POLICY INFORMATION
(iNFORMATION)

December 10, 2001 SECY-01-0220

FOR: The Commissioners

FROM: William D. Travers /RA/
Executive Director for Operations

SUBJECT: AGENCYWIDE DOCUMENTS ACCESS AND MANAGEMENT SYSTEM (ADAMS)

PURPOSE:

In response to Commission direction in Staff Requirements Memorandum (SRM) M00120, dated February 11, 2000, this paper provides the Commission with a lessons learned report on the Agencywide Documents Access and Management System (ADAMS) implementation experience. It also provides input to staff activities that are currently underway to institutionalize solutions to lessons learned identified by Information Technology (IT) Capital Planning and Investment Control (CPIC) projects. In addition, this paper informs the Commission of (1) the current status of ADAMS and (2) the staff's future plans to improve and advance the use of ADAMS by completing the activities identified in the "ADAMS Assessment Action Plan," Revision 2, dated August 2001.

DISCUSSION:

ADAMS today is operating effectively and being used by both the public and the staff, although not to its full potential. With the exception of a full-text search on the Main Library, which is disabled, the software operates in a reliable and consistent manner. This includes the electronic recordkeeping module. The system demonstrates consistently good availability and satisfactory response time. Substantial progress is evident in executing tasks of the ADAMS Assessment Action Plan.

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This Commission paper provides background on the initial production system and discusses reviews of ADAMS that have been performed in order to develop the best understanding of lessons learned and how to move forward and improve the system. It also discusses those factors that were direct causes of the problems experienced, lessons learned, as well as the followup actions being taken to integrate those lessons learned into current and planned activities. It also provides a profile of the current system and identifies key planned tasks to further advance the use of ADAMS. Finally, it discusses how the lessons learned from the agency's IT projects, including ADAMS, will be addressed to improve the NRC's IT CPIC process and guidance.

Initial Production System

The operational characteristics of ADAMS today are very different than the initial production version deployed in late 1999 and early 2000. The operational characteristics of the initial production version are highlighted below. The current operational characteristics of ADAMS are discussed later in this paper. In the initial production version of ADAMS:

- Document management capability was operational, but it was difficult to use because some of the custom code did not operate reliably.

- The full-text search capability in the Main Library, although initially operational, was disabled because of a bug in the vendor's (FileNET's) commercial off-the-shelf software (COTS). It remained operational in the ADAMS Public Library.

- The software module to file, dispose of, and retire records electronically was not deployed because of problems identified during acceptance testing.

- The legacy library containing citations of historical documents stored on microfiche was not deployed because of performance issues.

- The workflow capability did not meet all of the NRC's functional requirements and was subsequently placed on hold. Its implementation was abandoned. (At this time, there are no current plans to assess alternative means of supporting workflow requirements.)

- The system performance was extremely slow.

- Public access was cumbersome.

The initial implementation of ADAMS was difficult to manage, resulted in poor data quality, required process reengineering in some offices, and was a disappointment after early high expectations.

Nonetheless, the initial production system did achieve some goals:

- OCIO successfully reengineered its Document Processing Center operation to fully process (scan, OCR, index, and electronically distribute) incoming documents, producing a high-quality product within 8 – 10 hours of document receipt, and regional offices reengineered their operations to electronically capture incoming documents to the regions.

- The staff were able to access the images of an expanded collection of documents at their desktops, rather than having to find them in paper files or microfiche cabinets or request them from other offices or regions.

- The NRC made its documents publicly available in days rather than weeks.

- The public avoided costs of about $215,000 a year from the Public Document Room (PDR) reproduction contractor by being able to download and print documents locally, free of charge.

- The OCIO established an ADAMS Customer Support Center, staffed by former PDR reference librarians and records managers, to provide dedicated assistance to NRC staff in the use of the system. Assistance extended beyond typical help desk support, including application of ADAMS policies and procedures, customized training sessions, and limited onsite assistance in how to use ADAMS effectively in performing specific agency work functions.

- The OCIO established a pilot capability for electronic submission in which several 10 CFR Part 50 licensees could submit documents in a secure manner using electronic signatures via the Internet to a dedicated Web server for entry into ADAMS.

ADAMS Reviews

The OCIO, the IG, and consultants have performed a number of reviews in order to develop the best understanding of lessons learned and how to move forward and improve the system. All of the reports cited below are available on the NRC's internal Web site (by selecting OCIO, then ADAMS).

