

**ENVIRONMENTAL
SCIENCE
ASSOCIATES**

**BACKGROUND
INFORMATION DOCUMENT**

FOR

**THE ENVIRONMENTAL
IMPACT ASSESSMENT FOR
PROPOSED ELECTRICITY
GENERATION PLANT**

AT

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March 2008

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**BACKGROUND INFORMATION DOCUMENT FOR AN ENVIRONMENTAL IMPACT
ASSESSMENT IN TERMS OF GNR 385 PROMULGATED UNDER THE NATIONAL
ENVIRONMENTAL MANAGEMENT ACT: 1998**

**GENERATION OF ELECTRICITY FROM THE COMBUSTION OF
FERROCHROME FURNACE OFF-GASES**

PREPARED FOR:

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1. WHAT DOES THIS DOCUMENT TELL YOU?

This document aims to provide you, as an interested or affected party (IAP), with background information regarding a proposed electricity generation plant that will run on off-gases from Herculite Ferrochrome (Pty) Ltd's (Herculite) smelter furnaces. The document also provides brief information regarding the Environmental Impact Assessment (EIA) to be undertaken. By registering as IAP you will be provided with information at pertinent stages in the EIA process have the opportunity to become actively involved in the project. Public participation is an important part of the EIA and ensures that the concerns and views of IAPs are considered within the EIA.

Environmental Science Associates (ESA) was appointed by BioTherm, to apply for the proposed construction and operation of a plant to generate electricity from the combustion of ferrochrome furnace off-gases.

The project aims to utilise off gases containing carbon monoxide to drive an electricity generation plant and thus offset power imported from the national grid. Electricity supply from the national grid is largely produced by coal fired power stations. The net overall effect of the proposed development will be to reduce Herculite's contribution to upstream carbon dioxide emissions, thus reducing the plants total greenhouse gas contribution.

2. MOTIVATION FOR THE PROJECT

Electrical power supplied in the national grid is obtained largely by coal fired power stations. These power stations burn coal to generate electricity, and release large amounts of carbon dioxide into the atmosphere, thus contributing to global warming. Coal is also a non-renewable source of energy. BioTherm proposes to use off-gases from Herculite's furnaces to produce electricity, and in so doing reduce Herculite's demand from the national power grid. The proposed project has the following benefits:

- a) Overall reduction in the carbon footprint of Herculite's activities
- b) Reduced electricity demand from the national power grid which is at present oversubscribed.

3. DESCRIPTION OF THE PROPOSED PROCESS

The ensuing process description is aimed at giving the reader an overview of the intended development. Further detail will be provided during the Scoping and EIA phases.

Herculite produces ferrochrome for the stainless steel and speciality steels industry. The production of ferrochrome (otherwise known as charge chrome), involves the smelting of ferrochrome ore in electric arc furnaces. Such furnaces, and in particular closed furnaces, inherently produce some carbon

monoxide. BioTherm proposes to generate electrical energy from the combustion of off-gases containing an appreciable amount of carbon monoxide.

