

**South Carolina Child Support
Enforcement System
(SC CSES)**

**Independent Verification & Validation
Assessment Review Report
August 17, 1999**



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

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EXECUTIVE SUMMARY

As a result of missing the October 1, 1997, deadline for achieving statewide installation and operation of a comprehensive automated child support enforcement system as required under the requirements of the Family Support Act of 1988, the South Carolina Child Support Enforcement System (SC CSES) project became subject to mandatory provisions of 45 CFR 307.15(b)(10). These provisions require an entity independent of the State Title IV-D agency and of the SC CSES project management structure to review all technical and managerial aspects of the project. An Independent Verification and Validation (IV&V) assessment of the SC CSES was conducted by the Federal Office of Child Support Enforcement (OCSE) on June 21-22, 1999. The purpose of the assessment was to determine the extent of IV&V services required on the SC CSES system project. This report presents the findings of our *IV&V Assessment Review*.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

SCOPE OF REQUIRED IV&V SERVICES

The SC CSES is currently in a transitional phase. System development is on hold. The development contractor (UNISYS Corp.) is no longer actively involved with the project. The State is currently planning to hire a vendor to conduct a feasibility study. This study will determine the best direction to take in restarting the State's system development effort. Because of the status of the project, this review focused primarily on planning and management issues. Once the State has determined an appropriate course of action to complete SC CSES development, they will be required to obtain Independent Verification and Validation (IV&V) services. **IV&V services will be required throughout any future system development effort**, as delineated in this report. The acquisition of this "IV&V Service Provider," either through a formal procurement of contract resources or interagency cooperative agreement, will need to commence immediately. To assist the State in this regard, this report's recommendations are structured to present specific IV&V tasks that can be included in the Statement of Work of an IV&V Service Provider.

IV&V SERVICES PROVIDER

The State must move to begin the identification of requirements for and formulation of a Scope of Work for ongoing IV&V services to the State's Child Support Enforcement automation project. Though much is unknown at this time regarding the future direction (completion of the current application, new transfer, new development) of the project, it is incumbent on the State to begin the acquisition process for these services now to avoid further schedule delays. Given that the State is currently in the process of procuring technical resources to conduct a feasibility study of the SC CSES project, including an analysis of alternatives, concurrently starting the acquisition of IV&V services appears both prudent and timely.

Therefore, the State should immediately pursue the identification of potential IV&V resources in-State or through a contract procurement effort. In-State resources must be independent of the Department of Social Services, but may be obtained from other State agencies such as the Budget and Control Board. This report has been designed to provide the State with a series of initial recommendations that can be incorporated into a Scope of Work for the project's IV&V Service Provider. To further support the State's IV&V process, this Office has committed to providing the State with a follow-on *IV&V Planning Review*, geared to an assessment of the State's forthcoming feasibility study. OCSE's conduct of this *IV&V Planning Review* will include an assessment of the feasibility study itself, as well as again assess the project's management and organizational structures, resources and capabilities. This *IV&V Planning Review*, addressing any Federal issues and/or concerns with the State's feasibility study, will be conducted as part of a subsequent *IV&V Assessment Review*. The State's IV&V acquisition/procurement process will then need to incorporate the additional, final recommendations provided as part of that *IV&V Assessment Review's* report (including any issues that may be raised by the *IV&V Planning Review* portion of the *IV&V Assessment Review*), prior to final execution of a contract securing an IV&V Service Provider.

An initial benefit of this IV&V acquisition strategy will be to ensure the timely, independent validation of the State's planning phase activities and deliverables, such as the proposed resource, schedule and budget estimates and management structures contained in the project management plan of the project's "Implementation Advance Planning Document (IAPD)." Additionally, this IV&V acquisition strategy should provide valuable input and counsel as the State develops the IAPD, thus likely expediting the Federal review and approval process.

