



U.S. Department of Energy  
Office of Inspector General  
Office of Audit Services

# Audit Report

## The National Nuclear Security Administration's B61 Spin Rocket Motor Project

DOE/IG-0740

September 2006



Department of Energy  
Washington, DC 20585

September 26, 2006

MEMORANDUM FOR THE SECRETARY

FROM:

*Greg Friedman*  
Gregory H. Friedman  
Inspector General

SUBJECT

INFORMATION: Audit Report on "The National Nuclear Security Administration's B61 Spin Rocket Motor Project"

BACKGROUND

The Department of Energy's Sandia National Laboratories are refurbishing the Spin Rocket Motor, a prime component of the B61 nuclear weapon system. Both the original motor produced in 1966 and the version last produced in 1991 are the subjects of the refurbishment. Both motors, which are essentially identical, produce thrust to arm the weapon. In December 2001, the National Nuclear Security Administration (NNSA) received Nuclear Weapons Council Standing and Safety Committee (NWCSSC) approval to study the feasibility and cost of replacement options. In April 2003, the NWCSSC approved the development of a new Spin Rocket Motor based on Sandia's assertions that test data collected between 1997 and 2002 showed the motors, due in large part to "detrimental aging," were not performing according to specifications. Detrimental aging occurs when a component's age prevents it from performing to meet military requirements. The first production unit for this refurbishment effort is scheduled to be completed in December 2006, at an estimated overall project cost of about \$60 million.

NNSA's 6.X process for managing refurbishments requires the examination of various design options and their cost impacts before proceeding to the development-engineering phase. Pursuant to the 6.X process, a rationale for replacing components is to be supported by test evidence indicating weapon defects and aging trends. In order to be used as part of a justification, test results must be obtained under "War Reserve" conditions, that is, conditions similar to those experienced in wartime (e.g., climate factors such as temperature). Furthermore, refurbishments are to be supported by evidence indicating the cause and impact of any reported anomalies.

The Office of Inspector General received allegations raising serious questions concerning the Department of Energy's decision to proceed with the B61 Spin Rocket Motor project. As a consequence, we initiated this audit to evaluate the Department conclusion about the performance of the motor.

RESULTS OF AUDIT

Based on reported test anomalies, coupled with the fact that some versions of the Spin Rocket Motor had been in use for over 30 years, we concluded that there was a reasonable basis to be concerned about the aging and future performance of the motor. However, the Department did not have conclusive information on the cause and impact of observed test anomalies nor of the cost of alternative options, both of which were needed



to prioritize the development of a new motor in the context of competing weapons development requirements. The lack of this information placed the decision to proceed with development of a new Spin Rocket Motor at odds with the operating principles promulgated in NNSA's 6.X procedures.

Moreover, independent reviews conducted in 2002 suggested a range of expert opinion and different courses of action regarding motor aging and test anomalies. For example:

- One review observed that it would be "uncomfortable" with delaying replacement due to observed component aging and test anomalies; while,
- Another review concluded that observed anomalies were not part of structured tests under War Reserve conditions and recommended that NNSA perform a Significant Finding Investigation to investigate the motor's performance and identify any aging concerns that would warrant replacing the motor.

While the suggested investigation was initiated, it did not begin until after the development of a new motor was approved and work commenced. The Significant Finding Investigation had not been completed as of the time of our audit. However, preliminary data from ongoing investigations did not evidence detrimental aging or performance decrements in the existing Spin Rocket Motor. Further, Sandia's cost estimates and assumptions used to support the decision to develop a new motor rather than to examine other options, such as refurbishing the existing motor, were not fully supported.

We found that NNSA had not adequately validated key Spin Rocket Motor data provided by Sandia prior to approval of the new project. One senior NNSA weapons program official acknowledged that, due to staff reductions in the NNSA program, the information presented by Sandia was accepted without question and had not been validated.