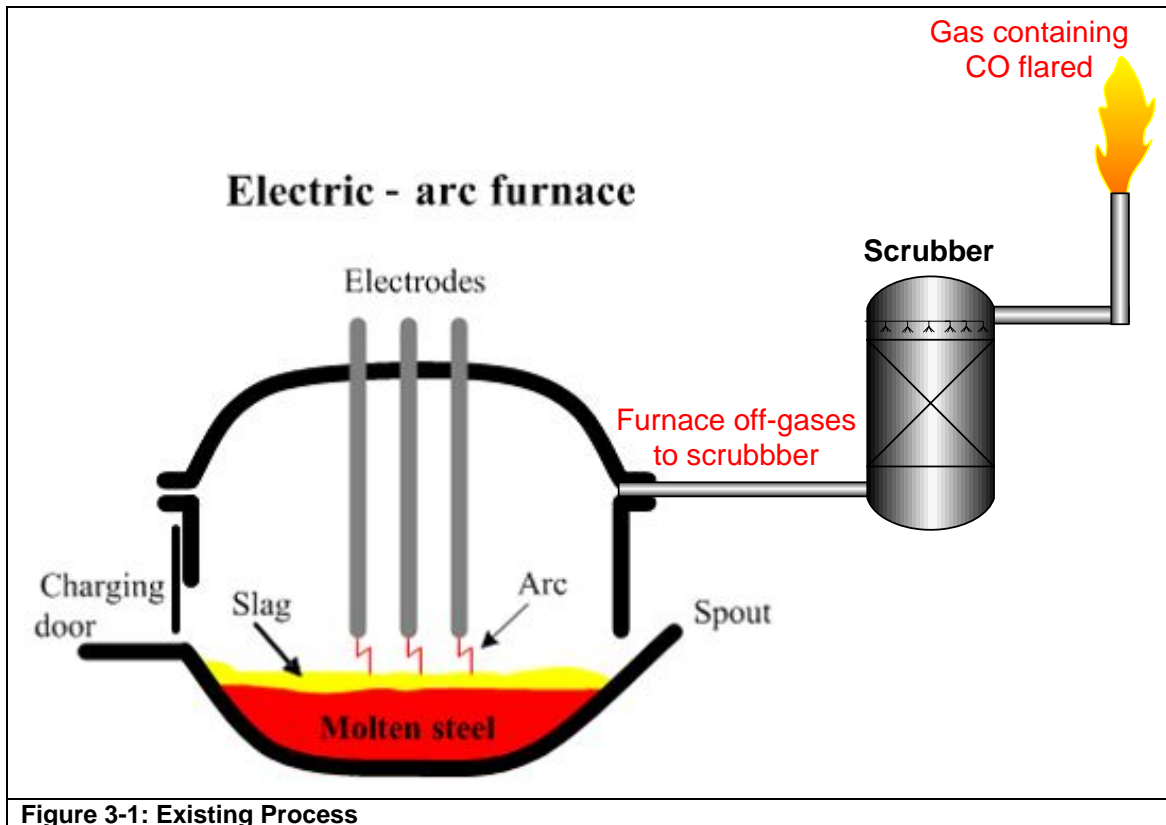


Figure 3-1: Existing Process

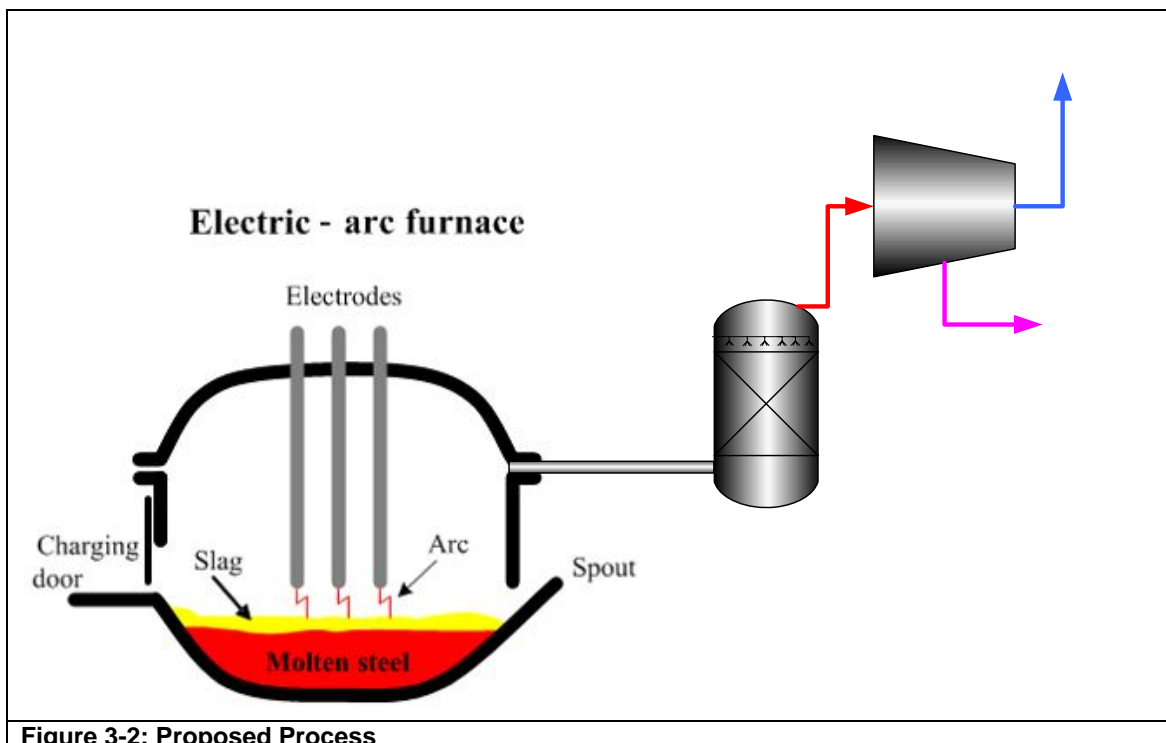


Figure 3-2: Proposed Process

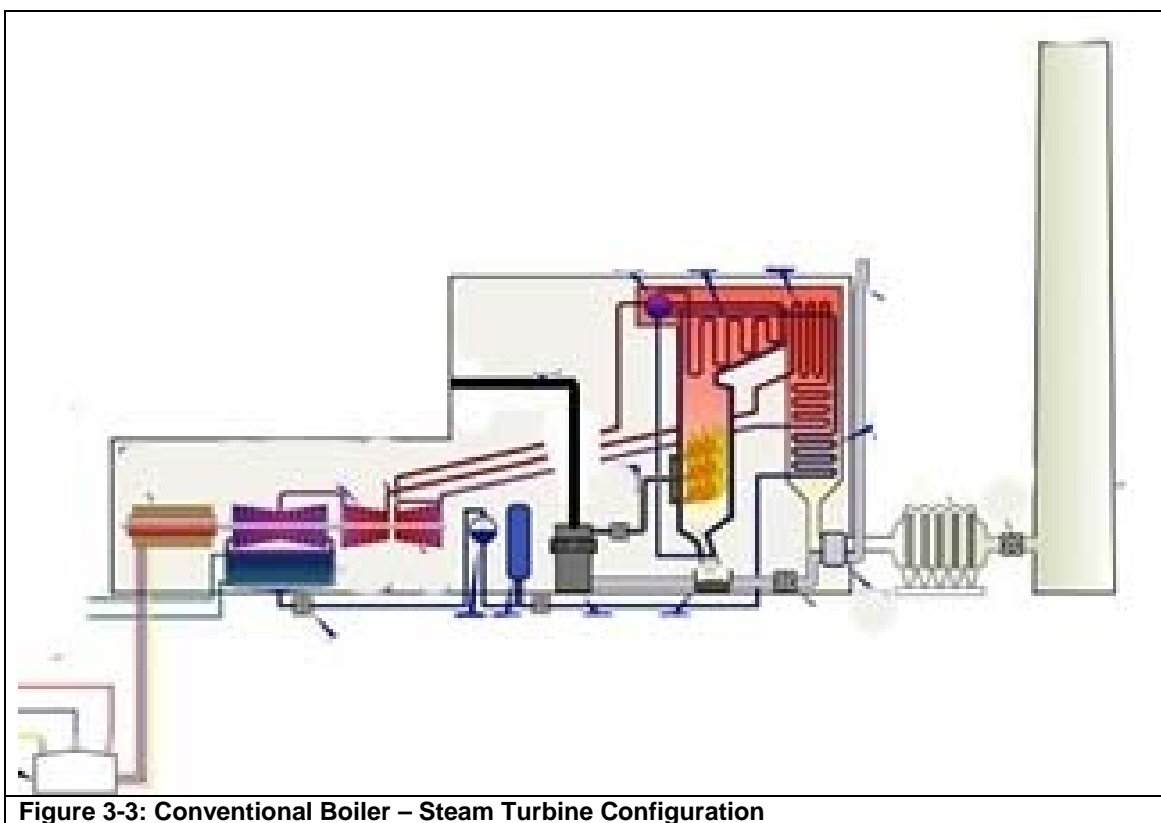
3.1 PROCESS ALTERNATIVES

In the case of carbon monoxide combustion is the primary the primary means of conversion of the innate chemical energy potential to a usable form of energy. The heat of combustion can then be converted to electrical energy various several means. Three potentially feasible alternatives have been identified for the proposed process, these are:

