Kansas Enhanced Statewide Support Enforcement Project (KESSEP)

Independent Verification & Validation Assessment Report

April 12-14, 1999

U.S. Department of Health and Human Services
Administration for Children and Families
Office of Child Support Enforcement

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1 Executive Summary

As a result of missing the October 1, 1997 deadline for achieving federal certification for system modification to meet the requirements of the Family Support Act (FSA) of 1988, the Kansas Automated Eligibility and Child Support Enforcement System (KAECSES) and its enhancement project, the Kansas Enhanced Statewide Support Enforcement Project (KESSEP), became subject to mandatory provisions of 45 CFR 307.15(b)(10). These provisions require an entity independent of the State to perform Independent Verification and Validation (IV&V) of all technical and managerial aspects of the project. ACF has the authority under Action Transmittal OCSE-AT-98-26 to grant very limited exceptions to allow a State agency independent of the child support agency and the development agency to provide these IV&V services.

ACF conducted an assessment of the scope of Independent Verification and Validation (IV&V) required for KESSEP, including the eligibility of the Chief Information Technology Officer (CITO) for an exception to provide the IV&V services, which included a site visit on April 12-14, 1999. This report presents the findings of that assessment.

1.1 Scope of Preliminary Assessment:

This assessment addressed several areas of KESSEP system development at a preliminary level. These areas include project management, system requirements process definition, quality assurance, and configuration management. The KAECSES system and its environment was not evaluated. The Office of the Executive CITO was evaluated as a candidate for providing IV&V services for KAECSES and KESSEP.

1.2 Summary of Findings:

IV&V Requirements

The State must acquire Independent Verification and Validation services. The IV&V provider who supplies these services must review and make recommendations on the following areas of the KESSEP development process as described in Section 3 of this report:

- Project Planning and Organization
- Requirements Documentation
- Requirements Management
- Detailed Design / Code Peer Review

- Process Definition
- Configuration Management
- System Capacity

> The IV&V provider must supply all plans, reports, analyses and recommendations to ACF OCSE Central and Regional Offices as well as to KESSEP and KAECSES management, as specified in 45 CFR 307.15(b)(10)(ii).

IV&V Provider

These services can be obtained from CITO (with the exception of the capacity analysis - see below), from a contractor via RFP, or from another independent State agency approved by ACF.

Prior Approval

The RFP and contract (or similar documents if IV&V is performed by CITO or another State agency) must be submitted to ACF for prior approval, regardless of the cost or thresholds.

The contract or the agreement with a State agency must include the names and qualifications of key personnel who will actually perform the IV&V analysis. This contract or agreement, including the qualifications of personnel, are subject to prior approval by ACF.

For all IV&V activities, the State must submit an Advanced Planning Document (APD) Update to include IV&V activities and costs eligible for Federal financial participation at the applicable matching rate.

IV&V Duration

ACF will reevaluate the IV&V requirements of KESSEP and KAECSES when the activities required by this report are completed or when one of the IV&V triggers described in 45 CFR 307.15(b)(10)(i), such as failure to meet a critical APD milestone, has occurred.

CITO as IV&V Provider

ACF believes that the office of the Executive CITO has the independence and technical resources available to perform most of the IV&V role for KESSEP. An exception is granted for the Executive CITO to provide all IV&V services except capacity analysis. Due to the Executive CITO's dual role as Chief Information Architect (see section 4), ACF feels he lacks sufficient independence from the KESSEP project to perform the system capacity analysis activity described in section 3.7 of this report. The services of a contractor hired by the State will be required for this activity, unless some other State agency approved by ACF can perform this role.

