OMNICANE ETHANOL PRODUCTION LTD

Installation and Operation of a Distillery and Concentrated Molasses Solids (CMS) Fertilizer Blending Plant

at Omnicane Industrial Cluster - La Baraque

Environmental Impact Assessment

Chapter 1: Project Background

1.1 Introduction

Omnicane Ethanol Production Ltd. (hereinafter referred to as **OEPL**) intends to install and operate a Distillery to produce ethanol using molasses, a by-product of sugar manufacturing.

With the coming into operation of the proposed Distillery, the Alcodis Distillery will be decommissioned with some of the existing equipment reused.

The proposed Distillery will be located within the Industrial[1] Cluster at La Baraque and will have a design production capacity of 25 million litres of hydrous Ethanol per year using approximately 90 000 tonnes of Molasses.

The Distillery will have the capacity to produce fuel grade (anhydrous) ethanol as well as potable hydrous ethanol for the alcoholic beverage, industrial, cosmetics and pharmaceuticals market.

The Sugar cluster at La Baraque consists of:

- The sugar factory with a maximum crushing rate of 425TCH and operates during the crop season for a milling operation of approximately 150 days between June and December;
- The sugar refinery with a design capacity of 600tons Granulated refined sugar (GRS) per day using Plantation White Sugar (PWS) produced by the sugar factory. The refinery operates around 330days/year;
- The power plant (CT SAV 1 & 2), of installed capacity 2 x 43.5MWe and designed to supply steam and electricity to the sugar factory, the sugar refinery as well as to the proposed Distillery. The power station is a co-generation Plant using Bagasse & Coal with two Steam Boilers and operates all year around except during the maintenance period.

1.2 Project Rationale

The manufacture of ethanol from molasses produced from processing of sugar cane is in conformity with the country sector strategy as elaborated in the Multi annual adaptation strategy (MAAS) and the development plan of Omnicane Group. The distillery project is

[1] The terminology industrial cluster is used interchangeably with sugar cluster in this report.

timely, since it will produce biofuel which is a renewable source of energy and provides an economic viable alternative for a reduction in imported fossil fuels for the local transport sector.

Furthermore as the thermal and electrical energy for ethanol production is derived from the power station that utilise mainly bagasse during the crop season and coal during the inter-crop season, the Distillery Project can be considered as sustainable as part of the energy is derived from within the system itself and main raw material used to produce ethanol is molasses, a by- product of cane sugar manufacturing.

The Distillery will produce carbon dioxide as a by product of the fermentation process. It is estimated that about 25 tonnes of food grade carbon dioxide (CO_2) will be produced daily from the Carbon dioxide Bottling Plant. Omnicane Ethanol Production Ltd, will process the CO_2 generated from its fermentation unit and twenty five percent of this CO_2 will be sold to the local soft drink industry, the balance being earmarked for export to the region. It must be noted that presently the CO_2 used by the local soft drink industries is produced by the combustion of fossil fuel**.**

1.2.1 Centralisation of Sugar Industry – Development of the sugar cane cluster

The sugar industry has been the backbone of the Mauritian economy for decades. Being a member of the ACP countries, Mauritius has for long benefited from a ready market and a guaranteed price for its sugar export on the EU market under the Sugar Protocol of the Lome Convention.

However, this preferential trade agreement has being phased out since 2009. After an initial reduction of 5% in prices paid to ACP countries in 2006, the price of sugar has dropped by the maximum amount of 36 percent resulting in significant reduced revenues to all the planters' community and losses in foreign exchange earnings for the country.

A comprehensive set of strategies regrouped under the Multi Annual Adaptation Strategy (MAAS)[2] was thus prepared jointly between the Government of Mauritius and the stakeholders in the sugar sector with the objective to maintain the commercial viability and sustainability of the sugar sector. The plan that emerged from the MAAS comprised several measures including the transformation of the sugar industry into a sugar cane cluster

In line with the MAAS, Societé Usinière du Sud (SUDS) Ltée now known as OMNICANE has embarked in the reform of its sugar sector since 2005 by implementing a number of strategies geared towards maintaining the competitiveness and survival of the industry. The significant realisations include:

- The centralisation of milling activities of Rose Belle, Britannia, Riche En Eau and Mon Trésor Mon Désert sugar factories onto La Baraque Sugar Factory in 2007;
- Reduction in workforce through blue print and Early Retirement Schemes (ERS);

[2] Ministry of Agro-Industry & Fisheries: Multi Annual Adaptation Strategy (April 2006)

- The setting up of a bagasse cogeneration power plant (CTSAV 1 & 2) with an installed capacity of 2 × 43.5MW_E next to the Sugar factory in 2007[3]:
  - To provide the electricity and steam to the bigger sugar factory, the sugar refinery and the proposed Distillery;
  - To generate electricity from bagasse and coal for export to the national grid
- The construction and operation of a sugar refinery in 2010[4] with a design production capacity of 600tons of Granulated refined sugar (GRS) using Plantation white sugar (PWS) produced by the sugar factory; and
- The completion of the centralisation milling activities with the closure of Union St Aubin Sugar factory as from crop season 2011[5].