- a) Conventional boiler and steam turbine
- b) Combined Cycle Gas Turbine (CCGT)
- c) Internal Combustion Generator Set

3.1.1 Conventional Boiler with Steam Turbine

This option would used a boiler fired by the furnace off-gases. The carbon monoxide is burnt and the heat energy released is used to produce steam which then runs through a steam turbine coupled to an electrical generator.



3.1.2 Combined Cycle Gas Turbine (CCGT)

A CCGT takes advantage of the high temperature of combustion to run a gas turbine fired by the furnace gases, the turbine is coupled to a generator. Exhaust from the turbine would then be used to run a boiler. Steam from the

boiler is the passed through another gas turbine also coupled to an electrical generator.

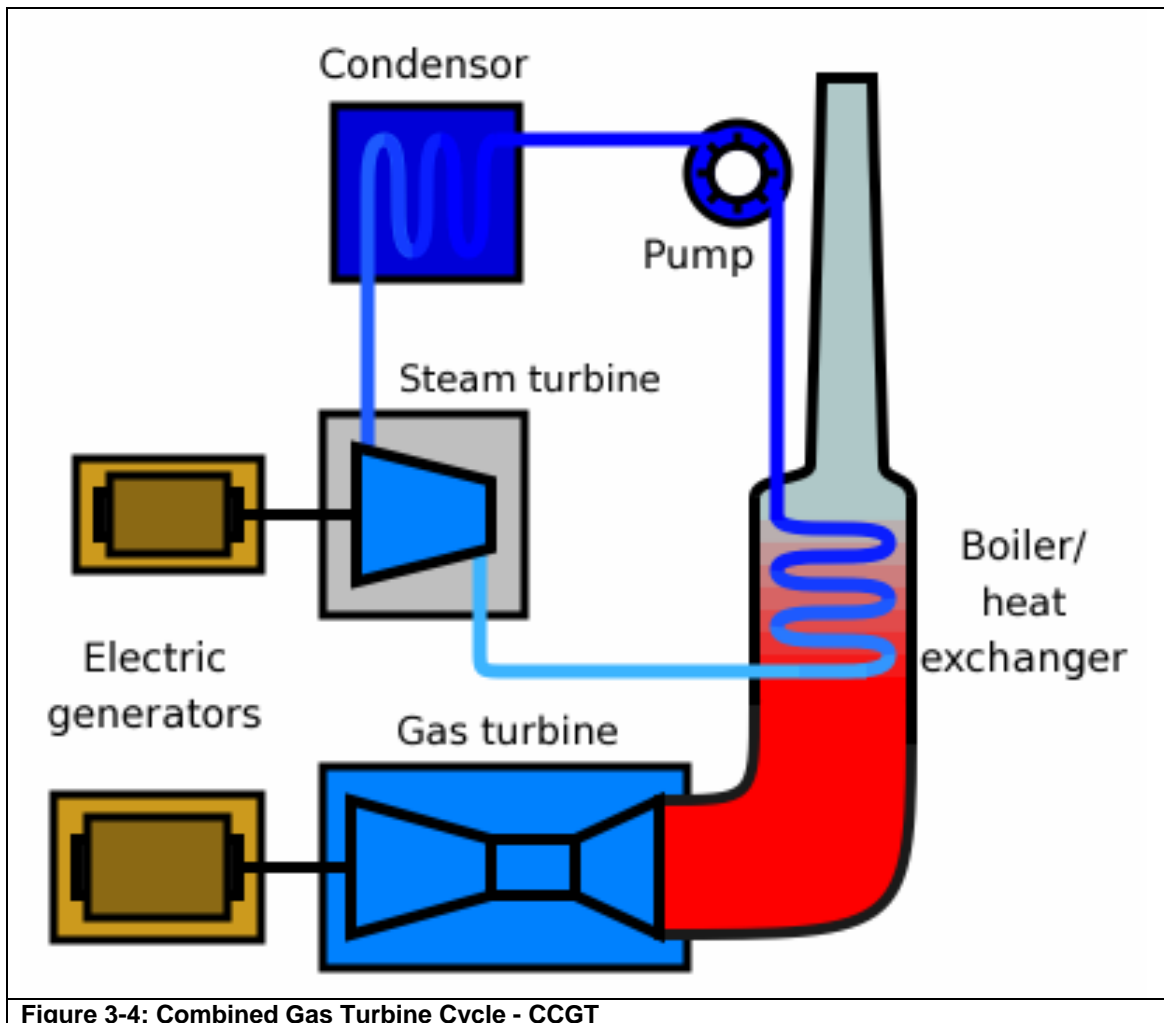


Figure 3-4: Combined Gas Turbine Cycle - CCGT

3.1.3 Internal Combustion Generator Set

The furnaces off gas are used to fire a set of internal combustion engines coupled to a generator. This option is very similar to conventional diesel generator sets used in homes and industry, the difference being that the engines would be fired by carbon monoxide in this case.



Figure 3-5: Conventional Internal Combustion gensets.

4. LEGAL FRAMEWORK

In terms of Regulation 21(1)(a) of the regulations gazetted in Government Notice No. R 385 promulgated in terms of Section 24(5) of the National Environmental Management Act (Act No. 107 of 1998), the so called NEMA 2006 EIA Regulations, Scoping and Environmental Assessment must be applied to an application if the authorisation applied for is in respect of an activity listed in Government Notice No. R. 387 of 2006.

Government Notice No. R 387 lists the following activities:

