

- a) List of assumptions and constraints,
- b) Adequate illustration of the current and future system,
- c) Detail on how the proposed system will impact all offices,
- d) Detail on links to other efforts,
- e) Methodology and evaluation criteria, and
- f) Major functional processes.

Management Comment(s)

Management concurred with the recommendation.

Recommendation 2

The CIO should:

- (a) Establish a formal quality assurance team as required by 801-2 and require the team work products be maintained in official project files.
- (b) Revise quality assurance requirements in 801-2 to include procedures for handling the comments process for IT proposals.

Management Comment(s)

Management concurred with the recommendation.

Project Risk Assessment Incorrect

HMS project risks were not correctly and adequately identified and assessed prior to approval of the HMS proposal. This occurred because the Proposal Development Team did not follow the guidance in the Supplement to NARA 801-2 for determining and assessing the project's risk. In addition, due to poor quality assurance oversight, the incorrect risk levels were not identified and corrected. By incorrectly identifying project risk, senior management may not have reviewed the categorized medium risk project proposal with the level of scrutiny actually warranted by a high risk project.

The Clinger-Cohen Act requires each agency to establish a process for assessing and managing the risks of its IT acquisitions, which includes identifying risks of investments. The Supplement to NARA 801-2, *System Engineering Capital Planning Investment Management Decide Process*, establishes this process and provides guidance to ensure that NARA thoroughly analyses an investment before significant amounts of resources are expended. Included in this supplement is guidance for assessing the project's overall risk level and criteria for ranking individual risk factors.

According to the Supplement to NARA 801-2, if any of the primary risk factors are ranked High, the overall ranking for the project is automatically considered High. In the HMS proposal, the project was given an overall risk level of Medium, even though one of the primary risk factors, Technical Deployment, was rated as High. In addition, two secondary risk factors, Cross-Functional Data and Development Effort, were given incorrect risk ratings. Both were ranked as Medium, but according to the risk criteria in the Supplement to NARA 801-2, both should have been ranked as High. Exhibit 1 was taken from the HMS proposal and shows the incorrect risk ratings.

Exhibit 1: Excerpt from HMS Risk Assessment

Cross-Functional Data	The level and type of data sharing between multiple systems.
Ranking	Ranking Conditions
<input type="checkbox"/> High	Data to be shared with other systems is not defined in the NARA data model.
<input checked="" type="checkbox"/> Medium	Data to be shared with other systems is already defined in the NARA data model.
<input type="checkbox"/> Low	Data will not be shared with other systems.

Development Effort	The anticipated length of time from initiation of the concept development foundational activity through completion of the deployment and acceptance foundational activity (as defined by NARA 805, Systems Development Life Cycle).
Ranking	Ranking Conditions
<input type="checkbox"/> High	Greater than 18 months.
<input checked="" type="checkbox"/> Medium	6 to 18 months.
<input type="checkbox"/> Low	Less than 6 months.

The development effort was ranked medium because HMS has a concept-to-deploy interval of greater than 18 months.

As shown in the table above, Cross-Functional Data should have been ranked as High, not Medium, because the data to be shared with other system was not defined in the NARA data model. Also, Development Effort should have been ranked as High because as clearly stated in the comment HMS has a concept-to-deployment interval of greater than 18 months.

We also reviewed the list of open risks for the project, which is maintained by HMS Project Manager. Each of these risks was rated on their probability and severity. Open items on this list included:

- (a) Lack of clarity of the ERA HMS interface;
- (b) Unknown requirement for interfaces to/from HMS and external applications;
- (c) Data cleanup and migration/integration may not be completed in a timely manner and will impact budget;
- (d) The budget amount to develop the entire HMS system may not be approved;
- (e) Implementation of bar-coding technology will impact budget and resources; and
- (f) Contractor delivered project schedule may not coincide with Product Owner expectations.

