

AUDIT REPORT

IMPLEMENTATION OF INTEGRATED BUSINESS INFORMATION SYSTEMS WITHIN THE DEPARTMENT OF ENERGY



APRIL 2000

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL
OFFICE OF AUDIT SERVICES

April 3, 2000

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)
Inspector General

SUBJECT: INFORMATION: Audit Report on "Implementation of Integrated Business Information Systems Within the Department of Energy"

BACKGROUND

The trend in both government and the private sector is greater reliance on "Integrated Business Information Systems" which are modern information systems that can be used to manage business functions as a seamless unit rather than as separate activities. The attraction of these software systems lies in management's ability to access real-time data, link business processes and applications, support immediate responses to change, and incorporate best business practices. A number of the Department's facility management contractors were in the process of developing and implementing such systems. The objective of the audit was to evaluate the progress being made by the Department's contractors in this effort.

RESULTS OF AUDIT

We selected eight of the Department's largest contractors for review. We found that six of the eight contractors had implemented integrated business information systems. However, two of the contractors, Westinghouse Savannah River Company (WSRC) at the Savannah River Site and the University of California (UC) at the Los Alamos National Laboratory, had not. WSRC terminated its project to implement an integrated information system after investing 9 months and \$11.5 million, and UC terminated its project after spending over 2 years in development and \$3.6 million in related costs. The contractors did not follow Federal and Departmental guidelines for software projects. For example:

- WSRC did not prepare a project plan, or adequately define the project scope;
- UC did not assign an overall project manager to be accountable for its implementation of PeopleSoft;
- Neither UC nor WSRC performed the required feasibility study, or reengineered the affected business processes before investing in information technology; and
- Neither UC nor WSRC established performance indicators as required by the Government Performance Results Act of 1993.

We concluded that the above examples were the primary cause of the difficulties they encountered in implementing an effective business management system. As a result, the Department received no appreciable benefit from the \$15.1 million invested in the new systems at these sites. One objective of the effort to introduce integrated business management systems is to increase the efficiency of Departmental operations. At the Savannah River Site,

alone, the Department estimated that it could have saved \$86 million over a 4-year period if the integrated business information system had been successfully implemented. Thus, the effort to introduce such systems, on time and on budget, has a significant potential benefit.

This audit compliments recently issued report DOE/IG-0463, *Commercial Off-The-Shelf Software Acquisition Framework*, dated March 20, 2000. DOE/IG-0463 dealt with acquiring "desktop" type software such as word processing, spreadsheets, email, and other ancillary type of programs. Together these two reports identify some of the information technology challenges facing the Department.

MANAGEMENT REACTION

We recommended a series of actions to ensure that future efforts to develop Integrated Business Information Systems are successful. The Savannah River and Albuquerque Operations Offices concurred with the finding and recommendations.

Attachment

cc Deputy Secretary
Under Secretary
Acting Under Secretary for Nuclear Security/Administrator for Nuclear Security

IMPLEMENTATION OF INTEGRATED BUSINESS INFORMATION SYSTEMS WITHIN THE DEPARTMENT OF ENERGY

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OVERVIEW

INTRODUCTION AND OBJECTIVE

The Department uses the services and expertise of contractors to manage and operate its field activities. To improve their efficiency in meeting the Department's missions, at least 21 contractors are implementing modern business information systems. The contractors have been acquiring new systems primarily from three companies: Systems, Applications and Products (SAP); Oracle Corporation (Oracle); and PeopleSoft Incorporated (PeopleSoft). The cost to implement the new systems ranged from \$2 million to \$29 million for the 8 contractors reviewed. The variation in costs was due to the different types of systems procured and the number of modules implemented. Also, several of the contractors acquired their systems at discounted prices through corporate software license and maintenance agreements.

The Office of Inspector General (OIG) issued Report DOE/IG-0436, *The U.S. Department of Energy's Procurement and Assistance Data System*, in January 1999. The audit concluded that the Department did not comply with generally accepted system practices for integrating its procurement information and financial management systems. The audit recommended that the Director, Office of Management and Administration develop an implementation plan that includes relevant analyses using generally accepted system practices. The Department concurred with the recommendation and agreed to develop an implementation plan.

