U.S. Department of Energy

Office of Inspector General

Office of Audits and Inspections

AUDIT REPORT

Energy Savings Performance Contract Biomass Project at the Oak Ridge National Laboratory

OAI-L-16-03

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Department of Energy
Washington, DC 20585

November 25, 2015

MEMORANDUM FOR THE MANAGER, OAK RIDGE NATIONAL LABORATORY SITE OFFICE

FROM: Debra K. Solmonson, Director
Eastern Audits Division
Office of Inspector General

SUBJECT: INFORMATION: Audit Report: "Energy Savings Performance Contract Biomass Project at the Oak Ridge National Laboratory"

BACKGROUND

In July 2012, the Oak Ridge National Laboratory (ORNL) Site Office (Site Office) authorized its contractor to commence operations on a new biomass gasification steam plant. The biomass plant was the Site Office's largest and most expensive endeavor in a series of energy conservation measures developed and financed through an Energy Savings Performance Contract (ESPC) with Johnson Controls Government Systems LLC (Johnson Controls). In accordance with the financing arrangement, Johnson Controls would receive a share of the site's energy savings to be realized over the ESPC's 21-year contract performance period. The $65 million biomass plant was designed to generate energy savings by producing steam more efficiently than that produced by the site's natural gas boilers. Further, the Site Office planned to significantly reduce its reliance on fossil fuels by replacing four of its six natural gas boilers with the biomass plant and promote the use of renewable sources by fueling the biomass plant with woodchips.

After operating sporadically for a year, the Site Office shut down the biomass plant in September 2013 when it discovered dangerous corrosion in the gasifier walls. Shortly thereafter, the Site Office notified Johnson Controls of the corrosion as well as other operational issues including degradation of the concrete beneath the conveyors and corrosion of the electrostatic precipitator. The Site Office requested that Johnson Controls resolve all operational issues and continue to ensure an uninterrupted steam supply. After months of negotiations, the Site Office and Johnson Controls agreed that the biomass plant would be demolished and replaced with a natural gas system. In August 2014, the ESPC was modified to reflect this substitution, while the overall value of the ESPC's delivery order remained unchanged. We initiated this audit to determine whether the Site Office had effectively managed its ESPC biomass project.

RESULTS OF AUDIT

The Site Office told us it had taken what it considered to be the best option to resolve the ESPC biomass plant issue. We noted that the Site Office had considered several options to resolve operational issues and had worked with Johnson Controls to arrive at a long-term solution to supply steam for ORNL's needs. Although the Site Office was able to modify its ESPC with no increase to the value of the ESPC's delivery order, we noted that an issue with the original terms and conditions of the ESPC could have complicated the resolution process.

Options Considered

In making its decision to replace the biomass plant with a natural gas system, the Site Office had considered several options to resolve the operational issues. For example, Johnson Controls offered to repair or replace the biomass plant. However, the Site Office found that those proposals did not address concerns with structural integrity, resolve the corrosion problems, or provide a long-term solution. The Site Office questioned whether a biomass restoration or replacement could remain operational for the remaining 18 years of the ESPC and requested that Johnson Controls provide a 5-year warranty on the proposed biomass restoration and replacement options. After Johnson Controls denied the warranty request, the Site Office was unwilling to accept the risks of continuing to operate a biomass system with the possibility of future failures and equipment repairs and determined that neither repairing nor replacing the biomass equipment was an acceptable solution.

The Site Office also considered a partial buyout of the ESPC, which would eliminate the biomass plant as an energy conservation measure. Although this option would have reduced the payment commitment to Johnson Controls, it required significant funding that was not readily available. In particular, the Site Office estimated that the lump sum cost of a partial buyout could range from $56 million to as much as $86 million. In addition to those costs, the Site Office could be responsible for demolishing the biomass plant and installing boilers to provide steam at an additional cost of more than $10 million. Due to the significant funds required, the Site Office determined that a partial buyout of the ESPC was not an acceptable solution.

The Site Office ultimately determined that the best resolution to the biomass plant's operational issues would be to replace the plant with a mature technology that would provide efficient steam operations for future decades and would adhere to its financial commitments under the ESPC. Accordingly, the Site Office modified the ESPC contract such that Johnson Controls would demolish the biomass plant and replace it with a natural gas system. Under the modified ESPC, the original payment terms and schedule were unchanged, with the Site Office responsible for repaying the remaining $124 million associated with the biomass plant's implementation and financing costs. The Site Office expects savings derived from the new natural gas system to be adequate to offset payments to Johnson Controls for the defunct system. Further, because the current price of natural gas has been lower than the cost of woodchips required for the biomass plant, the Site Office anticipates achieving even greater savings than estimated when it entered into the original ESPC. Therefore, the Site Office determined that this option provided the best value to the taxpayer and had the lowest overall cost and risk to the Department of Energy (Department).