These risks were not included in the project proposal presented ITEC, even though most of these risks were identified *prior* to ITEC's approval of HMS. Although NARA 801-2 does not require these risks to be included in the project proposal, it does suggest that pertinent issues, such as risk factors, be included in the Other Issues section. In our opinion, significant risks, such as those listed in the HMS risk list, should have been included in the project proposal and presented to ITEC.

The Proposal Development Team did not follow NARA guidance in preparing the Project Risk Assessment. Also, the team did not provide any additional risk information in the proposal section labeled: Other Issues, as suggested by NARA guidance. Also, due to limited quality assurance procedures, the incorrect risk levels were not identified and corrected. Since a formal quality assurance team within NH has not been established only the -----redacted, b(6)----- conducts the quality assurance review for each proposal. When brought to the attention of -----redacted, b(6)-----, he agreed with the findings and acknowledged that the incorrect risk levels were an oversight during his quality assurance review and should have been corrected.

Consequently, decision makers were not provided with an accurate risk level for the HMS project. According to NARA guidance, the data contained in the Full Proposal should be presented in a level of detail commensurate with the investment's cost, impact, technical risk, and reach. Given the cost, impact, technical risk and reach of HMS, the project should have been rated as High risk and its project proposal should have included a high level of detail. By incorrectly identifying the project as medium risk, senior management may not have reviewed the project proposal with the level of scrutiny warranted by a high risk project. Also, by not fully identifying risks, management may have overlooked important risks that could have an adverse impact on the successful implementation of HMS.

Recommendation 3

The CIO should establish a formal protocol to accurately recognize project risk levels and all identified risks associated with project proposals.

Management Comment(s)

Management concurred with the finding and recommendation.

Analysis of Alternative, Requirements, Costs, and Benefits Was Not Sufficient

The alternatives, requirements, costs, and benefits were not sufficiently analyzed prior to approval of the project. This condition occurred because the Proposal Development Team did not complete all of the analysis requirements in NARA 801-2, which requires that proposals have their costs, benefits, and risk analyzed in-depth prior to funding projects. Without a complete and accurate analysis of the project, senior management

was hampered in their ability to make an informed decision to approve and fund the project.

Analysis of Alternatives

The analysis of alternatives was not adequately completed for HMS. The HMS Proposal did include an analysis of alternatives, with at least two feasible alternatives as required by NARA 801-2; however, the method for selecting the preferred alternative was not adequately described as required by NARA guidance. The selection of the preferred alternative appears to be only based on the cost/benefit analysis. This analysis did not describe the reason for selecting the preferred alternative, other than it was the most cost effective. It appears that no other evaluation criteria were taken into consideration. Also, two of three alternatives offered were discounted due to NARA's inability to manage large projects and contractors. These two alternatives were to integrate the HMS functional requirements within the Electronic Records Archives project and outsource to a provider.

Lastly, NARA officials did not adequately consider other Commercial-Off-The-Shelf (COTS) products for HMS. We found that an evaluation of available COTS products was performed for ARCIS, which appeared to be thorough and provided a justification for the selection of Siebel 7.8 Software. However, a similar analysis was not performed for HMS and we did not find any indication that other COTS alternatives were thoroughly considered. According to NH officials, the decision to use the Siebel platform for HMS was based on NARA's past experience with the product and since NARA was already using it, it would be a lower cost investment. An NH official stated that other products and options were not analyzed because that work was completed during the planning of ARCIS. However, the analysis of alternatives for ARCIS was completed in 2005, two years prior to the approval of HMS. Therefore, new, more technologically enhanced and robust products may have been available for the development of HMS, but were not considered.