In addition, the OIG recently issued Report DOE/IG-0463, *Commercial Off-The-Shelf Software Acquisition Framework*, dated March 2000. The audit concluded that the Department had not developed and implemented software standards or effectively used enterprise-wide contracts, key components of a commercial off-the-shelf computer software (COTS) acquisition framework. Departmental offices (Federal and contractor) acquired application and operating system software that varied in type and price and duplicated procurement efforts by awarding and managing multiple contracts for the same product. The audit recommended that the Chairperson for the Executive Committee for Information Management require the development and implementation of mandatory Department-wide standards governing the acquisition of computer software, and negotiate and award a Department-wide COTS software contract, or use similar multi-agency contracts.

The objective of this audit was to determine whether the Department's contractors have implemented integrated business information systems.

**CONCLUSIONS AND
OBSERVATIONS**

Six of the eight contractors reviewed have implemented integrated business information systems. However, two of the contractors, Westinghouse Savannah River Company (WSRC) at the Savannah River Site and the University of California (UC) at the Los Alamos National Laboratory, have not. WSRC terminated its project to implement an integrated information system after investing 9 months and \$11.5 million in the project, and UC terminated its implementation project after an investment of 29 months and \$3.6 million. The contractors were unsuccessful in their implementation efforts because they did not follow Federal and Department guidelines for software projects. As a result, the Department did not receive the expected benefit from the \$15.1 million invested in new systems at WSRC and UC. Also, the Department estimated it could have saved \$86 million over a 4-year period if WSRC had successfully implemented and integrated a business information system.

The audit identified significant issues that the Savannah River and Albuquerque Operations Offices should consider when preparing its yearend assurance memorandum on internal controls.

Signed
Office of Inspector General

TWO CONTRACTORS DID NOT IMPLEMENT NEW INTEGRATED BUSINESS INFORMATION SYSTEMS

Six Contractors Implemented New Systems—Two Did Not

Of the eight contractors reviewed, six implemented new business systems. The six contractors, their sites, and the systems they implemented are as follows.

Contractor	Site	System(s)
Allied Signal Federal Manufacturing & Technologies	Kansas City Area Office	PeopleSoft
Bechtel Jacobs Company	Oak Ridge Reservation	Oracle
DynMcDermott Petroleum Operations Company	Strategic Petroleum Reserve	SAP
Lockheed Martin	Oak Ridge Reservation	SAP
Oak Ridge Associated Universities	Oak Ridge Reservation	Oracle
Sandia Corporation	Sandia National Laboratories	Oracle/ PeopleSoft

However, two of the contractors, WSRC and UC, did not successfully implement new business systems. WSRC cancelled its project to implement a SAP system after 9 months of effort; and UC suspended its project to implement a PeopleSoft system after 29 months of effort, pending review of a consultant’s recommendation to terminate the project.

WSRC planned to integrate 42 existing business systems into a single SAP system in March 1997. The existing systems were 15 to 20 years old and obsolete. In many cases, external technical support was no longer available. As a result, software maintenance was expensive and the risk of program failure was high for some systems. Despite these problems, WSRC terminated the SAP implementation project in December 1997, after investing 9 months and \$11.5 million in the project. Management believed that the funds needed to complete the project could be better used on other projects.

UC established a plan to integrate PeopleSoft into its Human Resources systems in three phases beginning in February 1997. Phase I was completed in August 1998; however, Phases II and III were never completed. After investing 29 months and \$3.6 million in the project, UC suspended the implementation of its PeopleSoft system in June 1999. The contractor hired a national consulting firm to determine whether it should continue or terminate the project, and the consulting firm recommended that the project be terminated. After the conclusion of our audit fieldwork, management terminated the project until a further study is conducted.

Integrated Business Information Systems Provide a Benefit to the Department

Converting to modern integrated business information systems would make the Department more productive and economical. Modern integrated business information systems can be used at each Department site to manage the site's business functions as a seamless unit rather than as separate activities. The attraction of these software systems lies in management's ability to access real-time data, link business processes and applications, support immediate responses to change, and incorporate best business practices. For example, the U.S. Mint implemented PeopleSoft to integrate the manufacturing, sales and distribution processes; shorten closing times on the financial cycle; better track materials; and consolidate standalone financial and manual record keeping systems.

