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Audit Report Number 2011-DP-0002

TO: Jerry E. Williams, Chief Information Officer, Q
Jemine A. Bryon, Chief Procurement Officer, N

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FROM: Hanh Do, Director, Information Systems Audit Division, GAA

SUBJECT: Better Planning for the Unisys Rehost Project Was Needed

HIGHLIGHTS

What We Audited and Why

We audited the U.S. Department of Housing and Urban Development's (HUD) efforts to rehost important financial applications from the Unisys mainframe computing platform to the UNIX open system platform. This audit was initiated based upon work performed during our fiscal year 2009 review of information system security controls in support of the annual financial statement audit. During that audit, we identified weaknesses in the planning and execution of the rehost project.

What We Found

Although HUD had processes and procedures in place for managing and monitoring information technology system development projects, improvements were needed. Specifically, better upfront planning was needed for the Unisys rehost project.

What We Recommend

We recommend that the Office of the Chief Information Officer ensure that HUD's system development methodology is used in all information technology development projects.

We recommend that the Office of the Chief Procurement Officer verify contractor capabilities prior to the initiation of information technology development projects.

For each recommendation without a management decision, please respond and provide status reports in accordance with HUD Handbook 2000.06, REV-3. Please furnish us copies of any correspondence or directives issued because of the audit.

Auditee's Response

The complete text of the auditee's response, along with our evaluation of that response, can be found in appendix A of this report.

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BACKGROUND AND OBJECTIVE

The U.S. Department of Housing and Urban Development (HUD) relies extensively on information technology to carry out its mission and provide services to the American public. Given the prevalence of cyber threats today, HUD must manage its information technology assets with due diligence and take the necessary steps to safeguard them while complying with Federal mandates and the dictates of good stewardship.

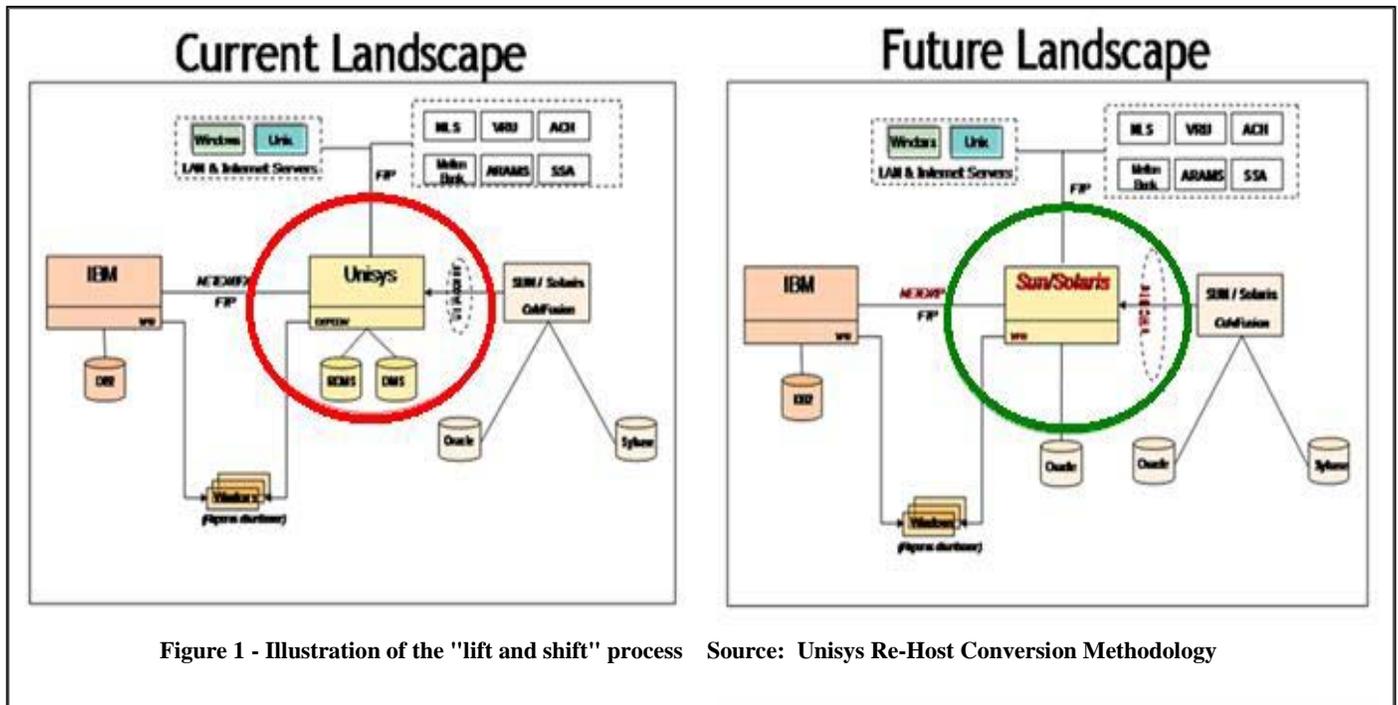
According to the “Unisys Re-host Migration Technical Proposal,” HUD is pursuing the modernization of its legacy¹ application systems that operate on mainframe platforms. Unisys and IBM mainframes continue to operate HUD’s mission-critical application systems. There have been various individual plans underway to modernize or otherwise replace HUD’s mainframe-based application systems to make HUD more agile and avoid increasing costs associated with the mainframe infrastructure and legacy application system maintenance expenses. However, various factors including lack of application system modernization funding and lack of an agency portfolio-wide approach to disposing of legacy application systems necessitated relicensing and operating the Unisys and IBM mainframe platforms. These platforms are currently hosting many of HUD’s critical business and financial application systems.