Pertaining to the production of ethanol from molasses, MAAS analysed the technical, economic and environmental aspects and made the following main conclusions:

- It is estimated that about 150 000 tonnes of molasses are generated from the sugar factory. Some 30 000 tonnes of molasses are used for animal feed and the production of potable alcohol. The remaining 120 000tonnes are available for export or the production of ethanol;
- Two Distilleries at FUEL and Savannah (now OMNICANE) can produce 30million litres of ethanol which can be used as a potential fossil fuel substitute at a mix of 20% with gasoline;
- The main constraint of ethanol production is the generation of Vinasse. However this constraint has been resolved with Vinasse and the treated Vinasse also called Concentrated Molasses Stillage (CMS) will be used as fertiliser after the addition of urea and phosphoric acid. Furthermore MAAS considers that the fertiliser can bring down the overall cost of fertilisation which is an important component of the cost of production.

Hence the installation and operation of a Distillery conforms to the recommendations of MAAS and provides value added to Molasses, a by-product of sugar manufacturing, through the production of ethanol.

1.2.2 MAAS Strategic Environmental Assessment

A Strategic Environmental Assessment (SEA) was carried out on the Multi – Annual Adaptation Strategy (MAAS). With regard to the production of ethanol, the SEA focussed principally on Vinasse management issues and noted the risks associated with the transport and storage of ethanol.

[3] EIA Report – SUDS- Construction and Operation of a 83.0MW Coal/Bagasse fired Power Plant at Savannah – SIGMA Ove ARUP & Partners, July 2005
[4] EIA Report – Omincane Milling Operations Ltd- Construction and Operation of a Sugar Refinery at Savannah – ARUP SIGMA Ltd., December 2008
[5] EIA Report – Omincane Milling Operations Ltd- Closure of Union St Aubin Sugar Factory – ARUP SIGMA Ltd., submitted in June 2011

The SEA concluded that:

- Vinasse generated during ethanol production is a major issue of concern and due to its high concentration of BOD can be subject to acid fermentation within 16-24hours of storage;
- Virtually all Vinasse Management options if inappropriately implemented and monitored may considerably disturbed neighbouring community with odours;
- Anaerobic digestion and the use of CMS as a source of energy are interesting future options;
- All management options of Vinasse pose significant environmental and technological risks and recommended continued research on these options to determine their environmental constraints and opportunities.

SEA suggested the following hierarchy of Vinasse management options:

- Composting of Vinasse
- Direct Application of Vinasse on fields located at least 100metres from the residential areas and in proximity of the ethanol distillery
- Concentration of Vinasse into CMS and its application on fields

The SEA further provided specific conclusions and recommendations for Vinasse Management options for the two Distilleries identified, namely at FUEL and OMNICANE. For OMNICANE, SEA recommended that:

- Fifty (50) percent of the Vinasse produced during the crop season be applied directly to the sugar cane fields located close to the Distillery (in the present case at La Baraque);
- The Vinasse produced during the off-crop season can be concentrated to CMS and applied to distant fields.

MAAS made some general recommendations for future ethanol plants such as:

- The location should be outside residential areas and as a general precautionary measure, ethanol plant should be located at least 300m from nearest settlements and this distance may be further increased depending on local meteorological conditions. No new urban developments are allowed within this buffer zone;

- Specific considerations to be taken into account in the design as well as EIA processes;

- All new ethanol plants supported through MAAS operate a basic ISO-certified environment management system;

- Adequate safety and risks management plans are required for transport of ethanol from the production site and for its storage and export facilities.

1.2.3 Distilleries in Mauritius

Distilleries have been in operation for several decades. The main recent ones are:

- Medine
- Beau Plan
- Alcodis

Other Distilleries of the rhum agricole types are:

- L'Exile Ltée at Chamarel produces about 2105 litres of rhum agricole per day from fermentation of sugar juice;
- Compagnie Agricole de Labourdonnais Limited – 247 litres per day from fermentation of sugar juice;
- Cascade Ltd. Artisanal Distillery for the production of 190 litres of rhum per day at St Aubin

Figure 1.2.3.1 shows the locations of the Distilleries around the island.

❖ **Alcodis Distillery at Rose Belle**

Alcodis Ltd. operates a Distillery in Rose Belle. The Distillery has been in operation since 2004 and has been the object of two environmental impact assessments, namely:

- In 2002, for the construction and Operation of the Distillery; and
- In 2005, for the installation of a fuel oil boiler, Vinasse treatment, Effluent treatment and Fertiliser manufacturing

The distillery at Rose Belle initially was the source of major complaints from local communities due to odour generation from Vinasse storage. Vinasse was stored in opened tank and was the main source of release of volatile organic compounds.

