



NOV 21 2006

TO: Associate Administrator for Space Operations
Associate Administrator for Exploration Systems Mission Directorate
Director, Kennedy Space Center
Manager, Space Shuttle Program

FROM: Assistant Inspector General for Auditing

SUBJECT: Addendum to Final Audit Report, "Space Shuttle Program Problem Reporting and Corrective Action Process at Kennedy Space Center Needs Improvement" (Report No. IG-06-014, August 30, 2006)

We requested additional management comments on the subject final report because we did not consider the comments on Recommendations 2, 3, and 4 to be responsive. We received additional management comments on October 23, 2006 (see the Enclosure) that are responsive; therefore, the recommendations are resolved but will remain open pending completion of the corrective action plan. Following is a summary of management's additional comments on Recommendations 2, 3, and 4 and our evaluation of those comments.

Recommendation 2

In our draft report, we recommended that the Director, Kennedy Space Center, direct the Center's Safety and Mission Assurance Office and Shuttle Processing Directorate to revise the Space Shuttle Program (SSP) quality and surveillance plans to require Kennedy Space Shuttle Division Quality Engineering and Process Assurance personnel and Space Shuttle Systems Engineers to review the accuracy of cause codes, sufficiency of nonconformance descriptions, and compliance with data tracking and traceability requirements as they conduct routine surveillance of United Space Alliance's (USA) Problem Reporting and Corrective Action (PRACA) activities.

In NASA's August 1, 2006, response to the draft report, the Associate Administrator for Space Operations nonconcurred with the recommendation, stating that processes were already in place to review the accuracy of cause codes and the sufficiency of nonconformance descriptions. Specifically, the Quality Engineers are required to verify that nonconformance descriptions are clear and accurate and that the probable cause of the discrepancy is clear. In addition, the Process Assurance personnel are required to perform sampling activities of closed discrepancy reports and problem reports to include verifying that nonconformance descriptions reflect disposition findings and (for problem reports) that the Conclusion/Summary section of the nonconformance report includes a

probable cause statement. Finally, the Associate Administrator stated that USA provided internal oversight to include a final cause code review.

We did not consider management comments to be responsive. We noted in our evaluation of management's response that the Quality Engineers did not review all nonconformance reports and that the Process Assurance personnel's sampling activities did not include an evaluation of the cause codes, which according to guidance, should provide the basis for PRACA trending activities. In addition, we did not agree that USA-conducted oversight met the intent of our recommendation, as we did not consider USA reviews as NASA-conducted surveillance activities. Therefore, in our final report, we requested additional Agency comments concerning the accuracy of cause codes, sufficiency of nonconformance descriptions, and compliance with data tracking and traceability requirements.

The Associate Administrator submitted additional comments on October 23, 2006, stating that PRACA is a contractor-managed process and, as such, the contractor is responsible for executing the process correctly. He stated that sampling is an accepted Government surveillance technique based on risk and reiterated that surveillance of PRACA nonconformance descriptions and cause codes is accomplished by sampling Material Review Board PRACA items and through the Process Assurance "closed paper sampling program." However, the Associate Administrator agreed to revise the checklist used during closed paper sampling of problem reports to ensure that the PRACA summary conclusion matches an appropriate cause code on the front page of the problem report. Additionally, the Agency will perform a detailed review of the PRACA nonconformance reports listed in Appendix E and F to our final report and update those nonconformance reports as necessary. The Associate Administrator estimates that the corrective actions will be completed by December 1, 2006.

On the basis of these comments, the recommendation is resolved but remains open for reporting purposes until we receive and review the revisions to Process Assurance checklist.

Recommendation 3

In our draft report, we recommended that the Manager, SSP, ensure that USA complied with hyperlinking requirements contained in USA000383, "PCASS Reports and Query Replacement Project (WebPCASS) Functional Requirements Document (FRD)," Revision E, June 30, 2005, and USA000399, "Web Based Program Compliance Assurance and Status System (WebPCASS) Detailed Requirements and Design Document Specification (DRDS)," Revision D, July 31, 2005.