During the course of the audit, Sandia and NNSA officials advised us that there were other concerns, such as spin rate issues and the time it would take to develop a new motor, that prompted the need for the project when it was approved. While we recognized that the age of the Spin Rocket Motor in and of itself may have provided a reasonable basis to be concerned about the performance of the existing motor, the project was approved before problems were fully investigated for cause and effect and before the cost impact of various options was fully evaluated. As a result, it was unclear: (i) whether the Spin Rocket Motor replacement project represented the highest and best use of the Department's finite weapons refurbishment budget; and, (ii) how the motor replacement project compared in terms of priority to other weapons refurbishment projects. In contrast to the Spin Rocket Motor, a Sandia official told us that at least one other project had been fully investigated, had defined causes for the anomalies, had been subjected to a full resource evaluation, and was not receiving the support needed for refurbishment.

Consequently, we made several recommendations to ensure that future refurbishment projects are managed in accordance with NNSA's 6.X policy, specifically to ensure that such projects are justified and supported based on analyses of refurbishment options and validated cost data.

## MANAGEMENT REACTION

Management did not agree with the finding but generally concurred with the recommendations. Management emphasized that the B61 Spin Rocket Motor replacement project was approved through the joint NNSA/Department of Defense NNSA Phase 6.X process and was a follow-on, long-term solution to a stockpile problem. While it acknowledged there was no evidence to indicate an immediate performance impact, management stated there was sufficient concern with aging, in combination with motor margins, to justify the prudent course to replace the motor. Management's verbatim comments are included in Appendix 5.

While the refurbishment decision was based on collaborative efforts between NNSA and the Department of Defense, we found that the 6.X process was not completely followed. Specifically, test evidence provided in support of the refurbishment had not been obtained under approved test protocols, i.e., War Reserve conditions; investigations of the cause and impact of test anomalies had not completed before initiating development of a new motor; and, documentation was not available to support Sandia's determination that building a new motor was the less costly option. With regard to concerns about aging and margins, as indicated in the audit report, a number of tests observed no performance degradation due to aging and found that the motors met expectations and continued to perform within margins. This included tests specifically designed to predict the effects of aging on weapons components. Consequently, information provided to NNSA and Department of Defense officials, which was the basis for the decision to refurbish the motor, was not complete. While there is no assurance of the final outcome, we continue to believe that, prior to making the decision to initiate the project, responsible officials should have had the benefit of the full range of information called for in the 6.X process. Had that been the case, any decision regarding the future of the Spin Rocket Motor would have been fully documented, eliminating any controversy.

Attachment

cc: Deputy Secretary  
Administrator, National Nuclear Security Administration  
Chief of Staff  
Director, Policy and Internal Controls Management, NA-66

# REPORT ON THE NATIONAL NUCLEAR SECURITY ADMINISTRATION'S B61 SPIN ROCKET MOTOR PROJECT

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## B61 Spin Rocket Motor Project

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### Spin Rocket Motor Concerns

The Nuclear Weapons Council Standing and Safety Committee (NWCSSC), of which the National Nuclear Security Administration (NNSA) is a member, approved the development of a new Spin Rocket Motor (motor) based on Sandia National Laboratories (Sandia) findings that Enhanced Surveillance Campaign (ESC) and other tests showed performance anomalies. ESC tests predict the effects of aging on weapons' components performance. Sandia's request to develop a new motor was further supported by a 2002 peer review, which observed that a part of the motor had "seemingly marginal performance."

Although these findings and the overall age of the motor presented a reasonable basis to be concerned about its future performance, NNSA did not fully investigate the cause and impact of the observed physical aging of components and test performance anomalies, nor did it fully evaluate the cost impact of alternative options for addressing concerns before it approved development of a new motor.

#### Data Uncertainties

In February 2003, Sandia presented a list of 20 test anomalies to NNSA to support developing a new motor. These 20 anomalies resulted from several hundred enhanced surveillance tests of the motors conducted over a five-year period ending in September 2002. An analysis of the 20 anomalies revealed, however, that 17 did not represent failures and, therefore, did not fully support Sandia's assertion that a new motor was needed.

For example, an analysis of the 20 anomalies by an independent assessment team found them "suspect" since they resulted from Non-War Reserve conditions. The team also found no evidence of a reduction in performance and thus recommended that Sandia conduct a Significant Finding Investigation (SFI) to factually investigate the motor's performance and identify any aging concerns that would warrant replacement. Additionally, Sandia Systems Engineers confirmed that 12 of the 17 motors, which experienced venting around their seals during testing, met performance expectations.

We noted that Sandia did initiate the recommended SFI; however, it was not completed prior to obtaining approval to develop a new motor.