Analysis of Requirements

We found that the requirements analysis was performed during the Business Process Re-engineering (BPR). However, the BPR did not address flexibility in some requirements that may be needed for NR and NL inventory and space management. Specifically, the HMS requirements analysis includes high level requirements that may not be mandatory for NR and NL when the system is implemented at field sites. In addition, we noted that HMS and ARCIS have similar requirements in the areas of inventory and space management. For example, three of the requirements for HMS (Stack Attribute, Shelving Scheme, Identify empty space/location) are included in the space management requirement for ARCIS. However, these similar requirements were not noted or identified in either project plan.

Cost/Benefit Analysis

NARA guidance requires a Cost/Benefit Analysis for the selected alternative, which includes an investment analysis, discussion of project costs, and sensitivity analysis. Each of these sections was included in the HMS Proposal; however, we noted omissions

and discrepancies in these sections. For example, we found that the cost of the project was understated. The initial capital investment includes only enough PDAs and computer monitors for the two research rooms at Archives I and Archives II. Additional equipment necessary for research rooms at other sites was not included in the investment analysis. We were informed that these research rooms have less volume and NW did not think these rooms would need the same type of equipment. Further, officials in NW were not certain what other equipment and hardware would be needed for HMS.

Also, a flawed return on investment (ROI) figure was presented to management officials. The ROI for HMS on Siebel was presented as 116.88%, but the ROI should have been 16.88%. An incorrect ROI was also used in the sensitivity analysis, which states that the ROI would be positive (86.39%) even if HMS costs were underestimated by 15% and HMS benefits were overestimated by 15%. However, the correct ROI for this scenario is -13.61%, which is not positive. Finally, the discussion of project costs did not include a statement indicating whether funding was available.

Analysis of Project Benefits

We found that the project benefits were identified in the HMS project proposal; however, we identified several problems in the analysis of HMS benefits. Specifically, we identified several issues with the calculation of the potential savings, such as:

- (a) The use of a small sample size and limited observations as a basis for the calculation of the potential savings for Archives I and Archives II.
- (b) The analysis of project benefits did not include all stakeholders. NL and NR were not included in the observations of project benefits.
- (c) An assumption that HMS would enable current users to increase productivity by 5% was used to calculate 62.4% of the potential savings associated with HMS. This statement is not supported by a sufficient and complete analysis.
- (d) The failure to provide sufficient support for 30.7% of the total savings associated with HMS.

In identifying potential costs savings, NHV and NW relied exclusively upon a limited analysis. NHV followed NARA technicians at Archives II, who pull records requested by researchers and re-file them after use, for only 2 four-hour periods (both in the morning). These limited observations were used to calculate the potential labor savings of about \$481,000 over a four year period for Archives I and Archives II. No other analysis was performed.

The Proposal Development Team also did not complete all of the analysis requirements in NARA 801-2. According to NH officials, management relied on the work performed under ARCIS to satisfy some of the required project analysis. However, independent analysis should have been conducted and included in the project proposal for HMS since it was considered a separate project. Also, the analysis did not represent the entire

project and include all stakeholders. Finally, the Cost/Benefit Template and sensitivity analysis included an incorrect formula for the calculation of return on investment. The formula used was total benefits divided by total costs. However, the more commonly used formula for ROI is equal to gain from investment minus cost of investment divided by the cost of the investment.

Consequently, decision makers were not provided with a complete analysis of alternatives, requirements, costs, and benefits. Without a complete and accurate analysis of the project, senior management was hampered in their ability to make an informed decision to approve and fund the project. In addition, incorrect analysis may have lead senior management to approve a project at risk for cost overruns, not meeting goals, and not being completed within schedule. By not adequately completing these analyses, management may not have approved the best project for their limited resources.

Recommendation 4

The CIO should:

- (a) Ensure that employees with responsibilities for conducting project analysis receive additional training for investment analysis regarding requirements, alternatives, and costs/benefits.
- (b) Establish validation measure to ensure the correct formula is used in future projects' Cost/Benefit Templates and sensitivity analysis.

Management Comment(s)

Management concurred with the finding and recommendation.