In the Agency's August 1, 2006, response to the draft report, the Associate Administrator for Space Operations concurred with the recommendation but declined to take recommended action. He stated that because the Kennedy PRACA software does not allow for hyperlinking multiple nonconformance reports to a single Corrective Action Assistance Request (CAAR), USA complied with its requirement to provide hyperlinks "where available." Although we agreed that the Kennedy PRACA software did not allow

for the hyperlinking of multiple nonconformance reports, we did not consider management comments responsive because our sample set contained nonconformance reports that were required, by USA guidance, to have an associated CAAR. As a result, we requested that the Agency provide comments to the final report regarding CAAR hyperlinking.

The Associate Administrator submitted additional comments on October 23, 2006, acknowledging that the Kennedy PRACA database is unable to support the hyperlinking requirements established in the June 2005 revision to USA000383 and that, in October 2005, the guidance was revised to remove those requirements. He stated that, "with only 15 flights remaining in the Space Shuttle Program, we do not believe that it would be cost or time effective to initiate a software upgrade to address this issue." He added that the best solution is for WebPCASS to continue to provide hyperlinks to cross-referenced information where data relationships exist. However, the Associate Administrator stated that additional review performed by NASA determined that a number of CAARs with the same root number were not linked and that the structure of the PRACA database prevented the proper link in some situations. Accordingly, the Agency agreed to (1) correct the structural problems that prevent linking problem reports to CAARs, and (2) ensure that, when required, problem reports and CAARs are properly linked. The Agency also agreed to correct the five problem reports from our sample that were not properly hyperlinked in the PRACA database. The Associate Administrator stated that documentation concerning the correction of the five problem reports will be provided to our office by November 15, 2006.

On the basis of these comments, the recommendation is resolved but remains open for reporting purposes. We request that, in addition to the documentation concerning the five problem reports, management submit documentation supporting the action taken to correct the structural problems to the PRACA database. The recommendation will remain open until we receive and review that documentation.

Recommendation 4

In our draft report, we recommended that the Manager, SSP, coordinate with USA to ensure that the award fee includes a performance metric based on the accuracy of nonconformance reports. In his August 1, 2006, response to our draft report, the Associate Administrator for Space Operations concurred with the recommendation, but stated that metrics to measure accuracy of nonconformance reports already exist and flow into the award fee process as appropriate. While we did not question the existence of the metrics, we could not determine how or whether they had been used in award fee calculations. Therefore, in the subject final report, we requested that the Associate Administrator provide additional comments addressing the use of an award fee performance metric based on the accuracy of the nonconformance reports.

The Associate Administrator submitted additional comments on October 23, 2006, stating that NASA employs several metrics sources to support award fee evaluation input. These metrics take into account the accuracy and acceptability of data in the PRACA system

and are reviewed monthly by NASA and periodically by the SSP Quality Panel. In addition, other methods such as audits, inspections, and observance of day-to-day tasks, are used to evaluate USA's performance and recommend an award fee score to the Fee Determination Official. However, the Associate Administrator agreed to re-evaluate existing metrics to determine whether revisions to those metrics are needed to better assess the accuracy of nonconformance reporting. Management estimates that corrective actions will be completed in February 2007, with the results provided to our office in March 2007. On the basis of these comments, the recommendation is resolved but remains open for reporting purposes until we receive and review the revisions to the award fee metrics.

We appreciate the courtesies extended the audit staff during the review. If you have any questions, or need additional information, please contact Ms. Carol N. Gorman, Space Operations and Exploration Director, Office of Audits, at 202-358-2562 or me at 202-358-2572.