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Other studies also raised uncertainty about the effects of aging on the performance of the motor. For example, a February 2000 study performed jointly by Sandia, the U.S. Air Force, and the motor's manufacturer reported that there was no observed performance degradation as a result of the motor's propellant aging.

#### Post-Development Investigations and Studies

Although not completed, preliminary data from ongoing SFI's started after development of the new motor do not indicate problems with detrimental aging of the motor or performance decrements. Furthermore, an investigation completed in March 2005, by the U.S. Army Research, Development and Engineering Command, Redstone Arsenal, at the request of Sandia, found motor case problems related to specific manufacturing lots but did not report indications of detrimental aging.

Additionally, a January 2005 component performance assessment showed that the motor's performance had been essentially unchanged since the 1980's. Sandia documentation showed that the current performance assessment rating was greater than what was anticipated when the motor was developed in the 1960's. Finally, in April 2006, one NNSA project official told us that while the engineers working on the motor strongly believed that there was a problem associated with aging, the engineers could not understand why the motor was nevertheless passing its tests.

#### Refurbishment Options

Sandia also did not fully consider other options before proceeding with the new motor. NNSA's 6X refurbishment process requires an examination of various design options and their cost impact before initiating development of a project. Available options, in this case, included rebuilding the existing motor to address test anomalies, such as venting around the seals, or developing a new motor.

We found that Sandia presented cost information on the rebuilding option to NNSA in January 2003. Although Sandia's cost information showed that it would cost less to build a new motor than to rebuild the motor, Sandia was unable to provide documentation showing how the cost estimates were derived or the basis for assumptions used in the calculations. Without supporting cost data, we question Sandia's basis for stating that it had fully considered the option of rebuilding the motor and that it had adhered to the requirements of its 6X refurbishment process.

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### Other Concerns

During the course of the audit and in responding to a draft of this report, Sandia and NNSA officials advised us that there were other considerations which prompted their decision to request approval to develop a new motor. These included concerns with aging in combination with the motor's performance margin. However, we noted that these issues had been resolved prior to key briefings on the need for the motor and that they did not impact the motor's performance.

An NNSA official advised that the primary reason for the project was a performance margin concern identified in a 1999 developmental test. Even though subsequent wind tunnel testing found that an adjustment to the weapons fins had alleviated the concern, NNSA officials said they considered the fin adjustment to be an interim measure and planned to build a new motor. We noted, however, that an October 2002 peer report found no performance margin problems with the motors in the active stockpile. Consequently, it appeared the issue with performance margin was resolved before Sandia briefed the NWCSSC and NNSA concerning the justification to develop a new motor in February 2003, and thus was not a viable basis for proceeding with the project.

Other concerns raised included spin rate issues and the time it would take to develop a new motor. Specifically, due to the fin adjustment, the bomb's spin rate is different than originally planned and thus raised concerns about its effect on other components. However, Sandia personnel determined that other components would not be adversely affected by the changed spin rate.

NNSA personnel also estimated that it would take up to ten years to develop, manufacture, and fully field a new motor and were concerned about whether a replacement could be developed before serious issues arose. We noted that under the current project, Sandia estimated that it would require only about five years to develop a prototype of the new motor.

Our concern is that the project was approved without fully evaluating the cause and impact of the observed aging of components and the test anomalies, and the cost impact of available options was not fully supported.



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## **NNSA Oversight**

NNSA did not adequately validate supporting data before it approved development of a new motor. For example, one senior NNSA weapons program official acknowledged that the information presented by Sandia regarding the motors' performance and costs was accepted without question and had not been validated. This official stated that at one time NNSA had the personnel to validate information; but due to downsizing in the NNSA program, it no longer had that capability. NNSA also accepted Sandia's cost estimates even though they lacked necessary detail to make a determination on the options.

A member of the B61 Project Officer's Group (an interagency organization composed of representatives from the Department of Defense commands, the Air Force and NNSA) confirmed that other options were not considered. Finally, a peer review of the developmental-engineering phase of the new motor conducted in October 2003, raised concerns about how Sandia was measuring the motor's performance and raised concerns whether a cost analysis was performed for the new motor.

