to achieve required levels, foundations, base for infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>NOISE</b>		
<ul style="list-style-type: none"> <li>Increase in ambient noise levels.</li> <li>Change in type and or distribution of noise</li> <li>Disturbances to sensitive receptors.</li> </ul>	<ul style="list-style-type: none"> <li>Movement of vehicles, machinery and mechanical equipment during construction.</li> <li>Plant operation and specific actions such as steam release.</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors and impacts to be identified.</li> <li><b>Specialist noise opinion OR assessment</b> to determine the impact of noise on receptors for operations.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>AIR QUALITY</b>		
<ul style="list-style-type: none"> <li>Change in particulate emissions (dust, PM10 and PM 2.5).</li> <li>Fallout dust nuisance.</li> <li>Change in emissions of SO<sub>x</sub>, NO<sub>x</sub> and other gases</li> <li>Impact on ambient air quality.</li> <li>Health impacts due to emissions</li> </ul>	<ul style="list-style-type: none"> <li>Dust generation during construction.</li> <li>Change in particulate and gaseous emissions from DRI stack as a result of phase 1.</li> <li>Potential additional emissions from combustion in FBB during phase 2.</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors and impacts to be identified.</li> <li><b>Specialist air quality impact assessment</b> to determine the emissions sources, model the emissions, define a dispersion plume and assess impacts on ambient air quality and identified receptors.</li> <li>Plant design and emissions controls to ensure emissions comply with standards or better.</li> <li>Review of monitoring programme.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>GEOLOGY AND SOILS</b>		
<ul style="list-style-type: none"> <li>Loss of soil as vegetation growth medium.</li> <li>Loss of soil productivity.</li> <li>Contamination of soils.</li> <li>Dolerites pose risk to ground stability</li> </ul>	<ul style="list-style-type: none"> <li>Earthworks and grading to allow for the establishment of infrastructure.</li> <li>Compaction of soils.</li> <li>Spillages of contaminants during construction and operations.</li> <li>Sink hole formation</li> </ul>	<ul style="list-style-type: none"> <li>Review of geological information for Dolerite Risk Assessment.</li> <li>Salvaging of all useable topsoil.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>SURFACE WATER</b>		
<ul style="list-style-type: none"> <li>Impedance of surface water flows</li> </ul>	<ul style="list-style-type: none"> <li>Construction in or over storm water flow paths</li> </ul>	<ul style="list-style-type: none"> <li>Review of storm water flows and design of storm water channels where required.</li> <li>Mitigation measures to be included in the EMP</li> </ul>
<ul style="list-style-type: none"> <li>Contamination of surface water resources.</li> </ul>	<ul style="list-style-type: none"> <li>Dispersion of sediments and contaminants during construction.</li> <li>Storage and handling of waste inputs to co-gen plant.</li> <li>Storage and disposal of process water.</li> </ul>	<ul style="list-style-type: none"> <li>Management of storm water during construction.</li> <li>Design of storm water management areas at co-gen plant.</li> <li>Review of monitoring programme.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>
<b>GROUNDWATER</b>		
<ul style="list-style-type: none"> <li>Contamination of groundwater resources.</li> </ul>	<ul style="list-style-type: none"> <li>Storage and handling of waste inputs to co-gen plant.</li> </ul>	<ul style="list-style-type: none"> <li>Management of storm water during construction.</li> <li>Design of waste storage and storm water management areas at co-gen plant.</li> <li>Review of monitoring programme.</li> <li>Mitigation measures to be included in the EMP</li> </ul>
<b>ECOLOGY</b>		
<ul style="list-style-type: none"> <li>Disturbance of sites of conservation importance.</li> <li>Loss of species of conservation importance.</li> <li>Restriction on animal movement patterns.</li> </ul>	<ul style="list-style-type: none"> <li>Surface disturbance due to the development of infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Sites are significantly transformed.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>HERITAGE RESOURCES</b>		
<ul style="list-style-type: none"> <li>Disturbance of graves and other heritage sites and artefacts.</li> </ul>	<ul style="list-style-type: none"> <li>Surface disturbance due to the development of infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Sites are significantly transformed.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>TRAFFIC</b>		
<ul style="list-style-type: none"> <li>Change in traffic for transport of waste</li> </ul>	<ul style="list-style-type: none"> <li>Redirect vehicles from Cell 4b to Co-gen plant.</li> </ul>	<ul style="list-style-type: none"> <li>This traffic is largely internal to the Scaw property and has no effect on public access ways.</li> </ul>
<b>SOCIAL &amp; ECONOMIC ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Economic benefits</li> </ul>	<ul style="list-style-type: none"> <li>Job creation, employment and skills development (construction and operation).</li> <li>Use of local service providers.</li> </ul>	<ul style="list-style-type: none"> <li>No investigation required.</li> </ul>



IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<ul style="list-style-type: none"> <li>Impacts on power generation and supply of power to/from the national electricity grid.</li> </ul>	<ul style="list-style-type: none"> <li>Increased security of electrical supply at Scaw.</li> <li>Possibility of additional supply for expansion projects at Scaw.</li> <li>Availability of additional electricity on the Eskom grid.</li> <li>Reduced carbon emissions of electricity generated by the project</li> </ul>	<ul style="list-style-type: none"> <li>Compare carbon footprint of projects energy generation with Eskom supplied electricity.</li> </ul>
<ul style="list-style-type: none"> <li>Impacts on neighbours and landowners.</li> </ul>	<ul style="list-style-type: none"> <li>Cumulative social impacts due to noise, visual impacts, dust and air quality risks.</li> </ul>	<ul style="list-style-type: none"> <li><b>Noise, air quality and groundwater specialist assessments</b> to identify potential impacts on adjacent receptors.</li> <li>Identify measures to safeguard neighbours and landowners from project risks.</li> <li>Mitigation measures to be included in EMP.</li> </ul>
<b>LAND USE AND LAND CAPABILITY</b>		
<ul style="list-style-type: none"> <li>Use of industrial land</li> <li>Loss of industrial land.</li> </ul>	<ul style="list-style-type: none"> <li>Co-generation power plant will use vacant land.</li> </ul>	<ul style="list-style-type: none"> <li>Industrial use is appropriate.</li> <li>End-use for ash disposal facility to be considered in the context of the site.</li> <li>Mitigation measures to be included in EMP.</li> </ul>
<b>VISUAL ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Changes to landscape character, visual appeal and sense of place of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of construction vehicles, equipment and machinery in the landscape during construction.</li> <li>Presence of additional buildings, and stack.</li> </ul>	<ul style="list-style-type: none"> <li>Sites are significantly transformed with an industrial character.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>