- 1(a)(i) The construction of facilities or infrastructure, including associated structures or infrastructure, for the generation of electricity where the electricity output is 20 megawatts or more

- 1(e) The construction of facilities or infrastructure, including associated structures or infrastructure, for any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No. R. 386 of 2006.

In this case registration of a scheduled process in terms of the Atmospheric Pollution Prevention Act.

- 1(l) The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more;

5. ENVIRONMENTAL ASPECTS

5.1 GENERATION OF WASTE

Particulate emissions from the combustion process will be captured in abatement equipment. The fallout from this equipment may constitute a hazardous waste.

5.2 DISCHARGE OF EFFLUENT

The process is not expected to generate effluent. However, should a wet scrubbing system is used, then some effluent may be generated.

5.3 EMISSIONS TO AIR

Emissions to air from the proposed development will consist primarily of:

- Particulates from the furnaces passed through the proposed combustion process with furnace off-gases.
- Gases of combustion namely Carbon Dioxide and Oxides of Nitrogen.
- Gases from the current combustion process are not expected to change significantly, with the exception of increased Carbon Dioxide and Oxides of Nitrogen.
- Carbon Monoxide emissions will be reduced to insignificant levels.

5.4 IMPACT ON SOIL AND GROUNDWATER

The proposed facility is not expected to impact ground and surface water.

6. PROPERTY PARTICULARS

6.1 NAME OF PROPERTY

R/E of Portion 103
De Kroon 444 JQ
Brits

Refer to Figure 1 : Site Location.