To reduce HUD’s dependency on costly proprietary mainframe platforms, the Office of the Chief Information Officer’s (OCIO) plan and vision were to rehost the Unisys mainframe application systems to a UNIX open system² platform. The application system rehost project, sometimes referred to as a “lift and shift,” was to be accomplished by retaining the same programming language while migrating the applications onto a different hardware platform.

According to the Unisys Re-Host Conversion Methodology, as little as possible should be changed during the migration process. For instance, screens are not redesigned, and program business logic remains the same (the syntax may change, but the logic is the same). Figure 1 demonstrates the process of lifting applications from the Unisys platform and shifting them to the Sun Solaris (UNIX) platform. Moving the applications from Unisys to Sun Solaris should have very little impact on the rest of the applications.

¹ A legacy system is an old method, technology, computer system, or application program that continues to be used, typically because it still functions for the users’ needs, even though newer technology or more efficient methods of performing a task are now available.

² Open system (computing), one of a class of computers and associated software that provides some combination of interoperability, portability and open software standards, particularly Unix and Unix-like systems.



One of HUD’s information technology (IT) support contractors confirmed that it was feasible to rehost the financial applications from the Unisys platform onto a UNIX open system platform and recommended that this rehost effort be performed as an add-on task to the existing HUD information technology support (HITS) contract³. The estimated value of this add-on task was \$17 million. For this expenditure, the IT support contractor estimated that HUD could save \$10 million per year in costs associated with continuing to use the legacy Unisys mainframe.

During our FY 2009 review of information system security controls in support of the annual financial statement audit⁴, we identified weaknesses in the planning of the Unisys rehost project. The rehost project was planned to begin on June 2, 2008, with a completion date of October 19, 2009. However, due to a series of missed milestones and deliverables and other difficulties encountered, HUD issued a stop work order to the contractor for the Unisys rehost project on July 8, 2009. On October 9, 2009, a contract modification was issued to terminate the Unisys rehost project for default.

Our overall objective was to assess HUD’s efforts on the Unisys rehost project. The criteria that we used during our audit included the Federal Acquisition Regulation (Title 48 of the United States Code of Federal Regulations) (FAR), National Institute of Standards and Technology (NIST) publications, and HUD’s own system development and information security policies and procedures.