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2 Introduction

2.1 Background

As a result of ACF's request, a site visit to help determine the required scope of IV&V for KESSEP was held on April 12-14, 1999 at the KESSEP development office in Topeka, Kansas. ACF had earlier provided a list of questions to KESSEP management and had received responses and some sample documents. The Federal assessment team consisted of:

Karen Bartlett	ACF/OCSE/DCSIS
Tom Mahony	ACF/OCSE/DCSIS
Edward Franklin	ACF/Region VII
Sheri Larkins	ACF/Region VII

2.2 Site Visit

The review team interviewed the following State of Kansas and Spencer Reed Group (SRG) personnel:

Don Heiman	Kansas Executive Chief Information Technology Officer
Gina Hoffman	KESSEP Division Director
Jim Davis	KESSEP Project Manager / SRG
Terri Studer	KESSEP Division Technical Director / SRG
Darrin Greene	KESSEP Finance Manager / SRG

The interview consisted primarily of follow-up questions to the State based on the State's responses to a questionnaire provided earlier by OCSE. Additional documents (see below) were provided by the State. Don Heiman, the executive Chief Information Technology Officer, was interviewed to help assess the ability of his office to provide IV&V. Federal personnel also attended a KESSEP working group meeting.

2.3 Documents

ACF reviewed the following documents provided by the State:

Document	Date
Data Level Security Requirements Specification	October 1, 1996
Deliverables Management Overview	April 11, 1999
Information/Decision/Change Request (IDCR) 0514	March 16, 1999
Kansas Senate Bill No. 5	May 21, 1998
KESSEP APD Update	December 1998
KESSEP Developer's Packet	1998-1999
KESSEP Finance Re-Engineering Document (IBM)	April 23, 1999
KESSEP Finance Re-Engineering Document Review (PSI)	September 15, 1998
KESSEP Project Plan	April 9, 1999
KESSEP Resource Update	April 9, 1999
KESSEP Steering Committee Notes	March 10, 1999
KESSEP Transition	March 26, 1999
Migration Log	April 13, 1999
Project Status Report	April 8, 1999
Questions/Topic Areas (State response to ACF questions)	February 15, 1999
Risks and Actions	April 14, 1999
Screen Assessment and Correction Form CRCC(SR16)	Nov 9, 1998
Security Business Rules	August 14, 1996
Security Subsystem Demonstration	April 25, 1997

3 Findings

3.1 Project Planning and Organization

Issues:

KESSEP personnel are highly motivated to obtain federal FSA certification for KAECSES in September 1999. KESSEP management and the CITO are closely monitoring project progress toward this goal. KESSEP has brought in experienced field personnel (Subject Matter Experts or SMEs) to aid in system development and to ensure that the system meets user requirements. KESSEP is continuously monitoring its risks and developing mitigation strategies (KESSEP Project Plan, April 9, 1999).

KESSEP is a project of the Division of Project Management and System Development (DPMSD). KESSEP is supported by DPMSD's Division of Information Resources (DIR). KESSEP has begun planning for the transition of the system to maintenance mode and further upgrades for PRWORA. KESSEP and the State are considering five options for future KAECSES development (KESSEP Transition, March 26, 1999);

(1) KESSEP would address PRWORA, DIR would do maintenance
(2) KESSEP would do PRWORA and maintenance
(3) KESSEP would do Cool:Gen programming, DIR would do everything else
(4) Maintenance and PRWORA development would be outsourced
(5) Maintenance would be outsourced, KESSEP would do PRWORA

KESSEP has identified risks and benefits associated with these options, including retention of personnel and cost to the State. It is expensive to obtain Cool:Gen developers with the appropriate background and experience levels for this project and the State is concerned about retaining contractors as KESSEP enters a maintenance phase. A heavy turnover rate will be detrimental to the project.

Other planning issues:

The Training Plan for users is still in draft form. (steering Committee Notes - March 10, 1999)

The State plans to have a contractor (DMR) supply FSA certification testing services. After FSA certification, the project will still need the services of an independent test organization for maintenance testing.

The current KESSEP accounting system may have difficulty in providing per task cost information required for APDs. The CITO is in the process of changing State accounting and reporting procedures. Federal representatives will work with the State to minimize the impact of the reporting requirements.

