3.0 APPROACH AND METHODOLOGY

The EIA will be completed to meet the requirements as set out in the *"Environmental Impact Assessment Guidelines and Procedures for Barbados, 1998"* and the *"Thermal Power Guidelines for New Plants in the World Bank Document Pollution Prevention and Abatement Handbook 1998 - Part III'*

3.1 Phased Approach to Conducting the EIA

The work was completed in a number of phases. The first phase involved the definition of the project components, collection of baseline data and information on the defined Project area. The second phase was to conduct an effects assessment of the construction and operation of the proposed power plant and pipeline facilities.

The EIA is based on scientific, engineering, environmental and economic parameters, professional judgment, and consultation with the public, applicable government agencies, communities, interest groups and other stakeholders directly affected by the Project. The approach includes the following steps:

Step 1 - Assembling Project Baseline Information

- Developing the Project description, including construction, and operation activities; and,
- Preparing a description of existing environmental conditions to assess the potential effects of the various Project activities on the environment and the potential effects of the environment on the Project.

Step 2 - Issue Scoping

- Issues identified during development of the study;
- Ensure that the concerns of the regulatory agencies involved in the Project review are identified;
- Consider public concerns;
- Environmental issues or Environmental Components of Concern (ECC) that may be affected by the Project are identified, by professionals in the field;
- Elements of the environment that could be affected by the Project and are protected by legislation or regulation are included as Valued Ecosystem Components; and,
- Pathways between the ECCs and Project activities are identified. Where pathways cannot be identified, the ECC or issue is deemed not to be affected by the Project and, therefore, is no longer part of the analysis.

Step 3 - Identification of Valued Ecosystem Components

Valued Ecosystem Components (VECs) are those environmental issues which have been identified through issues scoping and pathway analysis. The result of Step 2 of the assessment is a list of VECs on which the effect assessment focuses;

- A definition of each VEC is developed, including its scope (spatial and temporal boundaries), and description of linkages (or pathways) with the Project and with other components of the environment; and,
- Identification of issues relative to the identified VECs.

Step 4 – Effects Assessment

The effects assessment considers the environmental effects of the project with the proposed abatement technologies as applied (such as air emissions controls and wastewater treatment) and inclusive of the mitigation measures as provided in the report.

In order to be considered a significant adverse environmental effect, the assessment of these potential effects must determine that the effect is adverse **and** significant **and** likely.

The term cumulative environmental effect (CEE) means the effect on the environment, which results from the effects of a project when combined with those of other past, existing and imminent projects and activities. These may occur over a certain period of time and distance. The following points provide an indication of what should be considered:

- There must be an environmental effect of the project being assessed;
- The environmental effect must also be likely;
- That environmental effect must be demonstrated to operate cumulatively with the environmental effects from other projects or activities; and,
- It must be known that the other projects or activities have been, or will be, carried out and are not hypothetical.

Step 5 - Environmental Protection Measures

- Provide the details of environmental protection measures that would be applied to the project for construction and operations of the facilities.

3.2 Baseline Data Collection

To provide accurate and scientific analysis of the potential environmental effects of the proposed Project on the environment, it is critical to have data that represents the state of the environment prior to developing the Project. This baseline data can then be used, in conjunction with the predicted Project outputs, to complete the environmental assessment for the Project. For certain specific environmental components, it was necessary to collect more detailed and site-specific information. The following sections outline the specific baseline programs that were conducted for this EIA. The detailed methodology, locations and results of these programs is outlined in more detail in Section 5.0.

3.2.1 Ambient Air Quality

Ambient air quality monitoring was completed in the immediate vicinity of the site to confirm baseline conditions. This consisted of a station of passive monitors for nitrogen oxides (NO_X), sulphur dioxide (SO_2) and ozone operating over two monthly periods and daily monitoring for suspended particulate matter less than 10 microns in size (PM_{10}) over a one week period. Additional sampling of total suspended particulates matter (TSP) was also included to supplement the ambient air quality information.

3.2.2 Ambient Noise Levels

Baseline ambient noise levels were established by conducting 24 hour measurements and attended measurements in the vicinity of the site. These locations were determined in the context of the nearest sensitive receptors such as the St. Lucy School.

3.3 Spatial and Temporal Boundaries

The effect of a specific project activity on a VEC may differ in both space and time from the effect of any other activity. Certain project activities may have long-term consequences; others will be of short duration. Therefore, an important aspect of the EIA process is the determination of study boundaries. Temporal and spatial study boundaries have been considered for the construction and operation phases of the Project.

The spatial boundaries for power plant construction include the actual footprint of the Project facilities as well as those VEC's which the assessment has determined are potentially affected. The spatial boundaries considered for the pipelines construction were 100m on each side of the alignment. Spatial boundaries are identified for each VEC.

The operation phase also includes similar spatial bounds as for the construction phase.

For the operation phase, the temporal bounds extend for at least 25 years subsequent to completion of construction. The study has also considered longer durations for environmental effects on the VECs that could persist for all Project phases.