³ Awarded on January 21, 2005, the HITS contract was designed to provide HUD with necessary personnel, materials, equipment, infrastructure software, telecommunications, facilities, and services required to deliver core IT infrastructure functions, including a data center, national Help Desk, disaster recovery, a network operating center and direct IT services for HUD Headquarters and field offices.

⁴ OIG audit report number 2010-DP-0002, “Audit Report on the Fiscal Year 2009 Review of Information Systems Controls in Support of the Financial Statements Audit,” dated May 14, 2010.

RESULTS OF AUDIT

Finding 1: The Unisys Rehost Project Was Not Effectively Planned

HUD did not ensure that the project to rehost financial application systems from the Unisys mainframe computing platform to the UNIX open system platform was effectively planned. This weakness occurred because HUD did not use its system development methodology as a guide in planning the work and verify that its IT support contractor could effectively perform the Unisys rehost project. If better planning had been performed prior to the initiation of the Unisys rehost project, the time and resources expended on the project could have been avoided.

The Unisys rehost project aimed to rehost Unisys mainframe financial and Housing application systems to a UNIX open system platform. The application system rehost project, sometimes referred to as a “lift and shift,” was to be accomplished by retaining the same programming language while migrating the applications onto a different hardware platform. According to the Unisys Re-Host Conversion Methodology, as little as possible should be changed during the migration process. For instance, screens are not redesigned and program business logic remains the same (the syntax may change, but the logic is the same). The financial application systems scheduled to be rehosted from the Unisys mainframe computing platform to the UNIX open system platform were the following:

System code	Application name	Description
A51	Federal Assistance Award Data (FAADS)	FAADS gathers information for HUD’s grants or project awards and provides this information to the Bureau of Census quarterly.
A67	Line of Credit Control System (LOCCS)	LOCCS supports the Office of the Chief Financial Officer (CFO) and all HUD program offices in coordinating and controlling grant, loan, and subsidy disbursements.
A91	Consolidated Cost & FTE Files (CCFF)	CCFF contains a summarization of full-time employee (FTE) and personnel counts and personal service cost data.
A96	Program Accounting Office (PAS)	PAS is an integrated subsidiary ledger for HUD’s grant, subsidy, and loan programs. PAS maintains accounting records based on receipt of funding authorizations from the HUD Central Accounting and Program System (HUDCAPS), which generates transaction activity at different levels.
D05	OHR Office of Personnel & Training Inquiry System (OPTIS)	The purpose of this system is to provide the Office of Human Resources with personnel action information and updates which are provided by the National Financial Center’s Payroll/Personnel System. However, according to HUD’s system inventory records, this system has been inactive since 08/01/2008.
D08	Bond Payment (BONDMAPPER)	The Bond Payment System is used to determine semiannual payments to fiscal agents throughout the country, as well as payments on New York State Bonds which are paid monthly.

System code	Application name	Description
D21	Departmental Accounts Receivable / Tracking (DART) Collection System	DART establishes, tracks, and collects accounts receivable for residual receipts, excess financing, and miscellaneous payments for the public housing agencies/Indian housing authorities and Section 236 program receivables for multifamily excess rental income. However, according to HUD's system inventory records, this system will be available for read-only access through 10/31/2010, at which time it will be deactivated, and its functionality will be integrated into the A21 application (LAS/NLS), which is not scheduled for rehosting.
F17	Computerized Homes Underwriting Management System (CHUMS)	This system assists and supports field staff in the processing of single-family mortgage insurance applications from initial receipt through endorsement.
F42	Consolidated Single Family Statistical System (CSFSS)	CSFSS allows HUD to meet its requirement to collect, store, and report information related to the single-family mortgages it insures.
F42D	Single Family Default Monitoring Subsystem	Single Family Default Monitoring System is a subsystem of F42 (above). It tracks information pertaining to mortgages that are more than 90 days delinquent; lender or servicer submits Single Family Form 92068-a to HUD monthly until it has been completed by all lenders and/or is terminated or deleted.
F57	Credit Alert Interactive Voice Response (CAIVRS)	CAIVRS provides an automated response to electronic inquiries concerning the Federal credit claim or default history of an individual or corporation. It is used by HUD-approved lenders, several participating Federal lending agencies, and lenders acting on the Government's behalf to prescreen applicants for federally guaranteed loans against a shared interagency database of delinquent Federal borrowers.