**Table 12: Environmental impact identification for the Ash Disposal Facility**

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>CLIMATE</b>		
<ul style="list-style-type: none"> <li>Greenhouse gas emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Wastes disposed to the ash disposal facility</li> </ul>	<ul style="list-style-type: none"> <li>Very limited potential for landfill gas generation from inert wastes disposed.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>TOPOGRAPHY</b>		
<ul style="list-style-type: none"> <li>Change in the natural topography</li> </ul>	<ul style="list-style-type: none"> <li>Waste disposal will build a 25 m high hill.</li> </ul>	<ul style="list-style-type: none"> <li>May improve aesthetics of area as will screen industrial buildings.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>NOISE</b>		
<ul style="list-style-type: none"> <li>Increase in ambient noise levels.</li> <li>Change in type and or distribution of noise</li> <li>Disturbances to sensitive receptors.</li> </ul>	<ul style="list-style-type: none"> <li>Material handling and transport of ash during disposal.</li> </ul>	<ul style="list-style-type: none"> <li>Sensitive receptors and impacts to be identified.</li> <li><b>Specialist noise opinion OR assessment</b> to determine the impact of noise on receptors for operations.</li> <li>Mitigation measures to be included in the EMP.</li> </ul>

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>AIR QUALITY</b>		
<ul style="list-style-type: none"> <li>• Change in particulate emissions (dust, PM10 and PM2.5).</li> <li>• Fallout dust nuisance.</li> <li>• Impact on ambient air quality.</li> <li>• Health impacts due to emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Dust generation during construction.</li> <li>• Dust generation during material handling and waste disposal.</li> </ul>	<ul style="list-style-type: none"> <li>• Sensitive receptors and impacts to be identified.</li> <li>• <b>Specialist air quality impact assessment</b> to determine the emissions sources, model the emissions, define a dispersion plume and assess impacts on ambient air quality and identified receptors.</li> <li>• Method of ash transport and waste site management to ensure emissions comply with standards or better.</li> <li>• Review of monitoring programme.</li> <li>• Mitigation measures to be included in the EMP.</li> </ul>
<b>GEOLOGY AND SOILS</b>		
<ul style="list-style-type: none"> <li>• Loss of soil as vegetation growth medium.</li> <li>• Loss of soil productivity.</li> <li>• Contamination of soils.</li> <li>• Dolerites pose risk to ground stability</li> </ul>	<ul style="list-style-type: none"> <li>• Earthworks and grading to allow for the establishment of infrastructure.</li> <li>• Compaction of soils.</li> <li>• Spillages of contaminants during construction and operations.</li> <li>• Sink hole formation</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Specialist Geotechnical Assessment</b> to determine ground and soil conditions.</li> <li>• Review of geological information for Dolerite Risk Assessment.</li> <li>• Salvaging of all useable topsoil.</li> <li>• Mitigation measures to be included in the EMP.</li> </ul>
<b>SURFACE WATER</b>		
<ul style="list-style-type: none"> <li>• Impedance of surface water flows</li> </ul>	<ul style="list-style-type: none"> <li>• Construction in or over storm water flow paths</li> </ul>	<ul style="list-style-type: none"> <li>• Review of storm water flows and design of storm water channels where required.</li> <li>• Mitigation measures to be included in the EMP</li> </ul>
<ul style="list-style-type: none"> <li>• Contamination of surface water resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Dispersion of sediments and contaminants during construction.</li> <li>• Spillage of ash during transport.</li> <li>• Runoff from ash disposal areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Management of storm water during construction.</li> <li>• Design of storm water management for ash disposal site.</li> <li>• Review of monitoring programme.</li> <li>• Mitigation measures to be included in the EMP.</li> </ul>
<b>GROUNDWATER</b>		
<ul style="list-style-type: none"> <li>• Contamination of groundwater resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Transport of soluble contaminants from the ash to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>• Drilling of boreholes to determine ground profile and groundwater conditions.</li> <li>• <b>Specialist hydrogeological impact assessment</b> to determine the contaminant sources, model the dispersion plume and assess impacts on groundwater quality and identified receptors.</li> <li>• <b>Conceptual design of landfill</b> liner and protective measures in terms of the Minimum Requirements.</li> <li>• Review of monitoring programme.</li> <li>• Mitigation measures to be included in the EMP.</li> </ul>