Evelyn R. Klemstine

Enclosure

cc:

Associate Administrator
Chair, Aerospace Safety Advisory Panel
Executive Director, Aerospace Safety Advisory Panel
Director, Management Systems Division

Management's Additional Comments

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001



October 23, 2006

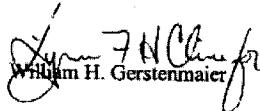
Reply to Attn of: **Space Operations Mission Directorate**

TO: Assistant Inspector General for Auditing
FROM: Associate Administrator for Space Operations
SUBJECT: Management Reconsideration Response to Office of Inspector General's Final Audit Report, "Space Shuttle Program (SSP) Problem Reporting and Corrective Action Process (PRACA) at Kennedy Space Center (KSC) Needs Improvement" (IG-06-014; Assignment No. A-05-024-00)

The Space Operations Mission Directorate, Exploration Systems Mission Directorate, SSP, and KSC have reviewed the subject final audit report. We acknowledge that Recommendations 1 and 5 will be considered for closure upon your receipt of the revised PRACA Data Code Manual, NSTS 08126, and baselined PRACA requirements for the Constellation program discussed in our previous response.

As requested in your letter of August 30, 2006, we have reconsidered our responses to Recommendations 2, 3, and 4, and have provided our consolidated comments that address the discussion in your evaluation of management's comments sections.

The enclosure provides results of our detailed review, including our comments and the corrective actions that we will implement. If you have any questions regarding this response, please contact the audit liaison representative, Ms. Gail Gabourel, at 202-358-1462 or Mr. Bill Hill at 202-358-0571.


William H. Gerstenmaier

Enclosure

cc:
HQ/Associate Administrator, Exploration Systems Mission Directorate
HQ/Director, Management Systems Division
JSC/MA/Manager, Space Shuttle Program
KSC/Director

Management Reconsideration Response to Office of Inspector's General's (OIG) Final
Audit Report, Evaluation of Management's Comments,
"Space Shuttle Program (SSP) Problem Reporting and Corrective Action (PRACA) Process
at Kennedy Space Center (KSC) Needs Improvement"
(Assignment No. A-05-024-00)

Recommendation 2: The Director of KSC should direct the Center's Safety and Mission Assurance Office and Shuttle Processing Directorate to revise the SSP quality and surveillance plans, to require Kennedy Space Shuttle Division Quality Engineering, Process Assurance personnel, and Space Shuttle Systems Engineers to review the accuracy of cause codes, sufficiency of nonconformance descriptions, and compliance with data tracking and traceability requirements as they conduct routine surveillance of United Space Alliance's (USA) problem reporting and corrective action activities.

Concur with Comments:

The National Aeronautics and Space Administration (NASA) has reviewed your request to provide additional comments with regard to accuracy of cause codes and sufficiency of nonconformance descriptions and have reconsidered our response. We would like to reiterate that in regard to the KSC PRACA system there exist different roles for NASA and the contractor. This is a contractor-managed process, and as such the contractor is responsible for executing the process correctly. The Government's surveillance role of the contractor's performance is based on the level of risk of the activities. NASA's involvement in the activities and the surveillance tools employed are determined based on the activity's risk. Based on the determined level of risk for this activity, sampling is deemed an accepted surveillance technique and is a useful tool to evaluate and validate contractor processes. As outlined in our original response, surveillance of PRACA sufficiency of nonconformance descriptions and the appropriateness of case codes are accomplished by PRACA sampling of all Material Review Board PRACA items and through a Paper Sampling Program according to KDP-P-3618. A checklist is used during the sampling activity with designated criteria. Our subsequent review of the checklist indicates that the checklist needs to be modified to make clear the requirement that the PRACA summary conclusion matches an appropriate cause data code on the front page of the problem report (PR).