The odour problem associated with Vinasse storage was resolved by the installation of an evaporator unit to produce concentrated molasses stillage (CMS) and a CMS fertiliser blending plant. Thus Vinasse was converted into CMS as it was being produced thereby eliminating the Vinasse storage.

Complaints of Noise nuisances were also recorded from the nearby local communities in particular Camp Sucrier located at 50m the Distillery. It was reported that the turbo alternator was the principal source of noise emanation.

1.3 Legal and Institutional Framework

The implementation of the Distillery Project falls under the ambit of the following legal, regulatory and institutional procedures.

1.3.1 Environmental Protection Act of 2008

The Distillery activity falls under Part B - Item 13 Distillery - of the First Schedule - **Undertakings requiring an Environmental Impact Assessment (EIA)** - of the Environmental Protection Act (2002) as per amendment GN 142 of 2006.

Omnicane Ethanol Production Ltd

Distillery and CMS Fertilizer Blending Plant at La Baraque

Figure 1.2.3.1 - Distilleries in Mauritius

Date October 2011

The Distillery activity falls under Part B - Item 27. Manufacture of dangerous chemicals, chemical fertilizer and pesticides - of the First Schedule - **Undertakings requiring an Environmental Impact Assessment (EIA)** - of the Environmental Protection Act (2002) as amended (Act No 6 of 2008).

1.3.1.1 Emission, Effluent Discharge and Noise Standards

The following Regulations and Guidelines promulgated under the EPA2002 and relevant to the operation of the Project are:

- Air Emission Standards (1998) proposed for Mauritius. They are supplemented wherever necessary by World Bank Environmental Guidelines.
- Effluent Discharge Standards[6]
- Noise Emission Standards, as per Government Notice 17 of 1997 and GN113 of 2003

Furthermore as described in Section 1.2.2 above, the Distillery associated with the reform of the sugar sector has been the object of a Strategic Environmental Assessment (SEA).

1.3.2 Ministry of Agriculture

- **Land Conversion Permit**
  The portion of land of area for the siting of the Distillery and its various components presently is under bare land as well as under sugar cane cultivation. The Promoters will have to apply for a land conversion permit for conversion of this land.

- **Chemical Fertiliser Act 1980**
  The Chemical Fertiliser Act requires that a license is required for the sale of chemical fertilizers and such license is subject to the terms and conditions as the Minister may determine and also upon payment of a prescribed fee.

  Island Renewable Fertilizer Company Ltd (IRFL) will be responsible for the production of renewable fertilizer and already possesses the said license for similar operation, a copy of which is attached in Appendix A.

1.3.3 Ministry of Housing & Lands

The implantation of the Distillery Project at La Baraque is subject to the following clearances as described below.

1.3.3.1 Grand Port Savanne Outline Planning Scheme

With reference to the Grand-Port & Savanne District Outline Scheme (September 2006), the Site lies within an industrial zone on account of the Sugar factory. The District Council is responsible for processing the application for the Land Use and Building Permit.

[6] Regulations made by the Minister under Sections 34 and 74 of the Environment Protection Act 1991

1.3.3.2 National Development Strategy

The National Development Strategy was carried out in 2003 and replaced the National Physical Development Plan of 1994. The main policies pertinent to the Project are given below.

1.3.3.2.1 Policy AG 4: Rationalisation of Sugar Milling

Policy AG 4 pertains to the support of the Sugar Sector Strategic Plan and the rationalisation of sugar milling so as to keep the sugar industry efficient and viable. In this context, Riche en Eau, Mon Tresor Mon Desert, Britannia, Savannah and Union St Aubin has formed the *Societé Usinière du Sud* (SUDS) now known as Omnicane.

1.3.3.2.2 Policy AG3: Agricultural Land Needed for National Strategic Projects

Policy AG 3 concerns the release and conversion (by the Ministry of Agriculture) of sites on land of high/moderate suitability for agriculture, needed solely for specific projects of national importance (and for which no alternative sites are available).

1.3.3.2.3 Policy I10: Storage of Hazardous Substances

This policy pertains to the provision for environmentally sound management, including the safe storage of dangerous substances in appropriate locations away from residential or sensitive land uses. Consideration should be given to the establishment of buffer zones around storage areas in conformity with Policy ST3.

1.3.3.2.4 Policy I5: Industrial Waste Processing

This policy pertains to reduction of pollutant production by industrial processes and their release to air and water medium. Noise is another form of pollution that directly impacts on human settlements.

1.3.4 Ministry of Labour, Industrial Relations and Employment

The Occupational Safety and Health Act 2005 consolidates and widens the scope of legislation on safety, health and the welfare of employees at work.

1.3.5 Maurice Ile Durable Project (MID)

Maurice Ile Durable (MID) is a long term vision aimed at promoting sustainable development in Mauritius. The MID strategy is to progressively reduce the country's dependence on fossil fuel while increasing the share of renewable energy sources as well as increasing the efficiency in the use of energy.

The production of anhydrous ethanol for use in the manufacture of blended gasoline (E10) for the local market is in line with MID.