Approval of HMS Not in Accordance with NARA Guidance

The HMS summary proposal was not approved per NARA 801-2 prior to proceeding on to the full proposal stage. Subsequently, the project was ratified by ITEC without a formal vote, based upon reported assumptions and assurances that may not be realized. In our opinion, this condition existed because specific criteria in the project development stage was not adhered to and the ITEC member voting methodology was neither defined nor implemented to include the case of the HMS ratification process. The process to be used for evaluating and approving IT project proposals is defined in NARA 801-2. NARA Notice 2005-251, *Establishment of Information Technology Executive Committee*, also outlines NARA's approval process for IT investments. Without an adequate approval process, there is no guarantee that the HMS and similar IT projects were approved in the best interest of NARA. The effect is that finite NARA resources may be expended on a project that was not thoroughly analyzed and planned and that alternative solutions were not afforded proper consideration.

According to NARA 801-2, the starting point to the Decide phase is the preparation and consideration of summary proposals for IT projects. Summary proposals are examined to determine whether projects meet minimal requirements. According to the NARA 801-2 supplement, part of the screening process should include preparing a summary proposal and deciding on whether to develop a full proposal. Proposals that pass this screening process have their costs, benefits, and risks analyzed in-depth and documented in the Full Proposal. With the information documented in the Full Proposal, the senior management decision-making body, ITEC, makes decisions about which projects to select for funding.

The decision process used to approve the HMS project was not in accordance with NARA guidance and best business practices. Specifically,

- (a) The HMS Summary Proposal was not officially approved by the Archivist and CIO before development of the full Project Proposal, as required by the Supplement to NARA 801-2.
- (b) ITEC approved the Full Project Proposal despite disagreement among various stakeholders.
- (c) The Project Proposal was approved by ITEC without an official vote or signature page.

In 2005, a Summary Proposal was prepared for HMS; however, the proposal was not reviewed or officially approved by ITEC. Similarly, the summary proposal for the Business Process Re-engineering (BPR) effort in support of the HMS project was not reviewed or official approved by ITEC. Although not required by NARA guidance, we believe that the BPR proposal should have been presented to or reviewed by ITEC members.

From our interviews with members of ITEC and officials of NR and NL, we found that the Full Project Proposal was approved despite disagreement and misunderstanding among stakeholders. Two organizations, NR and NL, expressed disagreement with HMS and may not adopt the system within their organization. For example, representatives of NL stated that they support the preservation and security aspects of HMS; however, they will not make the determination to use HMS until they can review the prototype. After they review the prototype, they will determine whether the system fits NL's requirements for permanent hardcopy documents. Finally, neither a voting process nor a signature page was used to approve the HMS project.

Management has not put in place an adequate process for approving IT projects. NH officials stated that when a project proposal is presented, if no major objections, it is considered approved by ITEC and ready for the Archivist's formal approval. Also, the HMS project proposal was approved two days after first presented to ITEC, which did not provide ITEC members sufficient time to provide feedback. Finally, a formal voting process is not detailed in the ITEC charter included in NARA Notice 2005-251. The

ITEC Charter designates voting and non-voting members; however, voting procedures are not included in the charter and actual voting has not occurred to date.

If a formal approval process is not established and documented, there is no guarantee that the project was approved in the best interest of NARA and its limited resources. Further, given the information in the project proposal and the time constraints, ITEC was not in a position to adequately discharge their duties and responsibilities. The lack of a vote further negates the value of the committee.

Recommendation 5

The Archivist should ensure that:

- (a) The ITEC decisions and approval process are documented via a formal voting process.
- (b) The CIO or designee provides ITEC members with project proposals, which include all required elements, and develop timeframes for proposals to be submitted, reviewed, and approved.

Management Comment(s)

Management concurred with the recommendation.