Recommendations:

The IV&V effort recommended by this report must include an independent risk analysis and recommendations for the KESSEP transition options currently being proposed. If the State is already proceeding with one of the options by the time an IV&V provider is obtained, the IV&V provider should perform an independent analysis of the decision-making process and a risk assessment of the option chosen. The IV&V provider should also evaluate the transition plan and any resulting changes in organizational structure and development processes.

The IV&V provider should evaluate the completed training plan.

The IV&V provider must evaluate State plans to ensure testing at the integration level and above is performed independently of the design and coding processes. This testing could be performed by a contractor or by an independent test organization.

The IV&V provider must evaluate and make recommendations on KESSEP's task and cost reporting process to ensure it meets State, project and Federal requirements.

3.2 Requirements Documentation

Issues:

KESSEP has deferred some documentation maintenance tasks until after certification. The requirements document for the KESSEP project may be complete, but they are not in an easily useable format. Requirements changes documented in the Screen Assessment and Correction Forms have not been incorporated in final design documents.

An up-to-date software requirements document for the system is essential for successful system maintenance. It will make it much easier for the State to review and approve new changes to the system. It should also be the guiding document for the development of test cases and test plans and procedures. Using Subject Matter Experts (SMEs) in requirements development is an excellent strategy, but KESSEP should ensure that their knowledge is captured in the documentation.

The KESSEP project began before State Law 5, which mandated that the Chief Information Architect provide standards for information systems. KESSEP has not implemented the State standards retroactively.

Recommendation:

A plan for updating the KESSEP documentation, including formats for documents and schedules for completion, should be developed by KESSEP and reviewed by an IV&V provider. The IV&V provider should also review the updated documentation for completeness and accuracy.

The IV&V provider should evaluate the risks and benefits of bringing the system documentation up to the new State information system standards.

3.3 Requirements Management

Issues:

In the current development process, it is difficult to match a requirement change to its corresponding system changes. Changes in the Business Rules, for example, cannot be traced to a specific Information Decision Change Request (IDCR), although KESSEP personnel believe that the Subject Matter Experts (SMEs) could reconstruct the cause of most changes. Modification forms such as the IDCR and Screen Assessment and Correction Form (SACF) do not automatically trigger appropriate changes in training and the User's Manual. There is a great deal of dependence on SMEs for system knowledge.

Good requirements traceability makes it easier to determine if a change has been completely implemented. It will also make it easier to determine the testing impact of a proposed change.

Recommendation:

The IV&V provider should evaluate the project's requirements management and make recommendations for improving it. The feasibility of an requirement traceability matrix or similar requirements management method should be evaluated.

3.4 Detailed Design / Code Peer Review

Issues:

KESSEP develops its software using the Cool:Gen CASE tool. A graphical and structured pseudo-code model is developed in Cool:Gen, and code is generated directly from the model.

All of the Cool:Gen model from which code is generated is not subject to peer review. KESSEP instead relies on experienced developers, the error-checking done by the CASE tool, and unit testing to catch errors in the model/code. Peer reviews and software inspections are very cost-effective methods for preventing software errors and improving product quality. There is some risk in the KESSEP strategy that some software errors will not be found, or will not be found until testing. Generally it is cheaper to fix errors the earlier they are found in the development process.

Recommendation:

An IV&V provider should evaluate the efficacy of the current process. This would involve developing software quality metrics appropriate for the project and tracking them through the development cycle. Finding the percentage and type of errors that occur in each stage of the process would provide insight into the effectiveness of development process and would help identify areas that need improvement.

3.5 Process Definition

Issues:

The KESSEP Project Plan provides brief descriptions of many of the project processes, but some are incomplete or lacking in detail. While the State was able to provide a more detailed description on request, the processes should be thoroughly documented. Processes that require definition or more detailed description include the Training, Test, Quality Assurance, and Configuration Management.

Recommendation:

The process definitions should be reviewed for accuracy and completeness by the IV&V provider. The IV&V provider should make recommendations on improving processes and improving process documentation.