HUD Did Not Follow Guidelines in Its System Development Methodology

HUD did not ensure that its established system development methodology (SDM)⁵ was used to accomplish the Unisys rehost project. Instead, HUD accepted the IT support contractor's "lift and shift" proposal, which was supposed to move applications from the Unisys platform to a UNIX open system platform with very minimal changes during the migration process.

Also, HUD did not thoroughly evaluate the technical and price proposals of its IT support contractor. A formal, detailed cost analysis was not conducted before the start of the project. The two-page rehost cost analysis that was prepared focused on cost and the amount of funding HUD had available rather than the best possible solution. Additionally, the cost analysis document did not identify uncertainties involved in performance and their possible impact upon costs. Further, while the IT support contractor stated in its technical proposal that it was

⁵ The SDM presents a methodology applicable to the development and maintenance of all IT systems. To accommodate the diversity of system development needs across HUD programs, the SDM offers a structured, disciplined approach that supports a variety of different lifecycle models.

feasible to rehost HUD's Unisys application systems, no corresponding formal feasibility study was completed.

HUD's SDM Is Applicable to All Information System Projects Related to HUD Programs

HUD's SDM identifies specific steps to be taken for information system projects, including new development, maintenance, reuse, reengineering, and all other activities resulting in software products. It is intended to be flexible so that it can be tailored to meet the needs of each project and is applicable to the development and maintenance of all HUD information system projects. The SDM notes that after the user's needs have been identified and documented in a needs statement and the system category has been determined and documented, it is necessary to evaluate the various options available for meeting that need. Key activities include examining system objectives, evaluating alternatives, identifying a preferred approach, and developing a feasibility study.

According to SDM section 1.4.4, the detailed feasibility study should describe the methodology and criteria used to determine the feasibility and the preferred approaches selected for fulfilling the system need. Key segments of the detailed feasibility study include descriptions of the system objectives, current functional procedures, the proposed system, and documentation of the results of the study.

HUD did not consider the Unisys rehost project to be a system development effort. Consequently, it believed that the SDM did not apply. However, the SDM points out that the methodology should be used on all information system projects related to HUD programs, and is intended to be flexible so that it can be tailored to meet the needs of each project. The SDM further specifies that it should be used for information system projects encompassing new development, maintenance, reuse, reengineering, and all other activities resulting in software products. The SDM presents a methodology applicable to the development and maintenance of all HUD information system projects.

HUD did not conduct a formal detailed cost analysis before starting the project because it did not think one was necessary; therefore, the IT support contractor only submitted an informal cost analysis document, which lacked the necessary details required of a formal cost analysis. HUD's SDM, Release 6.06, stated that a formal detailed cost analysis would include developmental as well as operational (both one-time and recurring) costs and must account for security risks and the impact of control measures. However, the Unisys rehost cost analysis submitted did not include these elements.

By not following established guidelines for conducting system development projects, HUD spent valuable time and resources on a project that was ultimately terminated and resulted in settlement negotiations. Without a detailed cost analysis for a project of this magnitude, there was no assurance that cost or pricing information was available at an early point in the contract performance to allow HUD to be able to successfully negotiate costs, thus resulting in waste and inefficiency.

HUD Did Not Verify That its IT Support Contractor Could Successfully Perform the Unisys Rehost Project

Prior to the initiation of the Unisys rehost project, HUD did not assess whether the IT support contractor had previous experience in conducting major rehost projects, and did not confirm that the contractor could successfully perform the Unisys rehost project. In its “Notice of Termination,” HUD pointed out that the contractor was unable to demonstrate the technical viability of its rehosting methodology, and gave no indication that it could successfully complete the rehost project. Schedule slippage, missed milestones, lack of domain knowledge, and a lack of deliverables substantiated the contractor’s inability to perform.