WSRC and UC Did Not Follow Federal and Department Guidelines

The attempts to implement new systems at WSRC and UC failed because the contractors did not follow Federal and Department guidelines for software projects. For example, WSRC did not prepare a project plan, or adequately define the project scope, both of which are required for software projects by Department Directive G200.1-1A, *Software Engineering Methodology (SEM)*. Also, UC did not assign an overall project manager to be accountable for its implementation of PeopleSoft, as required by Department Order 4700.1, *Project Management*. Neither UC nor WSRC performed a feasibility study as required by the SEM, or reengineered the affected business processes before investing in information technology, as required by Executive Order 13011, *Federal Information Technology*. Finally, neither UC nor WSRC established performance indicators as required by the Government Performance and Results Act of 1993.

Project Plan Was Not in Place Before Implementation Began

UC developed a project plan before implementation began, but WSRC did not. The purpose of a project plan is to establish reasonable plans for performing software engineering and for managing and tracking the software development project. The WSRC implementation team delivered a draft of the project plan to the Department at the beginning of the implementation process. The team planned to develop a more detailed project plan, but it was never completed. An incomplete version was delivered to the Department six months after the implementation of SAP began.

Project Scope Was Not Defined Before Implementation Began

UC defined the scope of the implementation project, but WSRC did not. The WSRC Project Team and the implementation consultants believed that the SAP Project scope was not well defined prior to implementation. The Project Team stated that they were not supplied with sufficient information to make scope determinations. Also, the consultants stated in their project scope review that there was a large uncertainty about the number of employees who would ultimately use the SAP system. The Project Manager believed there would be 7,000 users, whereas the Information Technology Team expected only 500 to 900 users. The consultants stated that the set of users should be better defined and that conversions, interfaces, and custom reports had not been determined or were poorly defined.

Overall Responsibility Was Not Assigned

Unlike WSRC, UC did not assign a Project Manager with overall responsibility for the implementation of PeopleSoft. Instead, three people shared project management duties and responsibilities. The Human Resources Project Manager had day-to-day management responsibilities for system implementation, but, did not have supervisory authority over Computer Information and Communications Division (CIC) personnel on the implementation team and did not manage the project funding. Also, the Technical Project Leader managed CIC personnel, but did not manage the Human Resources personnel or the project funding. Finally, the Group Leader for Human Resources managed funding for the project, but did not manage CIC or Human Resources personnel.

Feasibility Study Was Not Completed Before Implementation Began

Neither WSRC nor UC conducted a feasibility study before beginning the implementation process. The feasibility study is an important tool for identifying and reviewing software and hardware alternatives in order to support a "go" or "no go" decision. WSRC's consultants stated in an October 1996 report that a SAP pre-selection scope and sizing study was needed. The purpose of the pre-selection study was to estimate the cost to implement SAP and to act as a high-level feasibility study to assist management in finalizing the procurement decision. However, the procurement decision was made in December 1996 and the implementation began in March 1997, three months before the pre-selection feasibility study was conducted. UC did not perform a feasibility study, stating that cost was not a consideration in the purchase or implementation of PeopleSoft.

Business Processes Were Not Reengineered Before Implementation Began

Neither WSRC nor UC reengineered pertinent business processes before attempting to implement new information systems. WSRC planned to reengineer its business processes concurrent with system implementation. The Project Manager stated the business processes to be reengineered should have been identified prior to starting the project.

UC's primary reason for implementing PeopleSoft was to use a single software package to develop two independent systems, the Salary Review System and the Employee Personnel Action System. However, if UC had reengineered its business processes before attempting to implement the new system, management could have determined that PeopleSoft was not suitable for developing the Salary Review System and the existing software was suitable for developing the Employee Personnel Action System.

The Salary Review System was designed to replace an older system that tracked salary reviews and allocated salary increases. After nine months of developing the Salary Review System, the Salary Policy Committee proposed major changes in its philosophy for conducting the Salary Review process. These process changes, which should have been identified as part of reengineering, prevented UC from using the PeopleSoft system because of technical limitations. The PeopleSoft Salary Review System was eventually abandoned.