## **Refurbishment Priorities**

The motor is only one of many components in the B61 bomb. To ensure that the B61 remains reliable, component refurbishments must be prioritized so that those with the most urgent needs are addressed in order of importance. Accordingly, had the Department of Energy (Department) fully investigated the cause and impact of test anomalies and inspection observations, it may have allocated the estimated \$60 million being spent on the motor to other refurbishments with more urgent needs. In fact, a Sandia official pointed out that other refurbishment projects are not receiving the attention they need.

## **RECOMMENDATIONS**

We recommend that the Administrator, NNSA, ensure for future weapons refurbishment projects that:

1. All requirements are based on SFI reports, or ESC test results conducted under War Reserve conditions or other documented operational requirements;
2. Options and their cost impacts for refurbishment needs are identified;
3. Data supporting the need for refurbishments and cost estimates for refurbished components are validated prior to committing Department resources; and,
4. Adequate resources are provided for the validation process.

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**Management Reaction  
and Auditor Comments**

Management did not agree with the finding but generally concurred with the recommendations. Officials acknowledged that there was no evidence to indicate an immediate performance impact, but that there was sufficient concern with aging, in combination with motor margin, to justify the prudent course to replace the motor. Management stated that the recommendations, while good, may not be the appropriate ones for this project.

As indicated in the body of the report, analyses of test data did not fully support Sandia's assertion that a new motor was needed at this time. Based on these analyses, it appears that only three tests out of the hundreds conducted during the period 1997 through 2002 were actual failures of the motor. Additionally, an October 2002 Sandia Peer Review found no performance margin problems with the motor in the active stockpile.

Since the motor project is already under development, we intended that our recommendations be implemented by management in future refurbishment projects. Thus, management's comments and planned actions regarding the recommendations are responsive.

Management's specific comments, followed by our responses, are detailed below.

Management Comment

Management emphasized that the B61 Spin Rocket Motor replacement project was approved through the joint NNSA/Department of Defense NNSA Phase 6.X process, which included aging studies, analyses, and peer reviews.

Auditor Comments

The approval of the development of a new motor was a joint NNSA/Department of Defense decision. However, we have concluded that all elements of the 6.X process were not completely followed because, as discussed in the report:

- Tests that produced anomalies indicating aging concerns were not conducted under approved test protocols, i.e., War Reserve conditions;
- Independent reviews suggested alternative courses of action regarding aging and test anomalies, including investigating the cause and impact of the anomalies, before developing a new motor; and,

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- Documentation was not available to show how Sandia determined that it would cost less to build a new motor than to rebuild the existing motor.

Consequently, we have concluded that had the B61 Project Officers Group had more complete information about test anomalies and the feasibility and cost of alternatives, it may have reached a different decision about the priority that should have been given to the motor refurbishment.

#### Management Comments

Management believed that Recommendation 1, to ensure that all weapon refurbishment requirements are based on SFI reports, or ESC test results conducted under War Reserve conditions, implied that NNSA should only repair or replace nuclear weapon components after they have failed. NNSA often replaces components due to limited life, well before there is a performance impact and to do otherwise, would not be good stockpile stewardship. Regarding components that do not have a clear limited life, it is often very difficult to accurately predict when the component will start to fail due to aging. Management also commented the project was a long term, permanent solution to address the counter torque problem, margin and aging concerns discovered during the fielding of an earlier refurbishment and documented in the 1999 SFI.

#### Auditor Comments

We acknowledge that other operational needs may require a refurbishment of a specific component and accordingly have adjusted our recommendation to reflect that other operational requirements should be considered. Nevertheless, Departmental requirements are clear that weapon refurbishments must be based on a demonstrated and documented need. Based on its own policy, this need should be demonstrated through testing under War Reserve conditions.

With regard to concerns about aging, margin, and counter torque, as indicated in the report, several hundred ESC tests, which predict the effects of aging on weapons components, concluded that the motors met expectations. These conclusions were confirmed by a number of other studies, which observed no performance degradation as a result of the motor's propellant aging. Additionally, as stated previously, a peer review found that the motor continued to perform within margin.

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### Management Comments

Management generally agreed with Recommendation 2, to identify refurbishment options and their cost impacts, and stated that their evaluation of the refurbishment options and cost impacts for the motor was contained in the Weapon Design and Cost Report during Phase 6.2/6.2A.