The Federal Acquisition Regulations System notes that when selecting contractors to provide products or perform services, the Government will use contractors who have a track record of successful past performance or who demonstrate a current superior ability to perform. We found no evidence, however, that HUD had assessed whether its IT support contractor had previous experience in conducting major rehost projects before initiating the Unisys rehost task order. An OCPO official stated that they relied on the IT support contractor’s history and experience with HUD over the years in deciding to accept their proposal.

Cost considerations also played a role in HUD’s decision to accept its IT support contractor’s “lift and shift” proposal. According to the IT support contractor, HUD could save \$10 million per year in maintenance and support costs by moving applications from the Unisys mainframe to the UNIX environment.

By accepting the IT support contractor’s proposal to “lift and shift” without verifying its ability to complete the project, HUD could not ensure that it received the best, most advantageous and cost-effective service for the Government. To its credit, HUD recognized the contractor’s substandard performance and took action to terminate the contract. Although the estimated value of the contract initially was \$17 million, early termination of the contract reduced its overall value by approximately 50 percent. However, if better planning had been performed prior to the initiation of the project, the loss of time and wasted resources could have been avoided.

Conclusion

The Unisys rehost project was not effectively planned. HUD did not follow its own SDM, which was developed for use on all information system projects related to HUD programs, and intended to be flexible so that it can be tailored to meet the needs of each project. The SDM presents a methodology applicable to the development and maintenance of all HUD information system projects. Additionally, HUD did not verify its IT support contractor's experience with or ability to successfully complete the Unisys rehost project. These weaknesses occurred because HUD did not believe that its SDM was applicable to the rehost project and previous experience with the contractor made HUD comfortable with accepting the contractor's "lift and shift" proposal. By not following established guidelines for conducting system development projects, HUD spent valuable time and resources on a project that was ultimately terminated and resulted in settlement negotiations. To its credit, HUD took action to terminate the task order once it recognized the contractor's poor performance, and recovered nearly \$3.7 million of the monies expended on this failed project. Additionally, HUD removed \$5 million from the contract prior to obligation, effectively reducing the contract value.

Recommendations

- 1A. We recommend that the Office of the Chief Procurement Officer establish procedures to ensure that when selecting contractors to provide products or perform services, HUD will use contractors who have a track record of successful past performance or who demonstrate a current superior ability to perform.
- 1B. We recommend that the Office of the Chief Information Officer establish procedures to ensure that HUD's system development methodology is considered for all IT development projects.

SCOPE AND METHODOLOGY

The review covered the period October 1, 2008, through September 30, 2009. We performed the audit at HUD headquarters in Washington, DC, from March through September 2009. During our FY 2009 review of information system security controls in support of the annual financial statement audit, we identified weaknesses in the planning of the Unisys rehost project. Due to the sensitive nature of the identified weaknesses and the settlement negotiation that resulted, this separate project was initiated to further develop the details of the deficiencies.

Our review was based on guidance from the FAR, GAO's "Federal Information System Controls Audit Manual," publications by NIST, and HUD's own system development and information security policies and procedures. These publications contain guidance for reviewing acquisition procedures, contract type selection, and developing test and training plans as well as management controls that impact the areas of equipment, software, personnel, operation, and projected costs of development and operations. We evaluated HUD management controls in this rehost project intended to

- Assess the implementation progress of the Unisys rehost project for the CFO applications residing on the Unisys platform;
- Validate the current status of the project to report any possible deficiencies in a timely manner so that the remedial actions can take place immediately; and
- Identify any risks relating to CFO application programs, hardware, and system software to ensure the continuity of critical HUD business functions.

To evaluate these controls, we identified and reviewed HUD's contract modifications pertaining to the Unisys rehost project as well as its technical proposals; participated as silent observers in the project committee to identify the current status of the project; reviewed test plans and training plans; and held discussions with HUD staff and contractors to determine how the contract is executed and monitored and the effectiveness of the oversight for operations in stemming cost overruns, scheduling delays, and performance problems.

We conducted the audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective.

INTERNAL CONTROLS

Internal control is a process adopted by those charged with governance and management, designed to provide reasonable assurance about the achievement of the organization's mission, goals, and objectives with regard to

- Effectiveness and efficiency of operations,
- Reliability of financial reporting, and
- Compliance with applicable laws and regulations.