NASA is also in the process of performing a more detailed review of the listed PRACA items in Appendix E and F with inaccurate cause code and insufficient problem description; those that require changes will be updated. We recognize that the application of cause codes is a subjective activity and we are performing a test to determine the subjectivity of cause codes by having several experienced personnel review the same Work Authorization Documents (WADs) and identify the most likely cause code. This should permit us to refine the process. Our review so far has determined that of the 186 listed PRACA reports, 76 were discrepancy reports (DRs); NSTS 08126 does not require DRs to have cause codes. A cause code may be given on a DR, which provides more information, but is not required. Another observation is that out of the 186 PRACA reports, 33 relate to Kapton wiring nonconformances and 75 were for tile/Thermal Protection System nonconformances. We are not using PRACA for trending in these cases since limitations are well understood and

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corrective actions are in place. The Shuttle program clearly understands the issues with Kapton wiring, tile manufacturing, and installation. While greater accuracy is desirable, the specific cause codes in these cases do not alter our approach. When reviewing the problem reports listed in Appendix F, we will assess whether the problem descriptions are sufficient. Placing this in context, the descriptions are used for describing a nonconformance so troubleshooting and remedial actions can be taken. The problem description is not used to capture all of the information gathered during the remedial actions correcting the problem and will not reflect such information in the summary conclusion statement. As part of the detailed review of Appendix E and F, we will make all necessary corrections.

Corrective Actions:

1. NASA will revise the checklist used during the NASA Process Assurance closed paper sampling activity for PRs, to ensure that the most probable cause in the summary conclusion matches the appropriate cause data code on the front page of the PR. For closure, your office will be provided with a revised checklist for Process Assurance closed paper sampling on PRs by December 1, 2006.
2. NASA will perform a more detailed review of the listed PRACA items in Appendix E and F identified with inaccurate cause code and insufficient problem description, and those that require changes will be updated. As part of this detailed review, we will also perform a test to determine the subjectivity of cause codes by having several experienced personnel review the same WADs and identify the most likely cause code. For closure, your office will be provided a copy of the cause codes test results and the list of the items in Appendix E and F that were corrected by December 1, 2006.

Recommendation 3: The SSP Manager, should ensure that United Space Alliance (USA) complies with hyperlinking requirements contained in USA000383, "PCASS Reports and Query Replacement Project Web Based Program Compliance Assurance and Status System (WebPCASS) Functional Requirements Document," Revision E, June 30, 2005, and USA000399 "WebPCASS Detailed Requirements and Design Document Specification," Revision D, July 31, 2005

Concur with Comments:

We have reviewed your request to provide additional comments with regard to hyperlinking Corrective Action Assistance Requests (CAARs) to allow for easy analysis and retrieval of related data and have reconsidered our response. When the revision to USA000383 was issued in June 2005, the revision was intended to describe the current capabilities of WebPCASS, not to establish a new hyperlink requirement. The KSC PRACA database design was unable to support the requirement as it was written. USA000383 was revised in October 2005, and the specific hyperlink requirements were removed. The current WebPCASS system does meet the hyperlink requirements as defined in USA000399.

In the course of investigating the PR to CAAR linking issue, we discovered that some of the PR's and CAARs were linked in the database; however, there were also some CAARs that were not linked even though they had the same root PR number. After reviewing with the

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system programmers in Information Management (IM), it appears that the structure of the PRACA database is not making the proper link in some situations. IM has agreed to correct the function of linking PR's to CAARs and ensure that when required, they are linked. This will correct a problem with linking individual PR's to CAARs and not multiple related nonconformances to a single CAAR.

In reviewing your comments with regard to the process escapes (PEs), we would like to describe how we track the PEs and the corrective actions. The requirement for identifying PEs started in 2000. At the time, the PRACA database was updated to add a block to the PR form to identify whether the PR was or was not a PE (Y/N). No additional linking, tracking, or reporting systems were built into PRACA. Since the SSP levied a requirement for identification and tracking of PEs on all elements, KSC, as did other elements, developed tools to meet the requirements. USA Ground Operations used their Quality Corrective Action Tracking System (QCATS) to fulfill these requirements. This system was used because the software structure was much more capable than the PRACA database software structure. QCATS is web based, ties into the NASA wide e-mail system and is available to both contractors and NASA. This system also allows the PR to be processed for the remedial action and the PE assessment to be done separately.