In May 2000, Chairman Meserve ordered a two-phased assessment of issues that affected the efficiency and effectiveness of ADAMS. In Phase 1, the Chairman directed each office to identify the most important ADAMS problems that it believed needed to be addressed. In Phase 2, the Chairman directed the Chief Information Officer (CIO) to cluster the comments into challenge areas and develop an action plan to address each area.

To assist in the process, the CIO formed an ADAMS Steering Group of senior agency executives, including the Secretary of the Commission; CIO; ADAMS Program Manager; Deputy Office Directors of RES, NRR, and NMSS; a Deputy Regional Administrator; the Deputy General Counsel; and the Assistant for Operations (EDO). The Steering Group focused on the nature and significance of the problems identified by the offices, the timing and actions required to address the most important problems, and the implications of alternative actions. The Steering Group also reassessed the vision for ADAMS, developed a consensus

regarding its future direction, and advised the OCIO in the refinement of an ADAMS Assessment Action Plan. That plan lays out the necessary action steps to bring about needed improvements and better achieve the desired system. The ADAMS Steering Group has continued to meet on a monthly basis to provide consensus advice and directional guidance, with special attention to business process, change management, and communication issues. (We will periodically evaluate whether the ADAMS Steering Group is needed, including whether some or all of its functions should be assimilated into another interoffice body.)

In September 2000, OCIO contracted with the Federal Systems Integration and Management Center (FEDSIM) to perform an independent analysis of lessons learned. FEDSIM reviewed ADAMS-related documentation, conducted interviews of the ADAMS Steering Group, some ADAMS Partners, and OCIO staff involved in the project, and analyzed the results of the project and both direct (immediate) and root causes of project shortfalls. In March 2001, the OCIO prepared a CPIC lessons learned from the perspective of the system sponsor to address the requirement of Management Directive 2.2. The FEDSIM and CPIC reports form the basis for the discussion of causes and lessons learned found later in this Commission paper.

In April 2001, the Harvard Computing Group (HCG) completed an independent assessment of ADAMS. The purpose of that assessment was to determine whether the NRC is on an appropriate pathway to establish an electronic document management system to meet the agency's long-term needs. The Gartner Group conducted an independent validation and verification analysis of HCG's assessment. The reports were provided to the Commission in April and May, 2001. The reports noted that programmatic issues identified during the ADAMS Assessment will impact the successful deployment of the agency's document management system, regardless of the COTS product or category of product utilized.

With regard to technology issues, HCG and the Gartner Group reached the following conclusions:

- FileNET and Provenance, the vendors of the COTS packages being used for ADAMS, remain in place as the technical foundation for the long-term evolution of the system. (HCG and Gartner)

- ADAMS should evolve as quickly as possible toward increased COTS functionality, reducing its reliance on custom code. (HCG and Gartner)

- ADAMS should evolve as quickly as possible to ADAMS 5.0, intended to use new COTS and Web-enabling features developed by the vendor, in order to engage and satisfy the needs of the user community. (HCG recommended that the NRC should use a portal strategy; Gartner believed that the benefits of portal products for the NRC are overstated and advised evaluating the FileNET Web product as well.)

- The NRC should migrate to Microsoft Word, Excel, and PowerPoint, in order to reduce existing usage and integration inefficiencies. (HCG only)

The staff concluded that the ADAMS Assessment Action Plan would accommodate all independent assessment recommendations, with the exception of the analysis regarding the migration to the Microsoft Office suite.

In June 2001, the NRC became aware that about 700 documents designated as sensitive and/or non-publicly-available had been incorrectly placed in the ADAMS Publicly Available Records System (PARS). In September 2001, the IG issued an audit report on this subject. That same month, an EDO-established task force issued a report that examined the public release process, identified the root causes for the inadvertent release of documents, and recommended appropriate corrective actions. Causes identified in the task force report included software shortfalls, human error in performing system functions, incorrect profiling, and inadequate policy and procedures. Most of the documents were released in error by a single action. The report concluded that the risk of inadvertently releasing properly profiled documents to the public is now low because of the installation of a software script that runs continuously on PARS and immediately shuts down the system if non-public or sensitive documents are detected, as well as other immediate corrective actions taken by OCIO. Follow-up actions to the recommendations from the IG report and the task force report are scheduled to further mitigate the risk of inappropriate release of NRC documents to the public. Among those actions are the review and, as appropriate, update of agency guidance that addresses classifying documents for official record status, sensitivity, and public availability, as well as additional training for staff who make decisions on whether a document should be made publicly available.

Immediate Causes of ADAMS Software and Implementation Problems, Lessons Learned, and Followup Actions

This section discusses the factors that make up a consensus view of the direct causes of the problems that the NRC experienced with the initial production system. In each case, the discussion includes lessons learned, as well as the actions being taken to integrate those lessons learned into current and planned activities.