Internal controls comprise the plans, policies, methods, and procedures used to meet the organization's mission, goals, and objectives. Internal controls include the processes and procedures for planning, organizing, directing, and controlling program operations as well as the systems for measuring, reporting, and monitoring program performance.

Relevant Internal Controls

We determined that the following internal controls were relevant to our audit objective:

- Adherence to policies and procedures
- Managerial oversight and monitoring

We assessed the relevant controls identified above.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, the reasonable opportunity to prevent, detect, or correct (1) impairments to effectiveness or efficiency of operations, (2) misstatements in financial or performance information, or (3) violations of laws and regulations on a timely basis.

Significant Deficiency

Based on our review, we believe that the following item is a significant deficiency:

- The Unisys rehost project was not effectively planned (finding 1).

APPENDIXES

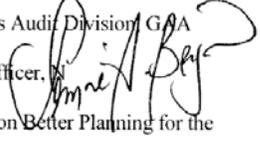
Appendix A

OCPO COMMENTS AND OIG'S EVALUATION

Ref to OIG Evaluation

Auditee Comments

Comment 1

	U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT WASHINGTON, DC 20410-0001
CHIEF PROCUREMENT OFFICER	NOV 15 2010
MEMORANDUM FOR:	Hanh Do, Director, Information Systems Audit Division, GAO
FROM:	Jemine A. Bryon, Chief Procurement Officer. 
SUBJECT:	Response to OIG Revised Draft Report on Better Planning for the Unisys Rehost Project Was Needed

We have reviewed the subject draft audit report received September 27, 2010. We appreciate the opportunity to have an open discussion with your office that resulted in some initially identified issues being resolved prior to publication of the report. This response is only in regards to the OCPO portion of the draft report; the Office of the Chief Information Officer (OCIO) will respond separately to their areas of responsibility.

Finding 1:
The Unisys Rehost Project Was Not Effectively Planned. HUD did not verify that its IT support contractor could successfully perform the Unisys rehost project.

Recommendation 1A: We recommend that the Office of the Chief Procurement Officer establish procedures to ensure that when selecting contractors to provide products or perform services, HUD will use contractors who have a track record of successful past performance or who demonstrate a current superior ability to perform.

OCPO Response:

In making the award of the initial contract, HUD fully complied with the already established regulatory requirements to assess contractor capability, evaluate past performance, and determine contractor responsibility to perform. The selected contractor was determined to be a responsible contractor with the skills and abilities to perform the contract requirements. The rehosting requirement, along with various other requirements, was originally anticipated as part of the IT support contract and, therefore, was within the scope of the existing contract (see page C32 of the contract). When the decision was made to order the requirement via contract modification, the only contractual requirement to award the modification was to assess their proposed technical approach and determine price reasonableness in accordance with FAR Part 15.402 utilizing one or more of the proposal analysis techniques outlined in FAR 15.404. Since the IT support contractor was already under contract, no additional past performance evaluation or responsibility determination was required.

Utilizing the support of an Independent Validation and Verification (IV&V) contractor, HUD conducted an evaluation of the technical approach and determined it to be technically acceptable. The IV&V contractor also analyzed the proposed price and provided information to the Contracting

Officer to enable a determination of price fair and reasonableness.

During the implementation of the rehost, the contractor missed required milestones and the schedule slipped. As noted in the report, the aggressive oversight and administration of the contract detected the problems and resulted in the contracting officer issuing a stop work order, subsequent termination of the effort and full recovery of related payments.

HUD concurs with the recommendation, and does have a process, that requires evaluation of a contractor's technical approach and past performance. The FAR already prescribes the requirements and is supplemented in Handbook 2210.3 chapter 5 Sections E. & F. OCPO believes that the procedures were followed and complied with in this situation.

Thank you.

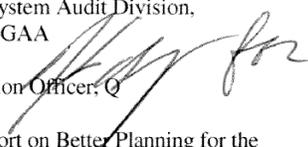
OIG Evaluation of OCPO Comments

Comment 1 OCPO concurs with the recommendation and OIG agrees.