### Auditor Comments

We agree that the Weapon Design and Cost Report listed costs for various options; however, because officials could not provide any documentation supporting the cost data or any detailed analysis of the various options, we continue to question the basis for the evaluation.

### Management Comments

Management agreed with Recommendation 3, to validate supporting data and cost estimates for future refurbishments, and contended that the reviews conducted during Phase 6.2/6.2A and in conjunction with the Phase 6.3 decisions for the motor accomplished this validation. The reviews concluded the motor project was warranted. Management further stated that the focus of the reviews was on the technical aspects of the project and not cost.

### Auditor Comments

We do not fully agree that the Phase 6.2/6.2A and 6.3 reviews accomplished the required cost validation for the motor. In fact, management's comments to the draft report acknowledge that the focus of their reviews was the project's technical aspects and not cost issues. This is further confirmed by an October 2003 Peer Review, which raised questions about whether cost estimates were performed for the new motor. Furthermore, the fact that Sandia project management personnel were unable to locate supporting documentation to verify the accuracy of the cost numbers or the planning assumptions used in their development raises questions about how the validation of the cost numbers was accomplished.

### Management Comments

Management concurred with the need to provide resources for cost validation for major weapon refurbishments as noted in Recommendation 4.

### Auditor Comments

Management's comment is responsive to the recommendation.

### OTHER MATTERS

Sandia did not have adequate financial controls over the project. The Office of Management and Budget and the Department require the systematic control of all costs necessary to complete the project.

Sandia was not able to fully identify the total amount spent since it began the research and development of the new motor. Sandia used B61 Stockpile Support funds for research and development of the motor through Fiscal Year 2004 and never separately identified the motor's costs. Rather, these costs were commingled with expenses for other B61 refurbishment efforts. We estimated that about \$15 million might have been spent during these first five years. However, the lack of clear accounting records made it very difficult for us to accurately determine the total cost incurred during this period. Consequently, the lack of financial controls prevented NNSA and Sandia from being able to ensure that funds were spent for their intended purposes. In 2005, Sandia began separately tracking costs associated with the motor project.

### PRIOR REPORTS

#### OFFICE OF INSPECTOR GENERAL REPORTS

- *The National Nuclear Security Administration's Refurbishment of the B61* (DOE/IG-0697, August 2005). The audit found that the National Nuclear Security Administration (NNSA) is at risk of not achieving the first production unit for the B61 refurbishment within the original schedule and scope specifications. It was concluded that NNSA had not ensured that the individual production schedules of participating sites were linked and consistent with its overall integrated schedule, provided sufficient authority to the refurbishment project manager to ensure that sites and contractors met the planned schedule, and validated its cost estimates in a comprehensive way to ensure that all costs were included and that only appropriate costs were charged to the project.
- *Refurbishment of the W80 -- Weapon Type* (DOE/IG-0590, March 2003). The audit disclosed that it was unlikely that NNSA's W80 refurbishment project would meet scope, schedule, and cost milestones established in the W80 NNSA Project Plan. Further, key management controls to oversee the project were not in place or operating as intended.

#### GOVERNMENT ACCOUNTABILITY OFFICE REPORT

- *Opportunities Exist to Improve the Budgeting, Cost Accounting, and Management Associated with the Stockpile Life Extension Program* (GAO-03-583, July 2003). The report found that, with respect to Fiscal Year 2003, NNSA did not include activities for high explosives work that is needed to support three life extension efforts in an unclassified budget annex that provided data for the program. Also, NNSA developed its budget by broad function, such as research and development, rather than by individual weapon system or program activity, such as the Stockpile Life Extension Program.

## Appendix 3

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**OBJECTIVE** The objective of our audit was to determine whether the Department had a reasonable basis to be concerned about the aging and performance of the B61 motor.