IMPACT	IMPACT SOURCE	FRAMEWORK FOR TASKS TO BE UNDERTAKEN DURING THE EIA PHASE
<b>ECOLOGY</b>		
<ul style="list-style-type: none"> <li>Disturbance of sites of conservation importance.</li> <li>Loss of species of conservation importance.</li> <li>Restriction on animal movement patterns.</li> </ul>	<ul style="list-style-type: none"> <li>Surface disturbance due to the development of infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Sites are significantly transformed.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>HERITAGE RESOURCES</b>		
<ul style="list-style-type: none"> <li>Disturbance of graves and other heritage sites and artefacts.</li> </ul>	<ul style="list-style-type: none"> <li>Surface disturbance due to the development of infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Sites are significantly transformed.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>
<b>TRAFFIC</b>		
<ul style="list-style-type: none"> <li>Change in traffic for transport of waste</li> </ul>	<ul style="list-style-type: none"> <li>Vehicles from Co-gen plant to Ash Disposal Site</li> </ul>	<ul style="list-style-type: none"> <li>This traffic is largely internal to the Scaw property and has no effect on public access ways.</li> <li>Reduction in volume through combustion will reduce vehicle trips.</li> </ul>
<b>SOCIAL &amp; ECONOMIC ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Economic benefits</li> </ul>	<ul style="list-style-type: none"> <li>Job creation, employment and skills development (construction and operation).</li> <li>Use of local service providers.</li> </ul>	<ul style="list-style-type: none"> <li>No investigation required.</li> </ul>
<ul style="list-style-type: none"> <li>Impacts on neighbours and landowners.</li> </ul>	<ul style="list-style-type: none"> <li>Cumulative social impacts due to noise, visual impacts, dust and air quality risks.</li> </ul>	<ul style="list-style-type: none"> <li><b>Noise, air quality and groundwater specialist assessments</b> to identify potential impacts on adjacent receptors.</li> <li>Identify measures to safeguard neighbours and landowners from project risks.</li> <li>Mitigation measures to be included in EMP.</li> </ul>
<b>LAND USE AND LAND CAPABILITY</b>		
<ul style="list-style-type: none"> <li>Use of industrial land</li> <li>Loss of industrial land.</li> </ul>	<ul style="list-style-type: none"> <li>Ash disposal facility will occupy industrial land and restrict future use.</li> </ul>	<ul style="list-style-type: none"> <li>Industrial use is appropriate.</li> <li>End-use for ash disposal facility to be considered in the context of the site.</li> <li>Mitigation measures to be included in EMP.</li> </ul>
<b>VISUAL ENVIRONMENT</b>		
<ul style="list-style-type: none"> <li>Changes to landscape character, visual appeal and sense of place of the area.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of construction vehicles, equipment and machinery in the landscape during construction.</li> <li>Presence of additional waste disposal facility.</li> </ul>	<ul style="list-style-type: none"> <li>Sites are significantly transformed with an industrial character.</li> <li>Impact likely to be of very low significance. No investigation considered necessary.</li> </ul>

# 9. Plan of Study for Environmental Impact Assessment

This Plan of Study describes how the EIA phase of the environmental assessment for the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw Metals will proceed. The plan of study for EIA includes a description of EIA process and tasks, specialist studies and consultation to be undertaken during the EIA phase. The Plan of Study presents a proposed impact assessment methodology and impact assessment and rating criteria.

The nature and extent of the further environmental studies and assessments required during the EIA phase have been identified through consultation with the authorities, the responses received from interested and affected parties and input from relevant specialists.

## 9.1 EIA Process

The EIA will address potential impacts and benefits of the proposed introduction of the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw Metals on the social and bio-physical environment. Impacts, direct, indirect and cumulative, associated with the project and all its phases will be assessed. The EIA will also aim to identify appropriate mitigation and management measures for the significant impacts.

The EIA assessment process has been developed to ensure that it complies with GNR 543 Section 26 to 33 and the associated guidelines (see Section 3). The proposed EIA process and public consultation activities are illustrated below, with specific reference to the opportunities for consultation and participation for IAPs, Competent Authorities, and relevant State Departments and Organs of State.

**Table 13: Simplified EIA Process with Explanation of Opportunities for Consultation and Participation in the EIA Process**

EIA Phase		Opportunities for Consultation and Participation		Schedule	
		Competent Authorities (DEA, EMM)	IAPs, State Departments and Organs of State		
Project Announcement and Application Phase	Review Baseline Data	Initial telecommunication with authorities.		June-11	2011
		Submit NEWMA application form to DEA. DEA acceptance of application.	Project notification to affected landowners.	Apr-12	
			Advertisements and project notifications to potential interested and affected parties	May-12	
		Initial consultation with authorities.		Apr-12 to Jun-12	2012
Scoping Phase	Focused consultation with authorities during scoping.	Initial public meeting.	Jul-12 to Aug-12		
	Draft scoping report to authorities	Review of draft scoping report (40 days, ±6 weeks).	Sep-12		
	Final scoping report to authorities Review and acceptance of final scoping report (30 days)	Review of final scoping report (21 days, ±3 weeks).	Oct-12	2013	
EIA Phase	Specialist Assessments	Meetings with authorities to discuss specialist studies and AEL.	Results of specialist assessments and recommendations made available for review		Nov-12 onwards
		Submit draft EIA report to authorities.	Review of draft EIA report (40 days, ±6 weeks)	Jan-13	

EIA Phase	Opportunities for Consultation and Participation		Schedule
	Competent Authorities (DEA, EMM)	IAPs, State Departments and Organs of State	
	Meetings with authorities during EIA.	Public and authority meeting during EIA phase(14 days notice)	
Authority review and Authorisation Phase	Final EIA report to authorities. AEL applications forms to EMM.  Authorities Acceptance of EIA report (60 days) Integrated Environmental Authorisation Granted / Refused (45 days) Waste Management Licence Granted / Refused (45 days) Atmospheric Emissions Licence Granted / Refused (45 days)	Review of final EIA report (21 days, $\pm 3$ weeks)       Notifications to IAPs regarding environmental authorisation (granted or refused).	Feb-13 to June-13
Appeal Phase / Pre-Construction Period	Consultation during processing of appeal.	Consultants to provide guidance regarding the appeal process as and when required.	variable

## 9.2 Development Alternatives to be Investigated in the EIA Phase

### 9.2.1 Locality

Scaw Metals is a brownfields industrial complex with a wide range of emissions and current impacts. The Electrical Co-generation Power Plant has to be integrated with the DRI plant as it is dependent on the outputs of that plant. As such the locality for the Electrical Co-generation Power Plant is fixed. No alternative locations will be assessed in the EIA.

The main selection criteria for a site for the Ash Disposal Facility was that the site had to be within the Scaw Metals property. The selection of the preferred site was made on the basis of available space, suitable ground conditions and proximity to the Electrical Co-generation Power Plant. The only alternative site would be the Scaw Metals property to the west of the N3 Highway. Access to the property across the N3 would be difficult and ash disposal here could result in impacts to adjacent residential areas. The alternative site is not suitable in the current context and thus no alternative sites for the Ash Disposal Facility will be assessed in the EIA.

### 9.2.2 Technology

The technology presented for the Electrical Co-generation Power Plant has been selected through a pre-feasibility investigation conducted by Scaw South Africa. Their studies considered a variety of technologies and configurations for the power plant. These alternatives were assessed on the basis of compatibility with the current DRI plant, the available energy resources, performance, cost, etc. The 2 phase, approach for the Electrical Co-generation Power Plant includes the preferred technology. The alternatives that were investigated for each aspect of the plant have been discussed under each section. The EIA will not assess the technology alternatives any further. However, alternative emissions control technology will be considered if the emissions limits require.