OCIO COMMENTS AND OIG'S EVALUATION

Ref to OIG Evaluation

Auditee Comments

	<p>U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT WASHINGTON, DC 20410-3000</p> <p>CHIEF INFORMATION OFFICER</p> <p>NOV 17 2010</p> <p>MEMORANDUM FOR: Hanh Do, Director, Information System Audit Division, Office of the Inspector General, GAA</p> <p>FROM: Jerry E. Williams, Chief Information Officer, O </p> <p>SUBJECT: Comments to the Draft Audit Report on Better Planning for the Unisys Rehost Project Was Needed</p> <p>This memorandum is in response to the November 4, 2010, draft audit report entitled, "Better Planning for the Unisys Rehost Project Was Needed." My staff and I have reviewed the subject audit report and our comments are provided on the attached.</p> <p>We look forward to working with you and your staff to resolve and close-out the recommendations. Should you have any questions or need additional information, please contact Joyce Little, Director, Office of Investment, Strategies, Policy, and Management at (202) 402-7404.</p> <p>Attachment</p>
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**OCIO Detailed Comments on the Draft Audit Report:
Better Planning for the Unisys Rehost Project Was Needed**

Comment 1

Draft Report Reference	OCIO Management Comments for OIG's Consideration
Page 10 Rec. 1B	<p>OCIO non-concurs with OIG's Unisys Rehost draft Audit report and recommendation:</p> <p>We recommend the Office of the Chief Information Officer establish procedures to ensure that HUD's system development methodology is considered for all IT development projects.</p> <p>OCIO's non-concurrence is based on the following:</p> <ul style="list-style-type: none"> • The Unisys Rehost project does not meet the characteristics of a system development effort and therefore, should not follow the SDM and • OCIO followed prescribed project management planning and oversight for the Unisys Rehost project, which allowed OCIO to appropriately monitor project performance. <p>System development efforts normally have characteristics based on size (i.e. lines of code), type (i.e. transactional processing or decision system), and environment (i.e. online/batch or remote/local). The Unisys Rehost project did not require modifications to system code, did not implement a new transactional or decisional system, or change the environment's processing requirements. Instead, the Unisys Rehost effort involved moving existing systems or applications from one platform to another to ensure the systems or applications remained on a supported platform. Maintaining systems and applications on supported platforms is an operational or steady state goal. Consequently, OCIO maintains that the SDM did not apply to the project.</p> <p>However, OCIO did apply project management standards and asserted the necessary management rigor to appropriately plan, initiate, and oversee the Unisys Rehost project effort and performance. The OCIO produced the necessary project documentation and was fully aware of the time and resources committed to the project, but terminated the Unisys Rehost project based on quantitative and experiential data. Furthermore, OCIO asserts that the Department's successful cancelation of the Unisys Rehost project and recovery all associated costs is evidence of adequate documentation and project management oversight. Otherwise, the Department would not have been able to successfully arbitrate settlement that resulted in the recovery of all costs.</p>

OIG Evaluation of OCIO Comments

Comment 1 OIG disagrees with OCIO’s comment stating that “system development efforts normally have characteristics based on size (i.e. lines of codes), type (i.e. transactional process or decision system), and environment (i.e. online/batch or remote/local). This is not defined in any HUD official document. Furthermore, the statement “Unisys Rehost project did not require modifications to system codes” is incorrect. The document “Unisys Rehost Conversion Methodology” has indicated that some new functions will be written to replace some Unisys functions and some functions written in other programming languages such as Fortran and C. OCIO stated that the Unisys Rehost was an effort to maintain systems and applications on the supported platform and insisted that the SDM does not apply to the Unisys Rehost project. However, the SDM Section 1, “Introduction” states that “SDM presents a methodology applicable to the development and **maintenance of all information technology systems.**” Therefore, the OIG maintains its position and continues to recommend that the OCIO establish procedures to ensure that HUD’s system development methodology is considered for all IT development projects.