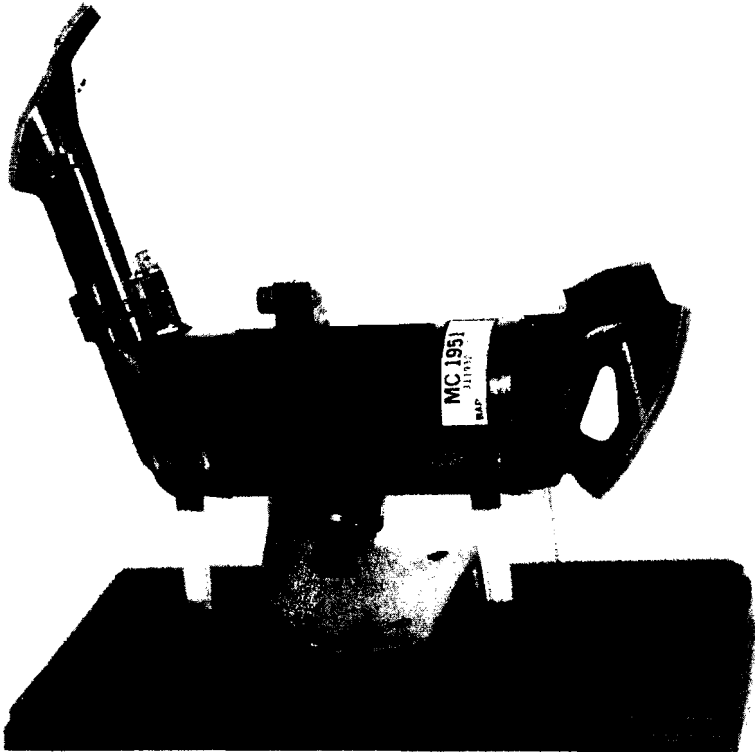
**SCOPE** The audit was performed between August 2005 and May 2006. The audit examined the B61 Spin Rocket Motor project. Audit work was primarily performed at the National Nuclear Security Administration and Sandia National Laboratories, Albuquerque, NM.

**METHODOLOGY** To accomplish the audit objective, we:

- Reviewed applicable Public Laws, Department orders, other departmental guidance, related correspondence, and contracts;
- Examined prior Office of Inspector General and Government Accountability Office reports;
- Analyzed key documents related to the B61 ALT 356/358/359 refurbishments; and,
- Interviewed key field and laboratory personnel.

The audit was conducted 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 objective of the audit. Accordingly, we assessed the significant internal controls and performance measures established under the Government Performance and Results Act of 1993 and found that measures specifically related to the B61 motor had not been established. 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 determined that controls over computer-processed data were not integral to meeting the objectives of our audit. We discussed the findings with the Director, Nuclear Bombs Division, on April 24, 2006. NNSA waived the exit conference.

PICTURE OF SPIN ROCKET MOTOR








Department of Energy  
National Nuclear Security Administration  
Washington, DC 20585



JUL 24 2006

MEMORANDUM FOR George W. Collard  
Assistant Inspector  
for Performance Audits

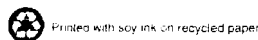
FROM: Michael C. Kane   
Associate Administrator  
for Management and Administration

SUBJECT: Comments to Spin Rocket Motor Draft Report;  
A05AL003/2005-16373

The National Nuclear Security Administration (NNSA) appreciates the opportunity to review the Inspector General's (IG) draft report, "The National Nuclear Security Administration's B61 Spin Rocket Motor Project." We understand that the IG conducted this audit based on allegations made related to the Spin Rocket Motor aging and performance.

The report states that based on test data available at the time, coupled with the fact that some versions of the Spin Rocket Motor had already been in use for over 30 years, there was a reasonable basis to be concerned about the aging and future performance of the motor. However, the IG believes that we did not have conclusive information on the cause and impact of observed test anomalies or the cost of alternative options needed to prioritize the development of the motor over other weapons development needs.

This draft report focuses primarily on whether NNSA had sufficient technical justification in the form of test failures, detrimental aging or reliability decrements to proceed forward with a replacement Spin Rocket Motor. What needs to be emphasized is that the B61 Alt 356/8/9 Spin Rocket Motor replacement project was approved through the joint NNSA/Department of Defense (DoD) NNSA Phase 6.X process. The project was planned as a follow-on, long term solution to a stockpile problem. A joint NNSA/DoD Phase 6.2/6.2A Study was conducted which included aging studies, associated analysis, and Peer reviews. While there was no evidence to indicate an immediate performance impact, there was sufficient concern with aging in combination with Spin Rocket Motor margins to justify the prudent course to replace the motor, a decision that was reached by the B61 Project Officers Group (POG).



