

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

AUDIT OF ELECTRICAL SYSTEM CONSTRUCTION PROJECTS
AT THE NEVADA OPERATIONS OFFICE

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

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November 6, 1996

SUMMARY

The Nevada Test Site became the nation's continental nuclear weapons test site on January 11, 1951. Over the years, the Nevada Operations Office (Nevada) built an extensive infrastructure to support and conduct nuclear tests at the site and in Las Vegas. Roads, housing, test towers, electrical systems, and water systems are just a few of the construction projects that have been required by the Site's nuclear testing mission. Nuclear testing continued through 1992. A presidential decision directive issued in October that year stopped the testing but required Nevada to conduct an experimental program and maintain a readiness posture to resume nuclear testing within 6 months through Fiscal Year 1995. The directive further required that, beginning with Fiscal Year 1996, Nevada maintain a 2- to 3-year readiness posture. This change in Nevada's mission coupled with Department downsizing requires that only cost effective projects with defined mission needs be undertaken.

Although Nevada has changed and rescoped some construction projects in response to the changing Test Site mission, there are two projects, one underway and one planned, that contain unneeded overlap of capability. Specifically, the audit identified two electrical system projects that provided unnecessary duplicate capability at a cost of about \$1.35 million.

Management concurred with our finding and agreed to implement the recommendation. Details of management's comments and our response are included in Part III.

OFFICE OF INSPECTOR GENERAL

PART I

APPROACH AND OVERVIEW

INTRODUCTION

During the Cold War, the Department used the Nevada Test Site to test nuclear weapons. In order to meet the mission, Nevada had to construct many facilities, including infrastructure support. However, the Cold War has ended and a Presidential Directive in October 1992 placed a moratorium on nuclear testing

that is still in effect. Since these events changed the Test Site's mission substantially, this audit assessed whether Nevada was constructing cost effective projects with defined mission needs.

SCOPE AND METHODOLOGY

The audit was conducted from November 1995 through July 1996, at the Nevada Operations Office and at the Nevada Test Site, located about 65 miles northwest of Las Vegas.

To accomplish the audit objective, we:

- * determined the universe of construction projects;
- * selected a judgmental sample of projects for detailed review;
- * reviewed selected projects for justification based on defined mission needs;
- * interviewed Nevada and contractor personnel involved with the construction projects reviewed;
- * reviewed selected projects for cost effectiveness where appropriate;
- * toured existing facilities and sites where construction projects were either ongoing or planned; and,
- * reviewed prior reports of other groups on the management of selected projects.

In addition, to provide evaluations of justifications for projects that involved technical requirements of electric power systems, we interviewed technical experts outside of Nevada. Specifically, we interviewed a Manager of Communication, Engineering Construction and Maintenance for Nevada Power Company, and a Telecommunications and Control Engineer for the Department's Western Area Power Administration.

Currently, Nevada has 77 construction projects either underway or planned to begin in the near future. These projects have a total estimated cost of \$206.6 million. We judgmentally selected and reviewed 11 of these projects with a total value of \$96.8 million. Since some projects were conceived and planned before the moratorium on nuclear testing began, we evaluated these projects to determine whether they still met a defined mission need.

The audit was performed according to 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 audit objectives. We limited the review of internal controls because the audit focused on the need and cost effectiveness of specific construction projects. Because the 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 and, therefore, did not fully examine the reliability of that data. On July 2, 1996, we met with the Director, Engineering Division, Office of Assistant Manager for Technical Services, to discuss the audit. We discussed the initial draft report and management's response to the report with the Nevada Operations Office Field Chief Financial Officer on September 10, 1996.

BACKGROUND

The Nevada Test Site became the nation's continental nuclear weapons test site on January 11, 1951. Over the years, Nevada built an extensive infrastructure to support and conduct nuclear tests at the site and in Las Vegas. Roads, housing, test towers, electrical systems, and water systems are just a few of the construction projects that have been required by the Site's nuclear testing mission. Nuclear testing continued through 1992. A presidential decision directive issued in October that year stopped the testing but required Nevada to conduct an experimental program and maintain a readiness posture to resume nuclear testing within 6 months through Fiscal Year 1995. The directive further required that, beginning with Fiscal Year 1996, Nevada maintain a 2- to 3-year readiness posture. This change in Nevada's mission coupled with Department downsizing requires that only cost effective projects with defined mission needs be undertaken.

OBSERVATIONS AND CONCLUSIONS

In response to changes in its mission, Nevada canceled some projects, rescoped others, and eliminated parts of projects. For example:

The \$4.5 million Liquid Waste Treatment System project was canceled when needs changed.

Over \$6 million worth of nuclear test support power lines and equipment were cut from the Power Distribution Systems project after the moratorium on nuclear testing eliminated the need for them.

The general scope of the Power Distribution Systems project was changed from nuclear testing support to general power system infrastructure revitalization. This change included upgrades to the power communication system.