ESPC Terms and Conditions

Although an agreement was reached between the Site Office and Johnson Controls, we noted the ESPC's terms and conditions may have complicated the resolution process. In particular, per the terms in the contract negotiated in 2008, the Site Office was responsible for equipment repair or replacement of the biomass plant after the original warranty period expired. The ESPC stipulated that the biomass plant had a 1-year manufacturer's warranty that began at project acceptance. In March 2012, the Site Office extended a "conditional" project acceptance of the ESPC with the caveat that Johnson Controls complete several outstanding items. It was this conditional acceptance that led to the Site Office's and Johnson Control's opposing views as to whether the warranty period had started, and if the plant was under warranty at the time the corrosion was discovered. Due to the nature of the conditional acceptance, the Site Office and Johnson Controls sought to reach a mutually acceptable resolution to the failed biomass plant which resulted in the agreement to substitute the biomass plant with a natural gas boiler and leave other ESPC terms unchanged. Consequently, in August 2014, the ESPC was modified to reflect that agreement.

Modified ESPC

The Site Office informed us that it entered into a solution to receive the steam necessary to operate the laboratory and avoid potentially lengthy disputes. However, by replacing the biomass plant with a natural gas system, the Site Office will again rely on fossil fuel, despite Departmental goals to reduce fossil fuel consumption and to increase its reliance on renewable energy sources. As Departmental sites proceed with other ESPC-funded renewable energy projects, we believe it is important for the Department to understand the contract terms, performance responsibilities, warranty conditions, and financial risks associated with ESPCs, especially when the ESPC includes a new and innovative technology such as biomass. In doing this, the Government's interests will be better protected if an expensive energy conservation measure, such as ORNL's $65 million biomass plant, fails to deliver as promised.

In our prior audit report *The Department of Energy's Administration of Energy Savings Performance Contract Biomass Projects* (DOE/IG-0892, August 2013), we recommended that the Department implement critical project management practices and a lessons-learned program. The Department is in the process of implementing the recommendations from our prior report. When corrective actions are fully implemented, estimated to be about June 2016, the Department's project management practices and lessons-learned program should help ensure the performance responsibilities and financial risks associated with ESPCs are considered prior to awarding an ESPC.

Attachments

cc: Deputy Secretary
Acting Director of the Office of Science
Under Secretary for Science and Energy
Chief of Staff

OBJECTIVE, SCOPE, AND METHODOLOGY

OBJECTIVE

The objective of the audit was to determine whether the Oak Ridge National Laboratory (ORNL) Site Office (Site Office) had effectively managed its Energy Savings Performance Contact (ESPC) biomass project.

SCOPE

We performed this audit from December 2014 to November 2015 at the Site Office in Oak Ridge, Tennessee. Our audit focused on the Site Office's management of its ESPC biomass equipment failure and resolution. The audit was conducted under Office of Inspector General project number A15OR008.

METHODOLOGY

To accomplish our objective, we:

- Reviewed regulations, policies, and procedures pertaining to the Department of Energy's ESPCs and the ORNL biomass project;

- Interviewed key Federal and contractor personnel associated with the ORNL biomass project;

- Reviewed and evaluated ORNL's ESPC requirements and modifications related to the biomass project; and

- Examined the biomass equipment failure and resolution.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our conclusions based on our audit objectives. Accordingly, we assessed significant internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed implementation of the *GPRA Modernization Act of 2010* and determined it had not established performance measures for ESPC awards. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not rely on computer-processed data to accomplish our audit objective.

Management waived the exit conference.

PRIOR REPORTS

- Audit Report on *The Department of Energy's Administration of Energy Savings Performance Contract Biomass Projects* (DOE/IG-0892, August 2013). The review of the Energy Savings Performance Contract (ESPC) financed biomass project at the Oak Ridge National Laboratory (ORNL) identified planning and operational issues with the project. Specifically, the ORNL Site Office had not required site characterization testing and mitigation of adverse conditions prior to awarding the ESPC, mitigated the risk of biofuel shortages and cost fluctuations, and verified the quantity of biofuel deliveries. The problems identified with the ORNL Biomass Plant were due, in part, to inadequate guidance and oversight. Notably, the Department of Energy (Department) lacked sufficient guidance for managing the construction of large-scale ESPC projects. Also, the Department had not developed a process to identify, document, and disseminate lessons learned from ESPC projects across the Department complex.

- Audit Report on the *Management of Energy Savings Performance Contract Delivery Orders at the Department of Energy* (DOE/IG-0822, September 2009). The audit revealed the Department had not always effectively used ESPC orders to achieve energy savings. Specifically, the report noted that the Department had not ceased payments to the energy services company after projects had stopped generating savings, verified the ESPC orders had generated the contractually required energy savings, ensured equipment installed was appropriately operated and maintained, and taken actions to include all costs necessary to implement the project when evaluating the project's cost-effectiveness. The report also noted that site offices had not ensured adequate management existed for individual orders, the Department had not implemented an effective training program for contract and technical support personnel, and the Federal Energy Management Program had not developed specific guidance regarding estimates of the costs of energy improvements.

FEEDBACK

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