PROJECT STAFFING

The success of the SC CSES project depends on having qualified technical personnel to complete the application software development and acquiring a management team sufficient in number and expertise to ensure the successful direction of all implementation activities, both programmatically and technically. Therefore, **current project staffing must be appropriately augmented and subsequently maintained to ensure timely completion of the project.** This report, however, should not be viewed as a reflection upon the qualifications of the current staff. Rather, our findings reflect strong indications that additional, highly qualified staff will be required once the project is restarted. We encourage the State to begin the identification of potential contracting vehicles, such as Master Vendor Contracts (a/k/a body shop) and/or creation of the basic outlines and boilerplate of a Request for Proposal to procure the separate software development and quality assurance staffing resources needed. Such activities will result in considerable timesaving, regardless of the development path chosen.

Of additional importance is that although vendor staff will be brought onboard to help manage the project, the State must clearly demonstrate that day-to-day direction of the project rests squarely with State personnel. To that end, the State should begin to explore avenues within which additional State staffing can be brought to bear to manage the project.

INDEPENDENT VERIFICATION AND VALIDATION (IV&V) ASSESSMENT REVIEW REPORT FOR THE SOUTH CAROLINA CSES PROJECT

1. INTRODUCTION

As a result of missing the October 1, 1997, Federal certification deadline for operating a statewide, comprehensive automated system meeting the requirements of the Family Support Act of 1988, the State of South Carolina's Child Support Enforcement System (SC CSES) became subject to the mandatory provisions of 45 CFR 307.15(b)(10). These provisions require an entity independent of the State to review and report on all technical and managerial aspects of the project. ACF requested a review of the current documentation of the system, as well as current and future management planning for the project, in order to make recommendations on the extent of the IV&V services that the State will be required to obtain.

1.1 BACKGROUND

As a result of ACF's request, an assessment to determine the required scope of IV&V for the SC CSES was held on June 21-22, 1999 at the SC CSES development office in Columbia, South Carolina. The Federal assessment team consisted of:

Ed Morris -	ACF/OCSE/DCSIS
Joe Bodmer-	ACF/OCSE/DCSIS
Dave Tabler -	ACF/OCSE/DCSIS
David Kasriel-	ACF/Region IV
Janet Shore-	ACF/Region IV

The South Carolina Department of Social Services (DSS) Office of Child Support Enforcement staff represented the State. Representatives from the County Clerks of Court attended the first day's session via teleconference.

1.2 METHODOLOGY

The review team conducted discussions with State staff on current project conditions and future plans rather than past history. A previous IV&V review, conducted by the firm KPMG, identified issues related to past performance. Issues identified in that report remain valid as there have been no changes in the design, development or testing of the application programs since that review was conducted. Day One was spent primarily in discussions with representatives from the County Clerks of Court. After initial discussions regarding the current and future organization of the project, discussions focused primarily on "buy-in," otherwise referred to as project, program and user involvement and acceptance issues.

The IV&V portion of Day Two was spent examining system documentation and discussing current system status with State technical staff. A separate meeting with the State Director was also held on Day 2. The documents examined are detailed in Table 1: SC CSES Documents Reviewed. It should be noted this is not the only documentation available for the project. However, due to the limited scope of this review and of time limitations, the documentation review concentrated on basic software development documentation. A complete list of the documentation for the project can be found in the KPMG report.

Table 1. SC CSES DOCUMENTS REVIEWED

Document	Date	Volumes
Project Management Manual	March 1994	1
System Operations Document	October 1995	1
System Operator's Guide	October 1995	1
Training plan	October 1994	1
User's Manual	May 1997	2
Capacity Planning Study/Risk Analysis	July 1994	1
Detailed System Design	March 1995	15
General System Design	March 1995	4
Security Plan	June 1995	1
Acceptance Test Plan	February 1996	2
Full Load Stress Test	October 1996	1
System Test Plan	March 1995	1

2. FINDINGS

The findings in this report are based on the discussions held with State staff during June 21 and 22, 1999, and upon the system documentation review. This report intentionally does not assess past performance except where applicable to current project status. The focus of this report is on where the project is today and what needs to be accomplished by the State to restart the project.

