Environmental Classification and Issues:

Environmental Classification

This is a category III project according to the IIC's environmental and labor review procedure because specific impacts may result that can be avoided or mitigated by adhering to generally recognized performance standards, guidelines, and design criteria. The environmental and labor considerations related to the project include the following: liquid effluent management, water supply, air emissions, noise pollution, workplace safety and emergency response, and social and labor issues.

Belcogen hired an independent consulting company (Knight Piésold, now Scott Wilson Piésold) to prepare an Environmental Impact Assessment (EIA) to address these and other issues. The EIA report dated September 2002 and an Addendum Report, dated May 2004, are available through IIC's web page.

An Environmental Compliance Plan for the Belcogen Project was agreed and signed with the Belize Department of Environment in 2004.

Liquid Effluent Management

Most of the water to be used in the co-generation cycle will be reused. However, there will be discharges that will require treatment before they are released into the river: boiler blowdown, cooling water blowdown, plant water drainage and run-off from bagasse storage. Under normal circumstances, the main potential source of pollution of the water discharge comes from the chemical treatment of the boiler feed water. In extraordinary circumstances, additional pollution risks could arise from accidental discharges of chemicals and fuel handled in the plant. Additionally, in the event of a failure in the cooling system, there is a potential of thermal pollution if hot water is drained to the river. This risk is considered of low probability and of limited duration.

Several mitigation measures will be taken in order to reduce the risk of draining contaminated water into the river: chemical dosing into the boiler water feed will be closely monitored in order to reduce excess concentration of reactants, appropriate storage facilities will be designed for chemical and fuel storage to avoid accidental spillages, and effluent water will be cooled and treated before discharge. The effluent treatment plant is required to have oil separation and a clarifier, and comply with World Bank standards. The company is required to obtain an Effluent Discharge License, and to perform annual analyses in an independent laboratory to be submitted to the Department of the Environment.

Water Supply

Water supply, to compensate for water discharge and washing, plus water evaporated in the cooling tower, will be abstracted from the New River, adjacent to the co-generation plant. The water will be treated before use, by chlorination, de-chlorination and filtration. During the in-crop season water is recovered from the cane in the sugar mill that reduces the water requirements. Also, there will be a reduction in the cooling needs of the co-generation plant due to the use of low-pressure steam in the sugar plant that returns water to the cycle as condensate. Thus, the maximum extraction is estimated to occur in the out-of-crop season, which coincides with the rainy season when the river flow is at a maximum. In the worst-case scenario, considering maximum water intake at the minimum river flow rate, the water used will be less than 1.2% of the river flow. However, under normal conditions, this is expected to be only about 0.2-0.3%. Potential uses of groundwater resources are minimal, with no significant effect on availability.

Air Emissions

The co-generation plant will have two boilers that will use sugar cane bagasse as fuel, and two diesel generators. The main pollutant emitted from bagasse-fired boilers is particulate matter, since the air emissions are relatively cleaner than fossil fuel fired equipment in terms of sulphur dioxide and nitrogen oxides. The stacks will be equipped with flue gas cleaning equipment, probably electrostatic precipitators, required to meet appropriate World Bank standards. As a result of the operation of the co-generation plant, the existing boilers and bagasse incinerator in the sugar plant will be decommissioned, which results in a positive environmental impact since the existing equipment only has basic ash hoppers to reduce fly ash content as air emission treatment equipment. Also, the substitution of old diesel generators for new equipment is expected to improve the quality of flue gas emissions from this source too. However, emissions of sulphur dioxide will be monitored to assess the possible need of additional air cleaning equipment.

Noise Pollution

Belcogen's co-generation plant will be located adjacent to BSI's sugar mill, in a rural environment. The nearest population is Tower Hill Village 1.3 km away. Today, the sugar mill is the most important source of ambient noise. During in-crop season, the operation of the new co-generation plant will have a positive impact due to an expected reduction in the releases of high-pressure steam. However, the co-generation plant will operate also in the out-of-crop season, thus increasing the overall functioning period. Based on equipment manufacturers' data and using a noise attenuation calculation, it is estimated that the effect on the noise level at the nearest populations will be minimal, falling within World Bank limits and probably will benefit by the reduction of high-pressure steam release noise.

Workplace Safety and Emergency Response

The co-generation plant design and layout specifications require the use of fire barriers, fire detection systems with audible and visual alarms, and availability of in-plant fire fighting equipment. A pressurized fire water main will be installed. All personnel to be hired for Belcogen will be required to comply with BSI's health and safety rules and will receive the corresponding training. The Engineering Procurement and Construction (EPC) contractor is required to provide an Emergency Response Plan (ERP) within twelve months of the signing of the contract. The ERP shall address fire prevention and fire contingency plan, oil and chemical spill prevention and management and hurricane and flooding emergency response.

Social and Labor Issues

Among the main mandatory labor standards that Belcogen will follow are: social security benefits (including workplace accident insurance), freedom of association, freedom to form labor unions, prohibition of forced labor, elimination of exploitative and abusive child labor, and prohibition of job discrimination. BSI's hourly paid employees belong to a labor organization (Belize Workers' Union), with which BSI has signed an agreement.

According to Belize's Labor Act children between 16 and 18 years old may work with consent of their parents for light work during the day. Children below the age of 16 may work, with certain restrictions, provided it does not interfere with their education.

Monitoring and Annual Reporting

Prior to commencement of commercial operation of the power plant, Belcogen shall develop an

Environment and Health and Safety Management System. As part of the monitoring requirements, Belcogen is required to undertake independent annual environmental audits, monthly water quality monitoring of the New River, and monthly ambient air quality monitoring. Annual reports will be submitted to IIC.

Belcogen EIA addendum BSIL water balance

Belcogen EIA Addendum Cogen Water balance flow charts

Environmental Impact Assessment – Addendum Report - May 2004

Environmental Impact Assessment