Enterprise Architecture

While the development of HMS fits into NARA's enterprise architecture, NR's use of ARCIS for inventory and space management of hardcopy permanent documents would not be in line with NARA's enterprise architecture and would duplicate some HMS functions. This condition exists because those responsible for crafting the HMS project proposal may not have considered all requirements necessary to meet the needs of NARA organizations. GAO suggests that agencies have an established information technology architecture which systems and projects are expected to follow. Likewise, OMB requires agencies to avoid duplication with inter-agency investments. If HMS and ARCIS are developed to meet similar requirements, they will be duplicative systems, which will lead to extra and unnecessary development costs for both systems.

During the approval process, the Architecture Review Board (ARB) determined that HMS was appropriate for NARA's enterprise architecture; however, NR's intended use of ARCIS for inventory and space management is not in line with NARA's enterprise architecture. When we met with the CIO, she explained that ARCIS would handle the inventory and space management of Non-Electronic and Electronic Temporary records, whereas HMS would handle the inventory, space, preservation, and circulation management of Non-Electronic Archival Records. However, from our meetings with NR, we learned that they intend to use the ARCIS space and inventory modules for

permanent, temporary and accessioned records. In our opinion, the use of ARCIS for these functions would be duplicative of HMS.

OMB Memorandum M-05-23, *Improving Information Technology (IT) Project Planning and Execution*, requires agencies to avoid duplication by leveraging inter-agency investments to support common missions or other common requirements. The GAO guide, *Assessing Risks and Returns: A Guide for Evaluating Federal Agencies' IT Investment Decision-making*, suggests that agencies have an established information technology architecture that systems and projects are expected to follow. The NARA Enterprise Architecture Information Systems Definitions provides the high-level of the information systems that NARA requires to support the business processes that are currently defined in the Business Architecture. It provides a baseline information system concept against which NARA can align, track, and manage its IT systems.

From our interviews with officials from NL and NR, we learned that those responsible for crafting the HMS project proposal may not have considered all of the requirements necessary to meet the needs of NL and NR. Further, there appears to be a lack of communication between the organizations developing of these two systems. Also, we noted that an executive official has not mandated the use of HMS for inventory and space management of permanent documents.

If HMS and ARCIS are developed to meet similar requirements, they will be duplicative systems. This will led to extra and unnecessary development costs for both systems. In addition, duplicate systems could cause confusion for the users of each system. Finally, unless reliable interfaces are established between the two systems, the agency will not be able to track preservation needs across the agency.

Recommendation 6

The Archivist should direct the CIO to clearly delineate which functions will be managed by HMS and ARCIS.

Management Comment(s)

Management concurred with the finding and recommendation.



National Archives and Records Administration

8601 Adelphi Road
College Park, Maryland 20740-6001

Date: March 6, 2008
To: OIG
From: NPOL
Subject: Comments on OIG Draft Report 08-04, Audit of NARA's Development of HMS

Thank you for the opportunity to comment on this draft report. We also appreciate the time spent by the auditor to work with us regarding concerns in the original version of this draft report. NPOL is sending this memo on behalf of all the affected offices: NH, NL, NR, and NW. We have two remaining comments on the draft report.

First, on page 6 of the draft report, it is unclear to NW staff which comments are left unresolved. We ask that the final version of this report be more specific and assess whether these open items would have a major impact on the functionality and cost of the proposed system.

Second, page 13 of the draft report, states that the HMS Summary Proposal was not reviewed or officially approved by ITEC in 2005. While we note that the OIG is of the opinion that the summary product plan for HMS should have been reviewed by the ITEC, the CPIC policy was followed as written and NH did not violate this or any other policy. Further, NH and NW briefed various NARA management groups about HMS on a number of occasions. For example, the CIO briefed NR on January 11, 2007, NW on January 19, 2007, and the Lifecycle Guidance Team on January 31, 2007, which included ND, NL, and other NARA office heads.

We concur with all recommendations in the draft report and will proceed with an action plan to address them.

Susan M. Ashtianie
Director
Policy and Planning Staff