While we appreciate the IG reviewing concerns raised to them by a third party, it is important to note that the decision to go with a new Spin Rocket Motor was a joint NNSA/DoD management decision based on analysis, Peer reviews, and discussions with the B61 POG following a proscribed methodology. Therefore, we believe that the recommendations that are contained in the report, while good recommendations, may not be the appropriate ones for this subject.

### Recommendation 1

All weapon refurbishment requirements are based on documented SFI reports, or Enhanced Surveillance Campaign tests results conducted under War Reserve conditions.

This recommendation implies we should only repair or replace nuclear weapon components after they have failed. NNSA often replaces components due to limit life well before there is a performance impact and to do otherwise, would not be good stockpile stewardship. When it comes to components that do not have a clear limit life, it is often very difficult to accurately predict when the component will start to fail due to aging. In fact, addressing aging characterization has been a recent focus of our surveillance program improvements. Consequently, NNSA management often has to make the decision on whether to change out a component based on potential impact, time to resolve, and availability of resources all consistent with the desire and needs of our DoD partners. To support this decision process, NNSA and DoD jointly enter into a Phase 6.2/6.2A study to address the need to replace a component or retrofit the weapon. For the Spin Rocket Motor project, the B61 POG completed the B61 Alt 356/8/9 Phase 6.2/6.2A report recommending a new Spin Rocket Motor in January 2003. The report contains the results of the study, including aging studies, aero-modeling and independent peer reviews.

It is important to note that the original purpose of the Alt 356/8/9 project was as a long term, permanent solution to the counter torque problem that was first discovered during the fielding of Alt 335 and documented in the 1999 Significant Finding Investigation (SFI 99-38-B61-07). During the conduct of the Alt 356/8/9 Phase 6.2/6.2A study, aging concerns of the existing motors along with margin of the bombs without Alt 354 became additional reason for replacing the motors. The conclusion of the Alt 356/8/9 Phase 6.2/6.2A report cites implementation of a permanent solution to address the counter torque problem, margin and aging concerns as the primary reason for the joint NNSA and DoD decision to proceed with the Alt 356/8/9 Spin Rocket Motor project.

### Recommendation 2

Options and their cost impacts for refurbishment needs are identified.

We agree that options and cost impacts for refurbishment are essential elements of good project management. In this specific instance the refurbishment options and their costs were formally evaluated during the Alt 356/8/9 Spin Rocket Motor project. The project followed the Phase 6.X process which includes the requirement to develop a Weapon Design and Cost Report (WDCR) during Phase 6.2/6.2A. The WDCR is published to document the evaluation of options and costs associated with a proposed refurbishment. The Alt 356/8/9 WDCR was issued in January 2003 and is included in the Alt 356/8/9 Phase 6.2/6.2A report. The WDCR evaluated several different refurbishment options and associated costs were collected from each site and included in the final report.

### Recommendation 3

Data supporting the need for future refurbishments and cost estimates for refurbished components are validated prior to committing Department resources.

As above, NNSA agrees that requirements and associated costs must be validated as a part of good project management. In this case the Phase 6.X process requires Inter-laboratory Peer Reviews during each phase of the project. The focus of the reviews during Phase 6.2/6.2A is on evaluating the feasibility/adequacy of the proposed design and assessing the decision to include or not include components in the refurbishment proposals. Prior to the Phase 6.3 decision, two reviews were conducted and the results provided to NNSA and included in the joint NNSA/DoD Phase 6.2/6.2A report. Both reviews concluded the Spin Rocket Motor project was warranted. However, the focus of the reviews is on the technical aspects of the project and not cost. NNSA agrees that additional improvement is warranted in the cost validation of major refurbishment projects.

### Recommendation 4

Adequate resources are provided to the validation process.

NNSA concurs with the need to provide resources for cost validation for major weapon refurbishments.

## Appendix 5 (continued)

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Should you have any questions related to this response, please contact Richard Speidel, Director, Policy and Internal Controls Management. He also has additional technical information that he will provide to the auditors that will provide clarification and/or corrections to sections of the draft report.

cc: Thomas D'Agostino, Deputy Administrator for Defense Programs  
Patty Wagner, Manager, Sandia Site Office  
Karen Boardman, Director, Service Center

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