Disposal is the only viable alternative for the type and volume of ash that will be generated in the FBB. Although there may be opportunities for reuse or recycling of portions of the ash, the economic feasibility of project cannot be based on such uncertainties. Ash disposal will be investigated in the EIA as the preferred technology. If other technologies or uses with potential are identified then this will be considered and assessed against the disposal option.

### 9.2.3 No-go

The no-go alternative for the Electrical Co-generation Power Plant and each of its phases, as well as for the Ash Disposal Facility will be considered and assessed in the EIA.

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## 9.3 Environmental Impact Assessment Methodology

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The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, *inter alia*: the purpose and need for the project; views and concerns of interested and affected parties; social and political norms, and general public interest.

The methodology used for assessing impacts associated with the proposed project follows the philosophy of environmental impact assessments, as described in the booklet Impact Significance, Integrated Environmental Management Information Series 5 (DEAT, 2002b). The generic criteria and systematic approach that will be used to identify, describe and assess impacts are outlined below.

### 9.3.1 Identification and Description of Impacts

For each environmental component (i.e. visual, air quality, ecology), impacts will be identified and described in terms of the nature of the impact, compliance with legislation and accepted standards, receptor sensitivity and the significance of the predicted environmental change.

#### 9.3.1.1 Current Impacts (Impacts of Existing Developments)

Existing infrastructure and activities at and around Scaw Metals have, in many cases, altered the baseline environment to a less than natural state. In order to explain the environmental context of the site a general assessment of the current impacts arising from the site will be provided. The EIA will consider the current levels of environmental degradation as at August 2012. Defining of the current level of degradation associated with existing developments is essential to understand and enable the assessment of cumulative impacts.

#### 9.3.1.2 Incremental Impacts (Direct project impacts)

A detailed assessment of the impacts arising directly from the proposed introduction of the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw Metals will be undertaken. The impacts directly attributable to the project are the incremental impacts and will either constitute a new impact at the site or may alter an existing impact.

#### 9.3.1.3 Cumulative Impacts (Total Impacts)

For this project, cumulative impacts will be determined as:

<p><b>Existing Impacts</b></p> <p>Existing impacts (current level of degradation) associated with existing developments and developments under construction</p>	<p><b>+</b></p>	<p><b>Incremental Impacts</b></p> <p>Impacts of the proposed Co-generation Power Plant</p>	<p><b>=</b></p>	<p><b>Cumulative Impacts</b></p> <p>Existing impacts (current level of degradation) associated with existing developments and developments under construction combined with the impacts of the proposed Co-generation Power Plant</p>
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**9.3.1.4 No-go Development Impacts**

The no-go development is considered as an alternative in the environmental impact assessment and impacts of not developing the proposed coal conveyor will be discussed in the environmental impact report.

**9.3.2 Mitigation Measures**

The significance of environmental impacts will be rated before and after the implementation of mitigation measures. The impact rating system considers the confidence level that can be placed on the successful implementation of the mitigation.

**9.3.3 Rating the Significance of Environmental Impacts and Mitigation Measures**

The system used for evaluating impact significance and mitigation failure risks is explained below in Table 14.

**Table 14: Impact Rating Criteria and Assessment Process**

Impact Rating Criteria (Abbreviation / Symbol / Short Description)		Explanation of Impact Rating Criteria and Assessment Process	
<b>Nature of the Environmental Impact</b>		Brief description of the effect of human actions and activities on the environment, and impacts of the environment on development.	
<b>Draft Environmental Management Programme Mitigation Measures</b>		Measures designed to avoid, reduce or remedy adverse potential negative impacts, and compensate for residual impacts (mitigation measures), and measures designed to expand and augment the effect of potential positive impacts (enhancement measures) for consideration during development of the final environmental management programme.	
<b>Project Phase</b>	P	Planning	Activities, impacts and mitigation measures during the planning (or pre-implementation) phase.
	C	Construction	Activities, impacts and mitigation measures applicable to the construction phase, including decommissioning of existing infrastructure.
	O	Operational	Activities, impacts and mitigation measures applicable to the operational phase.
	D	Decommissioning	Activities, impacts and mitigation measures applicable to decommissioning of the project (closure, removal, rehabilitation).
<b>Impact Status</b>		Negative	Impacts with a potential negative / adverse effect.
		Neutral	Neutral, no impact.
		Positive	Impacts with a potential positive / beneficial effect.
<b>I&amp;AP Interest</b>		Neg Very High	Widespread concern and/or specific concerns of very high importance. Concerns difficult to be addressed to satisfaction of authorities or concerned parties. Various substantiated appeals against project anticipated / highly likely if issues are not resolved and addressed to the satisfaction of the concerned parties.
		Neg High	Several concerns and/or specific concerns of high importance. Real and substantial appeals against project possible if not addressed.
		Neg Moderate	Limited concerns. All concerns addressed. Unsubstantiated appeals possible.

Impact Rating Criteria (Abbreviation / Symbol / Short Description)		Explanation of Impact Rating Criteria and Assessment Process
	Neg Low	Minor concerns.
	Neutral	No interest.
	Not defined	Level of interest has not been tested.
	Pos Low	Very little support for project.
	Pos Moderate	Limited support for project.
	Pos High	General support. May be associated with high community expectations.
	Pos Very High	Widespread support. May be associated with extremely high community expectations.
	Diverse Low	Minor interest. Some support. Some concerns.
	Diverse Moderate	Limited interest. Some support. Some concerns.
	Diverse High	General interest. Some support. Some concerns.
	Diverse Very High	Widespread interest. Some support. Some concerns.
<b>Assessment Confidence</b>	Complete	No information gaps exist. Decision-making can go ahead.
	Adequate	Minor information deficiencies exist but this does not affect decision-making. Decision-making can go ahead.
	Incomplete	Not enough information for decision-making. Current data to be supplemented with further monitoring or research.