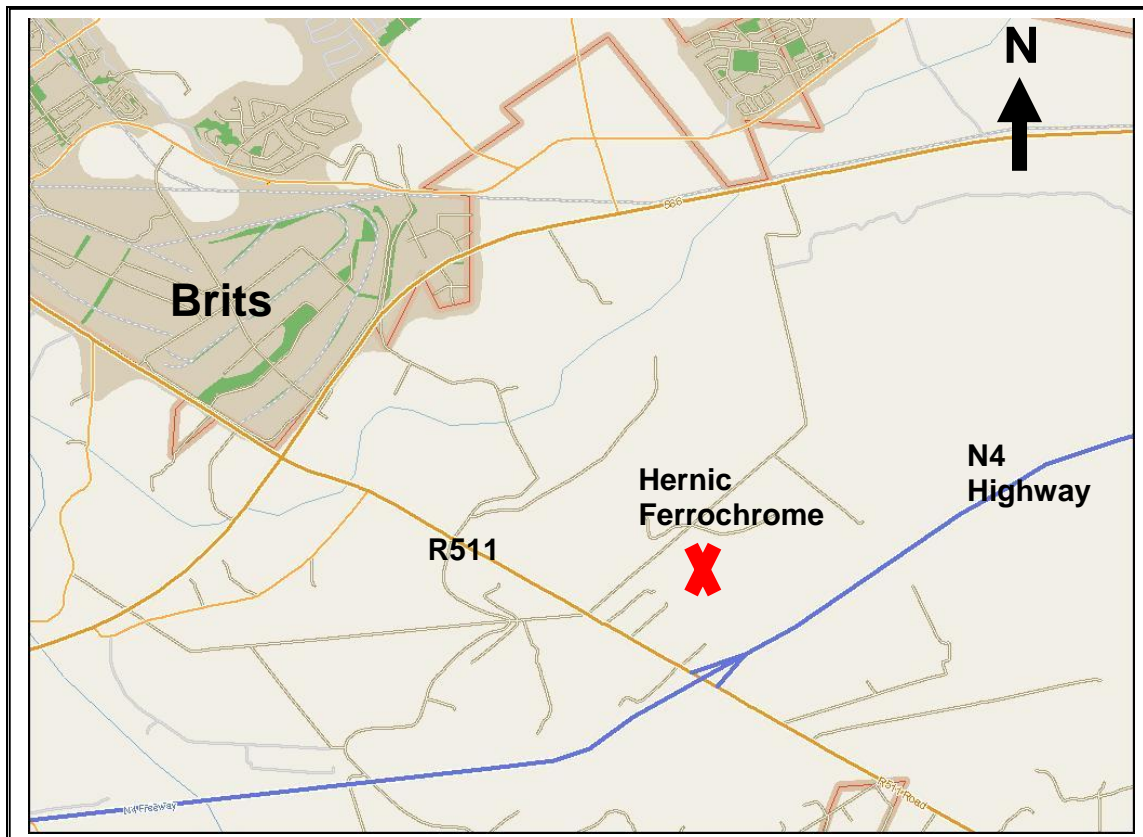


Figure 6-1: Site Location

6.2 LOCAL AUTHORITY

The subject property is located within the jurisdiction of the Madibeng Municipality.

6.3 PRESENT LAND USE

The land is presently zoned for Industrial use. The densely populated areas Brits town, approximately 3km North West of the site. The areas directly bordering site are mostly sparsely populated.

7. INVITATION TO REGISTER AS AN INTERESTED OR AFFECTED PARTY

In terms of the requirements of the EIA Regulations, all stakeholders and other interested and affected parties (I&APs) must be provided with opportunities to participate in the EIA process. This would include attendance of briefing meetings, review of reports generated, and submission of comments during the EIA process. Accordingly, an initial briefing and information sharing meeting open to all I&APs has been scheduled for Wednesday 12 March

2008, 16:00h, at the Heric head office conference room, Portion 47 De Kroon Brits, located off the R511 approximately 1 km North West of the R511 - N4 junction.

For further information, to confirm attendance at the above meeting, and/or to register as an I&AP by submission of your name, contact information and noting your interest in the project, please contact the person below, preferably but not necessarily by email:

Contact: **Abdul Ebrahim**
 Environmental Science Associates
 PO Box 73420, Lynwood Ridge, Pretoria 0040
 Tel: 011 728 2683
 Cell: 072 268 1119
 Fax: 086 610 6703
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Please fill in your details as per the ensuing table.

Name:	
Designation:	
Organisation:	
Tel:	
E-Mail:	
Fax:	
Postal Address:	
Physical Address:	
Interest in the Development	