(1) *Application of sound systems development methodology to achieve good technical quality (delivering an acceptable end product to the user community)*

The short falls of the initial ADAMS system were a result of several factors, including the following examples (among others):

- Commitment to an overly aggressive schedule (2 years, rather than the originally planned 3 years) required a change in the development approach and did not permit thorough stakeholder involvement, iterative prototyping, testing, and deliberate agencywide change management.

- Delivery of poor-quality custom code, combined with a lack of viable contingency plans to replace non-Y2K-compliant systems and the compressed schedule, resulted in the deployment of a problematic production system.

- Limitations of the COTS software to support stakeholder requirements coupled with the lack of business process redesign (BPR) led to substantial customization of the COTS product and unmet expectations.

- Insufficient (1) time, (2) skilled OCIO staff, and (3) experience in managing an undertaking of the magnitude of ADAMS impeded the project team's ability to adequately control and manage the development and implementation of the system.

Lessons learned include the following observations:

- Follow a modular development approach in which discrete stand-alone components are developed and deployed serially rather than in parallel.

- While COTS products are the preferred route for providing IT solutions for the agency, the project sponsor should perform a careful cost-benefit analysis of alternatives, which may include further customization of COTS software to meet unique agency requirements, changing or standardizing NRC business processes in lieu of customizing software, or remaining with existing business processes and developing all custom code. The management decision should carefully consider such factors as organizational threshold for change; the risk, development, and ownership costs of customization or developing a product from the bottom up; and the resource investment needed to perform process modeling, redesign, and standardization.

- Ensure that the project plan includes adequate time, resources, and FTE; if not, readdress the scope of the project and the expected return on investment.

The lessons learned are being integrated into current and planned activities through the following:

- The schedule of planned activities under the ADAMS Assessment Action Plan is adjusted when needed to ensure the quality and acceptance of work products.

- New software is not deployed until it passes rigorous acceptance tests.

- A cost-benefit-risk analysis will be performed for all requested changes that involve custom code. The outcome of such analyses will be provided to senior-level management to make an informed decision on how to proceed.

- Future major enhancements to ADAMS will come through incrementally planned releases endorsed by the ADAMS Steering Group and approved by the CIO and, as appropriate, the EDO.

(2) *Alignment and integration of ADAMS with the NRC's business from a top-down perspective*

OCIO assumed responsibility for too many roles in the ADAMS project (project sponsor, business sponsor, technical project manager, business expert) with insufficient participation at the appropriate level from other NRC organizations and insufficient alignment with the NRC's business. In its report, FEDSIM concluded that OCIO was the wrong sponsor for ADAMS, since it does not own either the documents or their contents (the offices do), and making OCIO the sponsor made ADAMS a "techie" project, not "ours."

Lesson learned include the following observations:

- Obtain consensus top-down direction through an intra-agency steering group of senior executives for IT projects that affect many NRC offices.

- Ensure that senior-level management pay careful attention to the assignment and execution of roles (particularly project sponsorship) specified under the Systems Development Life Cycle Management (SDLCM) Methodology.

These lessons learned are being integrated into current and planned activities through the following:

- An ADAMS Steering Group of senior agency executives is actively involved on an ongoing basis to provide consensus direction and programmatic alignment.

- A corresponding ADAMS Working Group of middle agency managers also provides perspective, develops options, critiques products, and provides feedback.

(3) *Attention to business processes and process reengineering at the proper early stage of the project*

Although the ADAMS Project Team dedicated considerable attention to resolving policy-related issues through office directors and the Executive Council, there was inadequate attention to business process modeling and redesign. This occurred because the project schedule did not allow sufficient time to perform this activity in a comprehensive manner, and OCIO did not appreciate the variability in the manner in which units within and across offices carried out their document management processes. This lack of standardization particularly impacted the implementation of ADAMS and continues to pose operational challenges today.

The lessons learned are embodied in the following observations:

- Ensure that project sponsors pay adequate attention and commit appropriate resources to process modeling, reengineering, and process standardization at the proper, early stage in an IT project.

- The need to change, or at the very least, bend existing processes may be one significant consequence of using a COTS product. The adoption of COTS products provides opportunities to design more effective processes, and to use best practices embodied in the product, but also requires an investment of staff and contractor resources to do so. A detailed analysis should inform management of what approach is most cost-effective and risk adverse for the project. As previously indicated, the alternatives analysis should evaluate the spectrum of options, ranging from all custom code to no customization, which would likely require modifying existing processes.