Impact Rating Criteria (Abbreviation / Symbol / Short Description)			Explanation of Impact Rating Criteria and Assessment Process		
<b>Consequence (C)</b> (Severity + Extent)	<b>Severity (S)</b> (Intensity + Duration + Frequency)	<b>Intensity (I)</b> (Negative Impacts)	1	low	Slight change, disturbance or nuisance. Targets, limits and thresholds of concern never exceeded. Impacts are rapidly and easily reversible. Require no or only minor interventions or clean-up actions if these impacts occur. No complaints expected when the impact takes place.
			2	moderate	Moderate change, disturbance or discomfort. Real but not substantial. Targets, limits and thresholds of concern may occasionally be exceeded. Impacts are reversible but may require some effort, cost and time. Sporadic complaints can be expected when the impact takes place.
			3	high	Prominent change, disturbance or degradation. Real and substantial. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Regular complaints can be expected when the impact takes place.
			4	very high	Severe change, disturbance or degradation. May result in illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Interest group / community mobilisation against project can be expected when the impact takes place. May result in legal action if impact occurs.
		<b>Intensity (I)</b> (Positive Impacts)	1	low	Slight change or improvement. Minor benefits.
			2	moderate	Moderate change or improvement. Real but not substantial benefits.
			3	high	Prominent change or improvement. Real and substantial benefits. General community support.
			4	very high	Considerable and large-scale change or improvement. Real and considerable benefit. Widespread support.
	<b>Duration (D)</b>	Refers to the total length of time (i.e. number of months or years) that the impact would or the impact source or risk will be present.			
		1	low	Short-term. May occur for weeks or a few months and are rapidly reversible.	
		2	moderate	Medium-term. May occur for the first few years of the project, during construction, up to three years. Impacts reversible within a three year period.	
		3	high	Long-term. May occur throughout the life of the mine, but will cease after operations ceases either because of natural processes or human intervention.	
	<b>Frequency (F)</b>	Refers to the time intervals and how often (i.e. number of days per year) the impact would manifest over the entire duration of the impact.			
		1	low	Seldom. Impact would be intermitted, limited to a few days a year (occurs 0-10 % of the time).	
		2	moderate	Occasional. Impact would occur now and again, not more than ten days a month (occurs 10 to 35% of the time).	
		3	high	Often. Impact would be present more than ten days a month (occurs >35% of the time).	
	<b>Extent / Scale (E)</b>	4	very high	Continuous. Impact would occur all the time (occurs 100% of the time).	
		0	none	None. Impact will not occur anywhere.	
		1	low	Site impact. Small area. No sensitive receptors outside servitude / project area affected.	
		2	moderate	Local. May affect immediate neighbours, never nearby townships. Small area or small number of sensitive receptors affected.	
3		high	Widespread impact. Large area or large numbers of sensitive receptors affected. May affect nearby townships.		
<b>Probability (P)</b>	4	very high	National or international impact. Impacts over a vast area or over vast numbers of receptors.		
	0	none	Never (0 % likelihood).		
	1	low	Conceivable. Will only happen in exceptional circumstances (<10 % likelihood).		
	2	moderate	Plausible. Could happen and has occurred here or elsewhere (11 to 40 % likelihood).		
	3	high	Probable (>40-80 % likelihood).		
	4	very high	Expected. Highly likely to happen (>80 % likelihood).		

Impact Rating Criteria (Abbreviation / Symbol / Short Description)		Explanation of Impact Rating Criteria and Assessment Process		
<b>Significance (S)</b> (Consequence + Probability)	Impact significance represents the degree to which the impact may cause irreplaceable loss of a resource			
	<b>Neg Very High</b>	Widespread negative effect. Negative impact that is of the highest order. Potential fatal flaw. Unacceptable impact / loss of a resource will occur.		
	<b>Neg High</b>	Substantial negative impact.		
	<b>Neg Moderate</b>	Negative impact that is real but not substantial.		
	<b>Neg Low</b>	Low to negligible negative impact with little real effect.		
	<b>Pos Low</b>	Low to insignificant positive impact.		
	<b>Pos Moderate</b>	Positive impact that is real but not substantial.		
	<b>Pos High</b>	Substantial positive impact.		
<b>Pos Very High</b>	Widespread/substantial beneficial effect. Alternative ways to achieve same benefits not possible.			
<b>Precautionary Weighting</b> (Value Judgement)	<b>(Negative Impacts)</b>	Used when there is a potential understatement of the significance of a negative impact to increase the significance rating.		
		0	none	No weighting required. Significance rating is a true reflection of the potential affect of the impact.
		1	low	There may be a slight understatement of the significance of the impact. Impact significance adapted to be slightly higher.
		2	moderate	There may be a moderate understatement of the significance of the impact. Impact significance adapted to be higher.
		3	high	The impact significance rating is highly understated. Impact significance adapted to be higher.
	4	very high	The impact significance rating is severely understated. Impact significance adapted to be higher.	
	<b>(Positive Impacts)</b>	Used when there is a potential overstatement of the significance of a positive impact to reduce the significance rating.		
		0	none	No weighting required. Significance rating is a true reflection of the potential affect of the impact.
		1	low	There may be a slight understatement of the significance of the impact. Impact significance adapted to be lower.
		2	moderate	There may be a moderate understatement of the significance of the impact. Impact significance adapted to be lower.
3		high	The impact significance rating is highly understated. Impact significance adapted to be lower.	
4	very high	The impact significance rating is severely understated. Impact significance adapted to be lower.		
<b>Mitigation Failure Risk (FR)</b>	Used to determine the degree to which impacts can be reversed and to calculate residual impacts. The likelihood of mitigation failure rated based on:			
	<ul style="list-style-type: none"> <li>- research and technology limitations,</li> <li>- long implementation timeframes with associated potential of internal (i.e. personnel changes, project ownership changes, changing financial situation) and outside (i.e. climate change, economic and political instability) influences occurring over time,</li> <li>- financial considerations,</li> <li>- skills and labour availability and potential for human error.</li> </ul>			
	0	Very Low Risk	Less than 10% likelihood that mitigation measures could fail. Mitigation implemented quickly, mitigation easy to implement, proven technology used, no special labour skills required.	
	0.2	Low Risk	10-30% likelihood that mitigation measures could fail.	
	0.4	Moderate Risk	>30 to 60% likelihood that mitigation measures could fail.	
	0.8	High Risk	>60 to 80% likelihood that mitigation measures could fail.	
1.0	Very High Risk	>80% likelihood that mitigation measures could fail. May need research and new technologies to be developed, and/or may have to take place over many years after closure, and/or may involve exorbitant/prohibitive expenses to implement successfully, and/or may require highly skilled personnel with special training, and/or have a high risk of human error during the execution of the mitigation.		