Although Nevada had changed and rescoped some construction projects, two projects contained electrical communications capabilities that were unnecessarily duplicative. The first project included digital-microwave and fiber-optic communications at a cost of \$1.1 million; the second included a pure fiber-optics communication capability costing \$2.6 million. By its own estimate, Nevada could avoid about \$1.35 million by taking action to eliminate this duplication. This situation occurred because of Nevada's uncertainty with the funding levels that would be provided for the pure fiber-optic system.

PART II

FINDING AND RECOMMENDATION

Electrical System Construction Projects at the Nevada Operations Office

FINDING

Department policy requires that project planning include the integration with other projects where applicable. However, our audit determined that Nevada had two projects, one underway and one planned, that contained unnecessary duplication of capability. As part of the ongoing project, Nevada is constructing digital-microwave and fiber-optic communications. Within four years, however, Nevada plans to update the communications with a pure fiber-optic capability. This situation occurred because of Nevada's uncertainty with the funding levels that would be provided for the future project. As a result, Nevada could spend about \$1.35 million unnecessarily.

RECOMMENDATION

We recommend that the Manager, Nevada Operations Office, pursue the most cost effective communications capability that meets overall technical requirements.

MANAGEMENT REACTION

Nevada management concurred with our recommendation. Management's comments and our responses are summarized in Part III.

DETAILS OF FINDING

Department policy is to plan, acquire, operate, maintain, and dispose of physical assets as valuable national resources. DOE Order O 430.1 requires that stewardship of these resources shall be accomplished in a cost effective manner to meet the DOE mission. The order also requires that the project planning process include the integration with other projects where applicable.

DUPLICATIVE PROJECTS

The audit determined that Nevada had two projects that included duplicative power communications capabilities: the Power Distribution project (Distribution project) and the planned 138 kV Substation Modernization project (Modernization project). Although an upgrade to existing power communications is necessary, we determined that the projects overlapped, providing unnecessary duplication.

Power Communication System

An essential part of Nevada's electrical system is the power

communication system. While this system, itself, does not supply power, it ensures the reliable operation of the Test Site power system. If there is an interruption of power, for example, the communication system would sense the problem. It, then, would rapidly shut off power to effected areas and communicate information about the outage to the switching station. This communication allows the dispatch of repair crews to effected areas. Without a reliable communication system, any power failure has the potential to cause a system-wide blackout as well as power surges that could inflict extensive damage to the electrical equipment. Since the Test Site's communication system, which is over 25 years old, has outdated equipment and has experienced numerous failures, an upgrade to the existing system is necessary.

Nevada responded to the need for a communications upgrade in March 1993 by including a fiber-optics capability as part of the Modernization project. The fiber-optics would meet communications requirements and provide for additional future capacities such as video surveillance and fire suppression at power system substations. Further, this all new capability would have an expected life of 20-30 years. However, as Nevada rescoped the Distribution project from direct support of the test program to basic infrastructure revitalization, it added digital-microwave and fiber-optic communications, for \$1.1 million, to be operational in 1997. This alternative would use some new microwave equipment with 15-25 year life expectancies as well as some 12 year old existing microwave equipment. The baseline change to the Distribution project that added the digital-microwave and fiber-optics justified the addition by stating that \$2.6 million could be cut from the Modernization project to delete the fiber-optics and avoid duplication between the two projects. However, Nevada never removed the fiber-optics included in the Modernization project.

BUDGET UNCERTAINTY

Nevada has not taken action to avoid duplication between the two projects because it was uncertain what level of funding would be provided to the Modernization project. Therefore, Nevada is moving forward to construct the digital-microwave and fiber-optics capability with the intent of replacing it within 4 years with the pure fiber-optics. Project personnel prefer the pure fiber-optics over the digital-microwave and fiber-optic combination because the latter will use some older existing equipment with limited remaining life. However, Nevada has been reluctant to remove the digital-microwave and fiber-optics from the Distribution project because the Modernization project has not yet been funded. Nevertheless, Nevada management agreed that rescoping the projects to avoid duplication would be appropriate.

COSTS

The audit showed that by continuing on its present course, Nevada will spend between \$1.1 million and \$2.6 million for unnecessary duplication between the Distribution and Modernization projects. Nevada's own estimate is that \$1.35

million in costs can be avoided.

PART III

MANAGEMENT AND AUDITOR COMMENTS

On September 10, 1996, we discussed Nevada's responses to our initial draft report with the Nevada Operations Office Chief Financial Officer. A brief summary of the Chief Financial Officer's comments and our responses follows.

Management Comments. Management concurred and the Chief Financial Officer stated that Bechtel Nevada was currently analyzing the merits of the two projects and that action would be taken to avoid duplication when Bechtel completes its analysis. Bechtel Nevada completed its analysis and a copy of the report was provided to the IG on September 25, 1996. Based on the analysis, \$1.35 million in costs for microwave equipment can be avoided by proceeding directly to a pure fiber-optic system. Engineering department personnel state that this course of action will be taken if Congress provides requested Substation Modernization project funding for FY 1997. This funding level should be known by the end of October 1996.

Auditor Comments. Nevada's intended action is responsive to our recommendation.

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