The QCATS system is the only database for KSC Ground Operations that has the accurate listing of PEs. To ensure the PR PEs are tied to the corrective action taken, the QCATS tracking number is entered into the Related Reports section for all PRs that have been confirmed to be PEs. The QCATS database contains all PE investigation data and the CAARs with the associated Corrective Action. All CAARs related to PR PEs are entered into the PRACA database to provide WebPCASS and program level visibility. The entry of the QCATS number to the PR is a manual process. In reviewing the list of PR's provided in the audit, there were 5 PR's that were confirmed as PE's, but did not have the QCATS number entered. These 5 items will be corrected in the PRACA database.

We acknowledge the software deficiency in the KSC PRACA and Kennedy CAAR systems that does not allow linking of multiple PR's to a single CAAR; however, with only 15 flights remaining in the SSP, we do not believe it would be cost or time effective to initiate a software upgrade to address this issue. If a software upgrade were done, populating the database with all past as well as future PRACA would require a detailed review of all previous PRACA. No pre-Challenger PRACA data is available electronically, making this review even more manpower intensive. Therefore, we believe the best solution is for WebPCASS to continue to provide hyperlinks to cross-referenced information where data relationships exist.

Corrective Actions:

1. For closure, your office will be provided documentation that the 5 PEs were corrected in the PRACA database by November 15, 2006.

Recommendation 4: The SSP Manager should coordinate with USA to ensure that the award fee includes a performance metric based on the accuracy of nonconformance reports.

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Concur with Comments:

It is not clear whether the metrics reviewed by the OIG for the period October 1997 to September 2004 comprise all of those used in helping to determine award fee. NASA employs several metrics sources to support award fee evaluation input. The metrics available to NASA are segregated into three primary categories: Statement of Work (SOW) metrics, non-SOW metrics located in the contractor-maintained Performance Measurement System, and other metrics largely developed and controlled at the operations division level. This approach provides a broader base on which contractor performance can be objectively assessed. Additionally, NASA and the contractor continually identify candidate metrics, especially at the operations division level, that provide accurate, timely, and informed insight into the contractor's processing activities.

The metrics that we referenced in our previous response are reviewed by NASA monthly and are also reviewed periodically with the SSP Quality Panel. Again, we consider these metrics acceptable indicators to measure accuracy and acceptability of data in the PRACA database. These SSP Quality Metrics and SSP Preventive/Corrective Action Reports are available electronically at: <http://usago1.ksc.nasa.gov/usago/orgs/QE001/Metrics>.

Your "Evaluation of Management's Comments" in the Final Audit Report state "...metrics should be included in the award fee determination and be included in the Award Fee Performance Assessment." As previously stated, NASA believes adequate metrics are presently in place to support award fee evaluation input. It appears that you are recommending that NASA institute a specific PRACA accuracy metric, in addition to the collection of metrics currently used. To institute such a metric would require a full NASA review and failure analysis of each PRACA line item, rather than sampling. We consider NASA oversight at this level to be inconsistent with our contractual arrangement, as well as resource prohibitive.

No one specific metric on the contract is quantitatively used to adjust award fee score. Metrics are only one surveillance indicator that NASA uses in evaluating the contractor's performance. Audits, inspections, quality of delivered products, schedule performance, and NASA first-hand observance of the contractor's execution of day-to-day tasks are all used collectively in evaluating the contractor's performance and subjectively recommending an award fee score to the Fee Determination Official.

Corrective Actions:

The SSP believes the necessary performance indicators are in place to assess the accuracy of nonconformance reports. However, as a result of your comments, the SSP will re-evaluate all metrics presently in place to assess the accuracy of nonconformance reports. Assessment results will be summarized and a determination will be made whether the existing metrics are adequate or additions/revisions are necessary to better assess accuracy of nonconformance reporting. Completion of this action is expected in February 2007, and a copy of the report will be provided to the OIG for closure of Recommendation 4 in March 2007.

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