Impact Rating Criteria (Abbreviation / Symbol / Short Description)			Explanation of Impact Rating Criteria and Assessment Process
Impact Rating Methodology (used to determine both Unmitigated Impacts and Mitigated Impacts)	<b>Formula</b>	<b>Example</b>	<b>Rating Criteria</b>
	I	1.0	Intensity (I)
	D	1.0	Duration (D)
	F	1.0	Frequency (F)
	$S=(I+D+F)/3$	1.0	Severity (S) = (Intensity + Duration + Frequency) / 3
	E	4.0	Scale (Extent) (E)
	$C=(S+E)/2$	2.5	Consequence (C) = (Severity + Extent) / 2
	P	3.0	Probability (P). A weighing of 0.5 used for probability to increase the conservancy of the assessment of negative impacts, in line with the precautionary principle.
	$S1=(C+P)/2$	2.7	Significance (S1) = (Consequence + Probability) / 2
	W	0.5	Precautionary Weighting (W)
	$S2=(S+W)$	2.9	Significance with Precautionary Weighting (S2) = (S1 + W)
FR	1	Mitigation failure risk (FR)	
$S2 \times FR = RR$	2.9	Residual Risk (RR). Represents an adapted mitigated impact adapted based on mitigation failure risk. <i>Mitigated impact x Mitigation Failure Risk = Residual Risk</i>	
	<b>Formula</b>	<b>Level</b>	<b>Level</b>
<b>Unmitigated Impact (UI)</b>	Using formula above	4	Impact rated assuming the proposed mitigation measures are not in place (UI)
<b>Mitigated Impact (MI)</b>		2	Impact rated assuming the proposed mitigation measures are fully in place (MI)
<b>Mitigation Potential (MP)</b>	$UI-MI=MP$	2	Mitigation potential (MP) represents the degree to which impacts can be reversed are calculated as follows: <i>Unmitigated Impact (UI) – Mitigated Impacts (MI) = Mitigation Potential (MP)</i>
	<b>Formula</b>	<b>Level</b>	<b>Level</b>
<b>Impact Rating</b>	<=	-3.6	Neg Very High
	<=	-3.0	Neg High
	<=	-2.0	Neg Moderate
	<	0.0	Neg Low
	>	0.0	Pos Low
	>=	2.0	Pos Moderate
	>=	3.0	Pos High
	>=	3.6	Pos Very High

## 9.4 Specialist Studies

Significant information on the environmental conditions at the Scaw Metals site is available from the investigations that have been conducted for various projects at the site. In addition intensive monitoring of a number of different environmental aspects at the site has resulted in a detailed information database being available (see Section 3.4.1).

However the nature of the Electrical Co-generation Power Plant (especially Phase 2) and the Ash Disposal Facility are such that additional specialist inputs are required in order to provide sufficient information to complete the EIA. The following terms of reference outline the scope of work based on the outcomes of the scoping assessment as well as the issues raised by IAPs during the scoping phase, and will be carried out by each specialist in order to provide input into the EIA. Should it be deemed necessary that additional specialist studies are required; terms of reference will be drawn up and these will then be included in the EIA report.

Specialist reports will be structured in terms of GNR 543 Section 32.

### 9.4.1 Noise

A specialist will be appointed to provide an opinion on the potential for noise from the Co-generation Power Plant to create an additional nuisance or disturbance in the context of current operations at the Scaw Metals facility. The specialist will be provided with design information and recent noise surveys reflecting the current baseline at the Scaw Metals facility.

If the specialist is of the opinion that the Co-generation Power Plant will alter the noise levels at the scaw Metals facility then they will be required to undertake a noise impact assessment for the Co-generation Power Plant. The scope of work will include:

- Undertake a baseline noise survey to determine the existing ambient noise levels in the area.
- Identify sensitive receptors.
- Review legislation and guidelines pertaining to noise control.
- Identify the change in noises due to the project.
- Calculate noise output during construction and operation of the co-generation power plant and ash disposal facility.
- Define impacts on receptors during construction and operation of the project.
- Define zones of influence for noise.
- The evaluation of estimated noise impacts based on legislation and(or) guidelines.
- Make recommendations for mitigation of noise impacts.

### 9.4.2 Air Quality

A specialist will be appointed to undertake an air quality impact assessment for the Co-generation Power Plant and Ash Disposal Facility. The main focus of the air quality assessment will be to determine the air pollutants resulting from the Co-generation Power Plant and the resultant impacts thereof on the surrounding environmental and human health. The air quality impact assessment will also consider the potential emissions from the Ash Disposal Facility. The scope of work will include:

- Baseline characterisation to define the emissions and impacts from the current operations at Scaw Metals;
- Compile an emissions inventory for the Co-generation Power Plant and Ash Disposal Facility.
  - Identify and distinguish all emissions sources (physical and chemical properties)
- Identify the change in emissions due to the project.
- Perform dispersion modelling for construction and operation of the Co-generation Power Plant and Ash Disposal Facility.
  - A number of scenarios will be assessed including Phase 1 only, Phase 1 and Phase 2 and Phase 2 with the combustion of shredder waste.
- Predict SO<sub>2</sub>, NO<sub>2</sub>, CO, dust fallout and fine particulate (PM10 and PM2.5) concentrations.
- Compare predicted emissions levels to relevant national ambient and specific process standards.
- Define dust nuisance (dust fallout) and potential health impact areas.
- Define air quality buffer and management zones around the sites (minimum distances to sensitive receptors).
- Propose emissions and dust control measures for construction and operation of both the Co-generation Power Plant and Ash Disposal Facility.
- Write up to be included in the Environmental Impact Assessment Report.

- Identification of any changes and or additions to the Air Quality Management Plan for Scaw Metals that may be required.
- Completion of the application forms for the Atmospheric Emissions Licensing.