3.4 Methodology to Predict Environmental Effects

Methodologies used in the identification and assessment of effects may be specific to each discipline. They can be grouped in the following categories:

- Review of published literature;
- Acquisition and review of unpublished reports and data from government agencies and departments, universities and research institutions, and other relevant projects;
- Interviews with resource persons and knowledgeable individuals;
- Use of models and extrapolation from datasets and trends;
- Compilation of relevant statistical datasets;
- Site visits and evaluations; and,
- Formulation of effect hypotheses and linkages for each VEC determined to be vulnerable to effect from Project activities.

VECs are identified through determining the pathways or linkages between the issues (ECCs, public perceptions) and the Project. Predictions are based on a combination of objective (measurable) and subjective (deduced) experience based on professional judgment and evaluation.

3.5 Cumulative Effects

The environmental effects of the Project in conjunction with other activities and other projects that have or will be carried out in the Project Area are examined. For the purpose of identifying and assessing cumulative effects, the spatial dimensions of the bounded areas for each VEC remain the same. The temporal boundaries, however, are extended to include activities in the past, those that are under way in the area, and known projects planned outside of the time boundaries established for the Project. A review of other similar projects that have been operational for long durations (20 - 25 years) also provides insight into the potential cumulative effect of this Project.

3.6 Determination of Significance

A common scale of reference for determining significance is required in order that the relative importance of various environmental effects can be compared.

A common definition that is used for environmental effect is:

> "any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance".

A significant adverse environmental effect is defined as an effect that is adverse and significant **and** likely.

Significance has been based on scientific determinations, social values, public concerns, and economic judgments. The significance of Project-induced changes on VECs is considered for all issues and is as determined based on the criteria set out in Table 3-1.

Table 3-1 Criteria to Determine Level of Significance when Determining Environmental Effects

Key Terms	Criteria
Adverse	• Loss of rare or endangered species; • Reductions in species diversity; • Loss of critical/productive habitat; • Transformation of natural landscapes; • Toxic effects on human health; • Reductions in the capacity of renewable resources to meet the needs of present and future generations; • Loss of current use of lands and resources for traditional purposes by aboriginal persons; and, • Foreclosure of future resource use or production.
Significant	• Magnitude; • Geographic extent; • Duration and frequency; • Irreversibility; and, • Ecological context.
Likely	• Probability of occurrence; and, • Scientific uncertainty.

The scoping exercise used to describe the VECs (including definition of spatial and temporal bounds) included an element of likelihood of interaction between the VEC and Project activities during both construction and operation. The significance of potential effects on VECs is determined as outlined in Table 3-1.

The effect predictions are made in the following context:

- It is highly likely or unlikely that the interaction between the proposed activity and the VEC will result in a significant adverse effect within the bounded area due to a sustained

suppression of fitness to maintain the population, or a decrease in density of the population below naturally occurring levels; and/or,

- Any interaction between the proposed activity and the VEC that will result in contaminant concentrations exceeding regulatory criteria.

3.7 Consultation Process

As part of the EIA process and the social impact assessment, consultations are completed with the public and government agencies to ensure that all of the relevant issues are addressed within the report. The following sections outline the components of the consultation process that has been undertaken as part of the Project development.

3.7.1 Community Consultation (Open Houses)

The Project was introduced and public input was solicited through public Open House events held by BLPC at the Trents site January 28th and 29th 2006. Both Open Houses featured poster boards providing information about the plant and the environmental assessment program. The events were well attended by local residents and each resident could have one-on-one discussions with BLPC personnel and their environmental and engineering consultants about any aspect of the project. An information sheet on the project was also provided. Attendees were encouraged to sign out and provide comments on the project before leaving.

Media coverage of the event was in the Nation, Advocate and on CBC television and radio.

3.7.2 Regulatory Consultation

A critical component of the EIA process involves the consultation with the Barbados regulatory authorities. The consultation for this Project was initiated by the submission of a Terms of Reference (TOR) Report for the Environmental Impact Assessment to the Barbados Town and Country Planning Department. Subsequent consultations were held with members of this committee, as well as other regulators, to review the proposed scope of work and responses to the comments, to describe the specific work plan for the baseline data collection program, and to obtain specific Project related information. These consultations were arranged with the following agencies:

- Barbados Water Authority about groundwater resources and presence of local wells;
- Environmental Protection Dept. regarding RAMCID and EIA scope;
- Department of Transportation for traffic information;
- Grantley Adams Airport to confirm any airport requirements.;
- Barbados Museum on known historical resources;

- Ministry of Agriculture and Rural Development on rural development issues;
- Barbados National Trust on significant heritage features;
- Ministry of Tourism regarding tourism developments in area;
- Coastal Zone Management Unit regarding the use of the Arawak wharf;
- Barbados Fire Service regarding emergency response; and,
- Barbados Turtle Study Group regarding turtle nesting on the beach at Arawak Cement.

The TOR have been reviewed, and approved by the TCDPO with comments on November 3, 2005. These are included in Appendix E.