3.6 Configuration Management

Issues:

KESSEP currently uses two forms to track changes in the system. Changes involving model and database changes are design are tracked by IDCRs. Errors in and changes to an application are screens are tracked by SACFs. SACF changes are regarded as part of the system requirements. A third form is used to authorize program migrations between test regions.

The Cool:Gen model versions are used for identifying software configurations. Code is generated from the Cool:Gen models so previous versions of code are not tracked or retained. There is a limit on the number of old versions that the Cool:Gen model can retain. This may have implications for implementation and maintenance.

Recommendations:

The IV&V provider should examine current and planned Configuration Management processes and ensure they are adequate for the system's life-cycle. The IV&V provider should make recommendations on the process and the scope of Configuration Management.

3.7   System Capacity

Issues:

KESSEP has ongoing concerns with the capacity of the system, both with volume of data, response times and CPU performance (see Risks and Actions, April 14,1999). A CMOS upgrade of the CPU is planned, which may affect short term availability, but should improve performance.

Recommendation:

The IV&V provider should perform a capacity analysis and make recommendations for improvement. The analysis should cover hardware (CPU, telecommunications, data storage) and software (database design, software architecture) to ensure that system response times under load are adequate for KAECSES requirements.

4 Evaluation of the CITO as IV&V provider

Kansas proposed its executive Chief Information Technology Officer (CITO) as a candidate for IV&V. To be considered for an exception to conduct IV&V for KAECSES and KESSEP a State organization:

(1) Must be independent of the State Title IV-D agency and of the development agency as described in Action Transmittal OCSE-AT-98-26, Standards for Program Operations

(2) Must have the technical resources to perform the tasks described in 45 CFR 307.15(b)(10).

ACF personnel interviewed Mr. Don Heiman, the Kansas executive CITO, on April 13, 1999. Mr. Heiman, in his role as CITO, oversees many information system projects, including the KESSEP project. He is deeply committed to the success of KESSEP. He is independent of the IV-D agency, reporting to the Governor and the Secretary of Administration, as described in Senate Bill 5 (Published in the Kansas Register May 21, 1998). Mr. Heiman's office has considerable personnel resources, and currently provides technical and management oversight to KESSEP.

Mr. Heiman, however, is also the Chief Information Technology Architect and Director of the Division of Information Systems and Communication (DISC). DISC provides data processing and telecommunication services to all state agencies. DISC therefore provides the hardware and telecommunications for KESSEP and KAECSES. In the opinion of ACF, Mr. Heiman's role as DISC Director makes him ineligible to provide a system capacity analysis (see section 3.7) for KESSEP, since, in the area of hardware and telecommunications, he is not completely independent of KESSEP.

Another State agency that satisfies the requirements stated above may be eligible to provide this service, but if first must be evaluated and approved by ACF.

Appendix A   Acronyms

ACF	Administration for Children and Families
APD	Advanced Planning Document
AT	Action Transmittal
CASE	Computer-Aided Software Engineering
CFR	Code of Federal Regulations
CITA	Chief Information Technology Architect
CITO	Chief Information Technology Officer
CMOS	Complementary Metal-Oxide Semi-conductor
CPU	Central Processing Unit
DCSIS	Division of Child Support Information Systems
DIR	Division of Information Resources
DISC	Division of Information Systems and Communication
DPMSD	Division of Project Management and System Development
FSA	Family Support Act
IBM	International Business Machine
IDCR	Information/Decision/Change Request
IV&V	Independent Verification and Validation
KAECSES	Kansas Automated Eligibility and Child Support Enforcement System
KESSEP	Kansas Enhanced Statewide Support Enforcement Project
OCSE	Office of Child Support Enforcement
PRWORA	Personal Responsibility Work Opportunity Reconciliation Act
PSI	Policy Studies International
RFP	Request for Proposals
SACF	Screen Assessment and Correction Form
SME	Subject Matter Experts
SRG	Spencer Reed Group