The air quality impact assessment will provide important feedback to the design team on the effectiveness of the operational and emissions controls proposed for the various phases of the Co-generation Power Plant. If the predicted emissions limits are exceeded then additional operational and emissions controls will be investigated and added to the design specification as required. **The air quality impact assessment will also provide feedback on the potential operational risks at the ash disposal facility and recommend emissions control measures as required.**

### 9.4.3 Hydrogeological

A specialist will be appointed to undertake a hydrogeological impact assessment study of the ash disposal facility. The scope of work will include:

- Describe baseline surface and groundwater characteristics.
- Define existing water users in the area (hydro-census data).
- Drill pairs of monitoring boreholes and undertake aquifer testing to inform the model.
- Develop and calibrate a numerical groundwater flow and mass transport model;
- Assess risks of groundwater pollution associated with the construction and operation of the Ash Disposal Facility.
- Make recommendations for the:
  - management and protection of groundwater resources.
  - management and protection of surface water resources.
  - monitoring of surface and groundwater resources.

### 9.4.4 Geophysics and Geotechnical

- Characterisation and mapping of soils and soil profile conditions.
- Evaluate the site soils with regards to suitability as construction materials.
- Excavation of TLB test pits.
- Permeability testing.
- Laboratory testing of representative horizons.
- Provide a report, with drawings, showing soil zones.

### 9.4.5 Conceptual Design of Ash Disposal Site

An engineer with appropriate qualification and experience will be appointed to provide conceptual designs for the ash disposal facility. The scope of work will include:

- Review available information, classification study report, geohydrological impact assessment and geotechnical report.
- Design of basin and final landform models.
- Stability analysis of ash pile to final height based on assumed barrier design.
- Conceptual storm water analysis for separation of clean and contaminated storm water.
- Liner design based on current standards at the time of appointment
- Conceptual design of site infrastructure: layout of access roads, weighbridge and site office.
- Conceptual drawings suitable for submission to the DEA for approval.
- Write up to be included in the Environmental Impact Assessment Report.

## 9.5 Study Team

Synergistics Environmental Services (Pty) Ltd (Synergistics) has been appointed by Scaw South Africa as independent environmental consultant to undertake the EIA for the Electrical Co-generation Power Plant and the Ash Disposal Facility.

Matthew Hemming, a director of Synergistics, is an Environmental Assessment Practitioner (EAP). His qualifications and experience include:

- MSc (Conservation Biology)
- 6+ years' environmental management and assessment experience, specifically in the mining, processing and infrastructure development sectors.

The environmental study team members and specialists that will be involved in the environmental impact assessment are listed in Table 15. Their roles and responsibilities on the project and their qualifications are provided.

**Table 15: Study Team**

Name and Affiliation	Qualification	Role
<b>Environmental Study Team</b>		
<b>Matthew Hemming</b> Synergistics Environmental Services	MSc (Conservation Biology)	<ul style="list-style-type: none"> <li>- Environmental Assessment Practitioner</li> <li>- Project Director</li> <li>- EIA report and EMP</li> </ul>
<b>Edwynn Louw</b>	BSc (Hons)	<ul style="list-style-type: none"> <li>- Public Consultation</li> </ul>
<b>Bheki Khumalo</b> Synergistics Environmental Services	BSc Geology and Applied Geology BSc (Hons) Environmental Modelling and Monitoring	<ul style="list-style-type: none"> <li>- GIS and Mapping</li> </ul>
<b>Hanlie Liebenberg</b> Airshed Planning Professionals	MSc (Geography and Environmental Management)	<ul style="list-style-type: none"> <li>- Air Quality Impact Assessment</li> </ul>
<b>Nicolette Krause</b> Airshed Planning Professionals	BEng (Hons) (Mechanical Engineering)	<ul style="list-style-type: none"> <li>- Noise Impact Assessment</li> </ul>
Jeffares and Green	To be confirmed	<ul style="list-style-type: none"> <li>- Geohydrological Assessment</li> </ul>
Jeffares and Green	To be confirmed	<ul style="list-style-type: none"> <li>- Geotechnical Assessment</li> </ul>
Jeffares and Green	To be confirmed	<ul style="list-style-type: none"> <li>- Conceptual Waste Site Design</li> </ul>

Name and Affiliation	Qualification	Role
<b>Technical Study Team</b>		
<b>Johan Claassens</b> Scaw Metals	GCC, Engineering Manager	– Project Manager
<b>Livhu Magdimisa</b> Anglo American	BSc (Eng) Chem MEng (industrial)	– Technical Design and Layout
<b>Pieter van Rensburg</b> Worley Parsons		– Technical Design

## 9.6 Consultation Process

The following opportunities will be provided to IAPs, Competent Authorities, relevant State Departments and Organs of State for input into the EIA process:

### 9.6.1 Public Participation Process

IAP responses received by the EAP during the assessment process will continue to be considered and will be integrated into the EIA report.

#### 9.6.1.1 Public Feedback Meeting during EIA

During the EIA phase of the study, public meetings will be arranged to present the results of the specialist studies. The meetings will be advertised in the local press and landowners and registered IAPs will be directly invited to attend the meeting.

#### 9.6.1.2 Public Review of the EIA Report

Both the draft and final EIA report will be made available for public review. IAPs will be provided with 30 calendar day review periods for the draft and final EIA report. Comments on the draft report should be submitted to the EAP, while comments on the Final report must be submitted directly to the competent authority, and copied to the EAP. Electronic versions of the scoping and EIA reports will be published on [www.synergistics.co.za](http://www.synergistics.co.za) and will be circulated to all landowners and registered IAPs. Hard copies will be made available at the Scaw Metals security offices and at the Dinwiddie Library. Additional copies can be made available on request.

### 9.6.2 Consultation with Competent Authority, State Departments and Organs of State

#### 9.6.2.1 Authorities Meetings

General authorities meetings will be arranged during the EIA phase of the project. Focused consultation meetings will be held with the relevant DEA directorates, EMM Air Quality and the DWA. The aim of the meetings will be to discuss the environmental assessment process, the project and alternatives and to define mitigation measures to be employed.