Performance Measures Were Not Used

Neither WSRC nor UC had meaningful and measurable performance indicators as defined in the Government Performance and Results Act of 1993 to assess and track the progress of system implementation. WSRC's draft project plan contained no performance measures, it stated that performance metrics would be established for project implementation and future system performance. However, performance metrics were never established.

Likewise, UC did not have clearly defined performance measures to assess the progress of implementing the PeopleSoft system. UC personnel did not agree on the elapsed time or total cost required for completion of the project. System implementation was budgeted from year to year with no formal plan for the total project cost. Further, the implementation plan did not include the level of effort required beyond the current year.

Expected Benefit Was Not Received

The Department did not receive the expected benefit from its \$15.1 million investment in new business systems at WSRC and UC. The Department invested \$11.5 million at WSRC and \$3.6 million at UC without implementing either new system. However, some benefits were obtained, such as the updating and validation of Savannah River Site's business system databases.

Also, the Department estimated it could have avoided \$86 million over a 4-year period if WSRC had successfully implemented the SAP System. If the project was completed as originally planned, significant savings could have been realized through staffing reductions and improvements in business processes for procurement, human resources, finance, and project management. The Department estimated that the staffing reductions could have been as many as 280 employees, and avoidable maintenance costs for obsolescent software would be at least \$3.1 million annually.

We were unable to estimate the future savings that UC could accrue if it had implemented a modern integrated business information system.

RECOMMENDATIONS

We recommend that:

1. The Managers for the Savannah River and Albuquerque Operations Offices require WSRC at Savannah River Site and UC at LANL to adequately define the scope of the project and perform a feasibility study to determine whether an integrated business information system should be implemented.
2. The Manager, Savannah River Operations Office require WSRC to reengineer associated business processes, establish performance measures to assess progress, and develop a detailed project plan prior to implementation should the project be authorized.
3. The Manager, Albuquerque Operations Office direct UC at LANL to assign a project manager with overall responsibility for the project, reengineer associated business processes, establish performance measures to assess progress, and develop a detailed project plan prior to implementation should the project be authorized.

MANAGEMENT REACTION

The Savannah River and Albuquerque Operations Offices concurred with the finding and recommendations. WSRC developed a concept document to initiate a project to replace existing major applications and agreed to include the project scope in the feasibility study and to perform the recommended actions should the project be authorized.

The Albuquerque Operations Office agreed to implement the recommendations of the report. Additionally, Albuquerque stated that it will determine whether to disallow any costs for the unsuccessful project, and will consider incorporating DOE G 200.1-1A, *Software Engineering Methodology*, into the contract.

AUDITOR COMMENTS

Management was responsive to the recommendations. However, neither WSRC nor Albuquerque Operations Office stated when the recommended actions would be taken.

Appendix

SCOPE

The audit was performed between April and December 1999 at Lockheed Martin Energy Systems and Energy Research, Oak Ridge Associated Universities, and Bechtel Jacobs Company in Oak Ridge, Tennessee; DynMcDermott Petroleum Operations Company at the Strategic Petroleum Reserve in New Orleans, Louisiana; Sandia Corporation at the Sandia National Laboratories in Albuquerque, New Mexico; University of California at the Los Alamos National Laboratory in Los Alamos, New Mexico; Allied Signal Federal Manufacturing & Technologies at the Kansas City Area Office in Kansas City, Missouri; Westinghouse Savannah River Company at the Savannah River Site in Aiken, South Carolina; and Office of Chief Information Officer in Washington, D.C. The audit covered the implementation of SAP, Oracle, and PeopleSoft integrated business information systems at eight contractor locations.

METHODOLOGY

To accomplish the audit objective we:

- Reviewed Federal and Departmental regulations, guidance, and standards for implementing information technology systems;
- Evaluated contractor procedures and practices for acquiring and implementing information technology systems;
- Reviewed business case studies and implementation data from SAP, Oracle, and PeopleSoft.
- Analyzed feasibility studies, project plans, cost benefit analyses, and performance measures applicable to the Department's implementation of new business systems.

The audit was performed in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Accordingly, the audit included reviews of Departmental and contractor policies, procedures, and performance measures related to the implementation of integrated business information systems. 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 extensively on computer-processed data.

We discussed the results of our review with the Savannah River and Albuquerque Operations Offices during the course of the audit and both sites waived exit conferences.

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