

## **BOGUE GENERATION EXPANSION PROJECT: PROJECT MANAGEMENT HELPS OVERCOME CHALLENGES TO PROVIDE A RELIABLE POWER SOURCE**

In an effort to provide a more reliable supply of electricity to customers, Jamaica Public Service Company Ltd. (JPS), the sole distributor of electricity in Jamaica, undertook the Bogue Generation Expansion Project in 2001. The result was a total renovation and expansion of the Bogue Power Station, JPS' second-largest power plant.

Using project management techniques, teams from both JPS and Mirant Corporation, JPS' parent company, coordinated project activities, planned for risks and accommodated unforeseen complications, completing the project under budget and ahead of schedule. The result was significant improvement in the quality of electrical service to the people of Jamaica.

### **Background**

After a decade of virtually no improvements to its power supply, Jamaica struggled with outdated generating units and recurring blackouts. The existing Bogue power station provided 122 megawatts (MW) of inefficient and unreliable power, forcing JPS to curtail power to its customers.

In an effort to increase the country's power generating capacity, JPS embarked on a \$120 million (US) project in May 2001 to expand the existing power plant and maximize its power generating capacity.

Of the total budget, approximately \$14 million (US) included:

- land acquisition for future expansion;
- implementation of new fuel- and water-treatment systems; and
- construction of a bridge, drain and new administration building.

The remaining \$106 million (US) included construction of a new, 120MW power plant, completed in two phases:

- Phase One: Installation of two 40MW gas turbines
- Phase Two: Installation of a 40MW combined cycle steam turbine

The Bogue Generation Expansion Project is Jamaica's premiere combined cycle—using both gas and steam turbines to efficiently generate electricity—project. It was also the first partnership between the National Water Commission (NWC) and JPS.

### **Challenges**

Numerous obstacles faced the team during the project. The Engineering Procurement and Construction (EPC) contractor failed to meet its obligations and was subsequently terminated. This forced the team to revise the project plan and, ultimately, self manage the project, changing the structure and style of management.

The project's location near the tourist capital of Montego Bay created additional difficulties. JPS faced government pressure to not only meet, but exceed, all emission and noise quality requirements due to its high visibility among nearby tourists.

Importing the necessary materials proved to be difficult given Jamaica's location relative to the supply market. The Caribbean island is at the mercy of severe rain and tropical storms, which caused considerable frustration and delay.

The labor market in Jamaica can also be quite turbulent: a strike on a nearby construction site delayed progress on the expansion several months. In addition, low knowledge of safety standards and regulations among local workers increased the need for training and supervision.

## **Solutions**

Using standard project management practices detailed in *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, both project managers on staff maintained a dynamic, open relationship to keep the project plan on track. Milestones were developed at the outset using Primavera software, in addition to over 600 scheduled activities and a 3-week look-ahead technique. These steps ensured the project stayed on course.

After the termination of the EPC contractor, project management became an even greater necessity. JPS relied on its project managers to self-manage construction, take responsibility for all business risks connected to the project and tightly monitor progress. Since each project manager had different areas of expertise, the team benefited from a blend of project management styles as each controlled aspects that fell within his specialty. Though unorthodox, this combination of styles succeeded thanks to excellent communication among team members and a project plan that used conference calls and meetings to reassess scope and methodology on a regular basis.

Termination of the EPC contractor was the largest change, though not the only alteration of the project plan. Project managers created a process to document all changes, requiring a project manager's approval and restricting single changes to \$10,000 (US), and total changes to \$100,000 (US). This helped assess overall progress and allowed management to estimate the cost of changes and their impact on the overall budget.

Due to the project size, the number of deliveries to the site was much greater than what custom officers would normally process. To avoid delays resulting from slow delivery, project managers formed a team whose sole responsibility was to receive materials. This team organized all necessary records and sent them to JPS, which then coordinated with Jamaican customs in advance of all scheduled deliveries.

Recognizing the potential for tropical storms and hurricanes to cause expensive project delays, the team implemented preventative measures to prepare for strong storms. Managers scheduled double shifts and 12-hour days during calm weather, and kept a detailed account of rain days and lost work time.

To manage potential risks associated with Jamaica's sometime volatile labor situation, key objectives were set and closely monitored. Labor unrest and poor knowledge of safety standards called for worker education, careful observation of work processes, implementation of a code of conduct and frequent performance reviews.

Project managers also made certain the project served as a positive reflection on Jamaica's progress to the tourists in nearby Montego Bay. Exceeding all emission and noise quality requirements was a top priority. Government authorities were invited to regularly inspect the project to ensure that no safety or health code violations occurred.

Communication with the Jamaican public, which had long suffered blackouts and an unreliable power supply, was another key project component. A comprehensive communication plan, which included community meetings, a groundbreaking ceremony and on-site interviews with national radio programs, kept them informed of the project's status.

Mirant's headquarters in Atlanta also needed to be kept apprised of the project's progress. A structured monthly report and executive summary detailed the project status, and a weekly report kept contractors informed of what supplies were needed, along with delivery schedules.

A key to staying under budget and on schedule was a successful and efficient handover of operations to the local team. Project managers created a team consisting of local employees who took part in regular construction and quality inspections and played vital parts in the commissioning of the project. Including them at the onset helped ensure that local employees could efficiently run the updated and expanded plant.

Finally, a formal scope verification process was developed, allowing the client to remain informed of the progress made at each step. Project managers' frequent updates allowed for formal acceptance as each step was completed, and expedited final acceptance upon project completion.

## **Results**

The power generation plant in Bogue is now the most energy efficient plant in the Jamaican power sector. The expansion has eliminated the need for scheduled blackouts in Jamaica and, according to JPS, the new plant is the most fuel-efficient in JPS' operating fleet. Mirant Corporation's project director credits practical and hands-on project management for the success of the Bogue Generation Expansion Project.

## **Key Achievements**

- Completed five days before scheduled completion date.
- Nearly \$6 million (US) under budget.
- JPS' reserve margin currently 30 percent, significantly increasing its ability to provide uninterrupted power supply to customers.
- Project received several awards including:

- Outstanding & Devoted Service award for 2002-2003 from the Kiwanis Club of Montego Bay & Freeport
- Project of the Year from the Jamaica Institute of Engineers
- Award for Excellence in 2003 from the Montego Bay Chamber of Commerce