### **9.6.2.2 Review of the Scoping and EIA Report**

In terms of the requirements of regulation GNR 543, organs of state and state departments will be allowed six weeks (forty calendar days) for review of the draft scoping and draft EIA reports. The review period of final scoping and final EIA report will be three weeks (21 calendar days).

Where the Department of water Affairs is required to comment on waste management activities and issue a record of decision in terms of section 49(2) of the NEMWA, then sixty calendar days must be provided for the review. All review periods for the competent authority will be in accordance with GNR 543 for the scoping and EIA report.

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## **9.7 EIA Report**

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The EIA Report will be structured in terms of Section 31 of GNR 543. It is anticipated that separate EIA reports will be developed for the Electrical Co-generation Power Plant and Ash Disposal Facility. Separate reports are proposed so that sufficient detail and information can be provided and assessed for each of the facilities.

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## **9.8 Draft EMP**

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Draft EMPs will be submitted as supporting documents to the EIA Report for each of the Electrical Co-generation Power Plant and Ash Disposal Facility. The EMPs will be structured in terms of Section 33 of GNR 543. The EMPs will provide recommendations on how to construct, operate, maintain and close the facilities and associated infrastructure through all relevant phases of the project life. The aim of the EMP will be to ensure that the Electrical Co-generation Power Plant and Ash Disposal Facility are managed to reduce potential negative environmental impacts and enhance potential positive environmental impacts. The EMP will detail the actions required, the responsibility for implementation and the schedule and timeframe.

Once approved by the relevant authorities, the provisions of the EMP are legally binding on the project applicant and all its contractors and suppliers.

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## **9.9 Atmospheric Emissions Licence**

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The final atmospheric emissions licence application forms will be completed with the final design details and information from the Air Quality Impact Assessment. The forms will be submitted to the Air Quality Officer at the Ekurhuleni Metropolitan Municipality.



## 10. Conclusions and Key Findings

This report concludes the scoping phase of the environmental assessment for the Electrical Co-generation Power Plant and Ash Disposal Facility at Scaw Metals. It outlines the results of the public participation and authority consultation processes to date, and defines the plan of study for the Environmental Impact Assessment phase.

The Electrical Co-generation Power Plant will have benefits in generating significant amounts of electricity from a variety of energy containing materials and waste streams. Generating electricity from these resources will reduce electricity costs, improve the security of electrical supply, improve energy efficiency and reduce the carbon footprint per unit production at Scaw Metals. The most significant risk of the Electrical Co-generation Power Plant, as raised by responding IAPS and identified by the EAP, is potential effects on air quality from emissions to atmosphere. Phase 1 of the project is likely to function as a 'cleaner technology' project and could reduce atmospheric emissions over current levels. However, Phase 2 requires combustion of energy containing materials and waste and could result in altered or increased emissions to atmosphere. The Air Quality Impact Assessment will be key to predicting the pollutant dispersion concentrations, defining the dust nuisance and health impact areas and determining the required emissions control measures. The project team are investigating various emissions control technologies for the two phases of the project in order that the Electrical Co-generation Power Plant operates within the atmospheric emissions limits set by the National Environmental Management Air Quality Act. If the project can achieve the emissions limits set then the air quality impacts will likely be within the acceptable range.

Ash and bag-house dust generated from Phase 2 of the Co-generation Power Plant will require disposal. A preferred site for the Ash Disposal Facility has been identified at the Scaw Metals facility. The project team are facilitating the classification of the ash in terms of the currently endorsed waste classification system. There may be risks to surface and groundwater during the disposal as the ash is potentially hazardous waste. Independent experts will undertake a geotechnical investigation of the site and complete a geohydrological impact assessment of the waste disposal. The ash disposal facility will be designed by experienced engineers with due consideration of the waste classification, geotechnical conditions and the geohydrological setting. Material handling and ash disposal could result in dust generation. The Air Quality Impact Assessment will also consider the potential nuisance and health risks arising from the Ash Disposal Facility. Construction and operation of the ash disposal facility will need to be done with minimal impacts to groundwater and air quality.

There have been no fatal flaws identified during the scoping phase and the project will proceed to the EIA phase. The next step will be to conduct the specialist studies and further consultation processes that will inform the EIA and authority decision-making process. Additional impacts/issues identified during the EIA phase will be addressed accordingly. Separate EIA Reports will be produced for each of the Electrical Co-generation Power Plant and Ash Disposal Facility. The EIA reports will incorporate an environmental management programme that will set out the management and mitigation measures required at each facility to ensure that potential impacts are managed to an acceptable level.

## 12. Consultant Declaration

Synergistics Environmental Services is an independent environmental consultancy that was established in South Africa in 2004. Matthew Hemming, the company director responsible for the reporting on this project, is an Environmental Assessment Practitioner with over 6 years of experience in the field of environmental consulting, particularly in the mining and waste management sectors.

I, the undersigned herewith declare that this scoping report represents an objective and complete scoping-level assessment of the environmental impacts associated with the proposed Electrical Co-generation Power Plant and Ash Disposal Facility. Issues and impacts were defined through professional judgement and consultation with interested and affected parties and authorities.

It is deemed that the environmental assessment process followed to date meets the requirements of relevant legislation to ensure that the regulatory authorities receive sufficient information to enable an informed decision to accept the scoping report and approve the Plan of Study for EIA as outlined in Section 0 of this report.

COMPILED BY:



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**Matthew Hemming**

MSC (Conservation Biology)  
Director

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# List of Appendices

## **Appendix A: Public Consultation Documentation**

- A1. Notification to Interested and Affected Parties
- A2. Proof of Notification to Interested and Affected Parties
- A3. Proof of Newspaper Placements and Site Notices
- A4. Database of Registered Interested and Affected Parties
- A5. Records of Public Information Meeting (13 June 2012)
  - Presentations for the Meeting
  - Attendance Registers for the Meeting
  - Minutes of the Meeting
- A6. Responses from Interested and Affected Parties
- A7. Correspondence to Interested and Affected Parties
- A8. Comments on Draft Scoping Report

## **Appendix B: Authority Documentation**

- B1. Authority Acceptance of Application Forms
- B2. Record of Authority Meetings
- B3. Correspondence from Authorities