These lessons learned are being partially integrated into current and planned activities through the following:

- The agency adopted a standardized approach for entering NRC-generated documents into ADAMS for further processing by the Document Processing Center that reflected the input of the ADAMS Steering and Working Groups, and was refined through an extended pilot.

- The agency will review and standardize the processes for the internal electronic distribution of NRC-generated documents and any future newly adopted process changes.

(4) *Mutual communication between sponsor and stakeholders*

The ADAMS project team engaged in a concerted outreach effort to communicate through management briefings, the ADAMS Partners, all-hands meetings and demonstrations, and official written correspondence. However, several respondents to the FEDSIM study cited poor communication from OCIO regarding ADAMS and the failure to seek buy-in from senior management in other offices through the NRC's review and concurrence process. The effectiveness of communication between the offices and OCIO depended on whether the office ADAMS Partner was active or passive, and whether office management viewed ADAMS as a project in which the office should be actively engaged. Some of the Partners were very active and their office management was engaged. Where office participation was lacking, efforts to gain senior management attention by OCIO were often not effective.

Lessons learned include the following observations:

- Assign an individual who has both the skills and can dedicate the appropriate amount of time to project communication.

- Ensure that office management pays active attention to IT projects, understanding that office participation is critical to project success, and that some issues cannot be handed off to the office "technical expert."

The lessons learned are being partially integrated into current and planned activities through the following:

- The ADAMS Steering Group and Working Group are providing an effective forum for collaborating with the principal NRC offices.

- As an input to refining its communication plan, OCIO is working with NRC offices and regions to assess the effectiveness of existing communication mechanisms and recommend more effective approaches and techniques to achieve two-way communication.

(5) *Attention to the need to manage change*

There was insufficient focus by the ADAMS Project Team on change management during ADAMS development and implementation because of project resource constraints, a lack of experience with change management techniques, and an insufficient understanding of the impacts that ADAMS would have on the way that the NRC staff processed and used documents in their work environments.

Lessons learned include the following observations:

- For projects that involve significant change, acquire necessary resources (with requisite expertise), and develop a change management plan as an integral part of project planning.

- Ensure that senior-level management is aware of and involved in addressing change management issues and that offices understand and better plan for the impact of the change.

These lessons learned are being partially integrated into current and planned activities through the following:

- OCIO is working closely with the ADAMS Steering Group in implementing elements of the ADAMS Assessment Action Plan.

- Pilots are being used where operational experience and feedback from staff can refine new processes before large-scale deployment.

- As changes occur, OCIO is reviewing their impact through discussions with offices and regions.

Current Status of the System

A profile of the current system is attached. As a result of the advice of the ADAMS Steering Group and the ADAMS Working Group, and the efforts of staff in both OCIO and the offices, significant improvements have been made to ADAMS:

- Custom code software problems identified during early production use have been fixed with the deployment of ADAMS 3.3, and high-priority system enhancements have been implemented.

- Full-text search capability in the Main Library remains disabled because there is a bug in the vendor's COTS product that cannot be resolved until OCIO upgrades to a more recent version of FileNET's software.

- Staff burden has been reduced with regard to adding NRC documents by reassigning responsibility for minimal profiles to secretarial staff and transferring much of the work to HQ and regional contractors.

- Roles and responsibilities of NRC staff, managers, and OCIO have been clarified, with step-by-step procedures and training provided to regional and HQ document submitters.

- Data quality for record additions is excellent because contractors perform independent quality control (QC) of scanning and profiling of all documents added to the system. Data quality for prior documents has improved as a result of a QC program in which OCIO has already made more than 35,000 corrections to the database.

- The legacy library has not been deployed because of performance problems with the COTS product and some data migration issues; in the meantime, the public and staff legacy databases containing citations to older NRC documents continue to be available for searching.

- The database of current documents is sufficiently populated (127,000 documents issued over the past 2 years) so that the staff can find many records needed to do their jobs. (As the database continues to grow, and full-text search is enabled, the staff will experience increased efficiency in accessing documents needed to perform their daily work.)

- Response time has significantly improved since database consolidation in February 2001, and is consistent and adequate regardless of the time of day or number of users.

- System availability is consistently good for the Main Library used by the staff and adequate for the Public Library as a result of increased operational experience and the development of operational procedures.

- An operational infrastructure, including hardware, software, and procedures, is in place for electronic submission, positioning the NRC to respond to provisions of the Government Paperwork Elimination Act. Electronic submissions will also reduce cost, as it costs about $10 less to process a document received in electronic form compared to a paper-based document.

- An electronic records management module is operational, and in use by OCIO, who is filing documents electronically for NRC offices and regions.

In combination, the first two items alone address approximately 50% of the comments provided by offices in their ADAMS assessment responses.

Future Plans

In FY 2002 and early FY 2003, the staff will focus on tasks in the ADAMS Assessment Action Plan to further the acceptance and use of ADAMS by NRC and public users and its supportability by OCIO and software product vendors. Technical work will be guided by recommendations made by HCG and the Gartner Group. The ADAMS Steering Group will continue to play a key role in providing a consensus senior management perspective and advice with regard to these tasks, and will assist in addressing issues related to ADAMS acceptance, communication, and change management.

Key additional tasks include the following activities:

- Improve the ease of public access and use of ADAMS by providing the public with an alternative user interface that does not require the use of Citrix (Public Interface Prototype).

- Improve users' ability to retrieve information from ADAMS through further cleanup of profile data.

- Make the staff more proficient in using ADAMS capabilities in their jobs by implementing role-based and job-specific training.

- Resolve performance and data migration issues so that the public and staff have access to ADAMS legacy libraries that contain citations to older NRC documents.

- Pilot, refine, and implement an approach to standardize the processes for the internal electronic distribution of NRC-generated documents.

- Improve ADAMS supportability by migrating to a supported release of the FileNET software product. This will allow OCIO to re-enable the full-text search feature on the ADAMS Main Library.

- Perform the analysis to move ADAMS to a Web environment and make further improvements in public and staff access drawing on the Public Interface Prototype.

- Expand electronic submission of documents by issuing a rule that allows for voluntary electronic submission and promoting the program among vendors, licensees, and other stakeholders.

CONCLUSION:

Many aspects of the NRC's experience in implementing ADAMS are typical of large system implementations at and outside the NRC. Nevertheless, the ADAMS lessons learned has highlighted the need to:

- Further clarify current guidance on the roles and responsibilities of the OCIO and the sponsor organization in the project planning, development, and execution phases.

- Strengthen guidance regarding the need to address process modeling, reengineering, and process standardization at the proper, early stage in an IT project.

- Improve performance in the project development phase of information technology investments at NRC.

- Incorporate guidance that addresses the need for a comprehensive and systematic approach to change management.

The Office of the CIO, in coordination with stakeholders, has begun to review potential improvements, including those outlined above, to the IT CPIC process. The review takes into account the lessons learned of ADAMS and other IT projects executed by the agency. Institutionalized solutions to the lessons learned identified during these projects will be reflected

in a revised CPIC process and Management Directive 2.2 (CPIC), scheduled for issuance in May 2002. In addition, the OCIO has initiated a review of industry best practice methods (such as the capability maturity model for software) for possible adoption by the agency.

COORDINATION:

OGC has also reviewed this paper and has no legal objection.

/RA/

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Attachment: Profile of ADAMS for the 6-month
Period from April through
September 2001

Attachment

Profile of ADAMS for the 6-month Period from April through September, 2001	
Usage Aspect	**Description**
Number of Internal Users	Averages 392 concurrent internal users per day
Number of External Users	Averages 23 concurrent external users per day
Document Processing Volume	Added approximately: 1,600 new accession numbers per week (approximately 1,065 documents per week)[1]
Size of Collection	Contains about 190,000 accession numbers as of Oct. 1, 2001 (approximately 127,000 documents)
System Availability — Main Library for Internal Staff	99.16 % Available
System Availability — Public Library for External Users	95.56 % Available[2]
Response Time	Opening the ADAMS Document Manager - 8 seconds Adding a document to the main library - 50 seconds[3] Displaying the document profile - 11 seconds Viewing a document - 14 seconds Searching for documents using simple find - 10 seconds
ADAMS Support Center Requests for Assistance	
Telephone Requests	2811
E-Mail Requests	1554
Walk-In Requests	120
Site Visits at Staff Workstation	65
Total Requests	4550
Public Document Room (PDR) Assistance to Public	
Search/Reference Assistance Requests	1208
ADAMS Printout Assistance Requests	219
ADAMS Instruction/Training Requests	186
Total	1613

[1] Accession number total includes the accession number assigned to individual documents as well as to packages and documents received via the electronic information exchange initiative.

[2] This percentage reflects instances when ADAMS was unavailable because of the scan that automatically shut down the system if certain conditions were detected to prevent an unintended document release. None of the instances of shutdown involved the release of a document that should not have been made publicly available.

[3] This does not include the time it takes to profile a document. This is the ADAMS system response time to select the library and folder and then display the profile screen so that data entry can begin.