2.1 PROJECT INITIATION

The review found the current status of the SC CSES project to actually be one of re-initialization. We observed that there is a firm commitment by the State to the project, as expressed by the State Director, State IV-D management staff, and by reference, among the State's County Clerks of Court. Further, there appears to be open lines of communication between State personnel and County stakeholders.

2.2 PROJECT PERSONNEL

The project currently has approximately eight State staff members responsible for ongoing management of the project, including coordinating and interfacing with the counties, and overseeing software development activities once that effort restarts. Current staff appear to have a strong background in and knowledge of the project. The State currently has no hiring plan for the project to ensure that adequate resources will be available for development and maintenance phase activities. Our review found that additional staff will clearly be required once the system development effort restarts. However, the State staff acknowledged that additional staff, through either supplemental designations of State personnel, or through procurement of contract staff, will be required of the SC CSES project once the development effort restarts.

2.3 PROJECT ORGANIZATION

The State was unable to provide the review team with a current project organization chart. Further, though various project team member responsibilities were described to the review team for those staff currently assigned to the project, not all organizational roles and responsibilities were addressed. For example, the project did not appear to have designated contract/procurement oversight staff, nor were adequate staffing levels apparent in many significant areas of project management and responsibility, such as: quality assurance, test management, policy and requirements definition.

2.4 EXTERNAL STAFF

Our review found that there is currently no contractor or subcontractor staff available to the SC CSES project. The State, however, is in the process of defining their scope of work requirements for such vendor support.

2.5 DOCUMENTATION

The State was able to provide a complete set of project documentation for review by the IV&V assessment team. A brief review of the documents listed in Table 1 above was performed during the June 21 and 22, 1999, visit. This review was limited to cursory observations due to time constraints. However, despite the reduced documentation analyses, our review found that the documentation appeared to be well organized and comprehensive in scope. No opinion could be rendered as to the currency of the documentation presented. Most of the documents examined were dated from 1994 through 1996 and did not appear to have been updated since their initial issuance. State technical staff indicated they had recently acquired electronic copies of these documentation files that may represent a working version of the software design documentation. Verification of these files is ongoing.

2.6 QUALITY ASSURANCE

There is currently no quality assurance (QA) staff or QA organization within the SC CSES project. State staff expressed concurrence with review team insights and recommendations regarding the need for a formal QA organization and process upon restart of the system development effort.

2.7 CONFIGURATION MANAGEMENT

In the past, the State's Configuration Management process included writing a "Change Request" which then proceeded through a formal review and approval cycle. Unfortunately, this process was only used for significant changes to the system's hardware and software architecture, online and batch control programs and/or application software programs. According to State personnel, if the vendor was able to produce a "quick fix" solution to a problem, or provide an enhancement that eliminated the existing problem, then the project's Configuration Management process was not used. As a result, our review found that many changes to the application software programs were not documented.

2.8 SOFTWARE

The system's application software was last officially turned over to the State in 1996. Since that time, a great many changes have been implemented in or incorporated as an enhancement to the original design. However, a substantial portion of this enhancement work appears to have been integrated to the application software modules subsequent to initial acceptance testing. Our review found that the version(s) of the application software containing the great majority of these changes/enhancements has not been delivered, nor is now available, to the State.

South Carolina's project management team is currently in the process of hiring a vendor to examine various options for completing the SC CSES software development effort. Likely options, as discussed during this assessment review, include:

- updating the current 1996 version of the code to meet both the requirements of the Family Support Act of 1988 and PRWORA of 1996;
- transferring a currently certifiable system from another State;
- transferring one of the county systems to a statewide system; and,
- beginning a completely new system development effort.

The results of this analysis will be formulation of a recommended course of action for the successful completion of the CSES project.

3. RECOMMENDATIONS

The IV&V assessment team provided the following recommendations to the State's CSES project management team during the course of the two-day onsite visit to the project site. Additional recommendations are also presented herein based upon the analyses conducted of the State's CSES project documentation after the onsite portion of the review.

3.1 IV&V MANAGEMENT PLAN

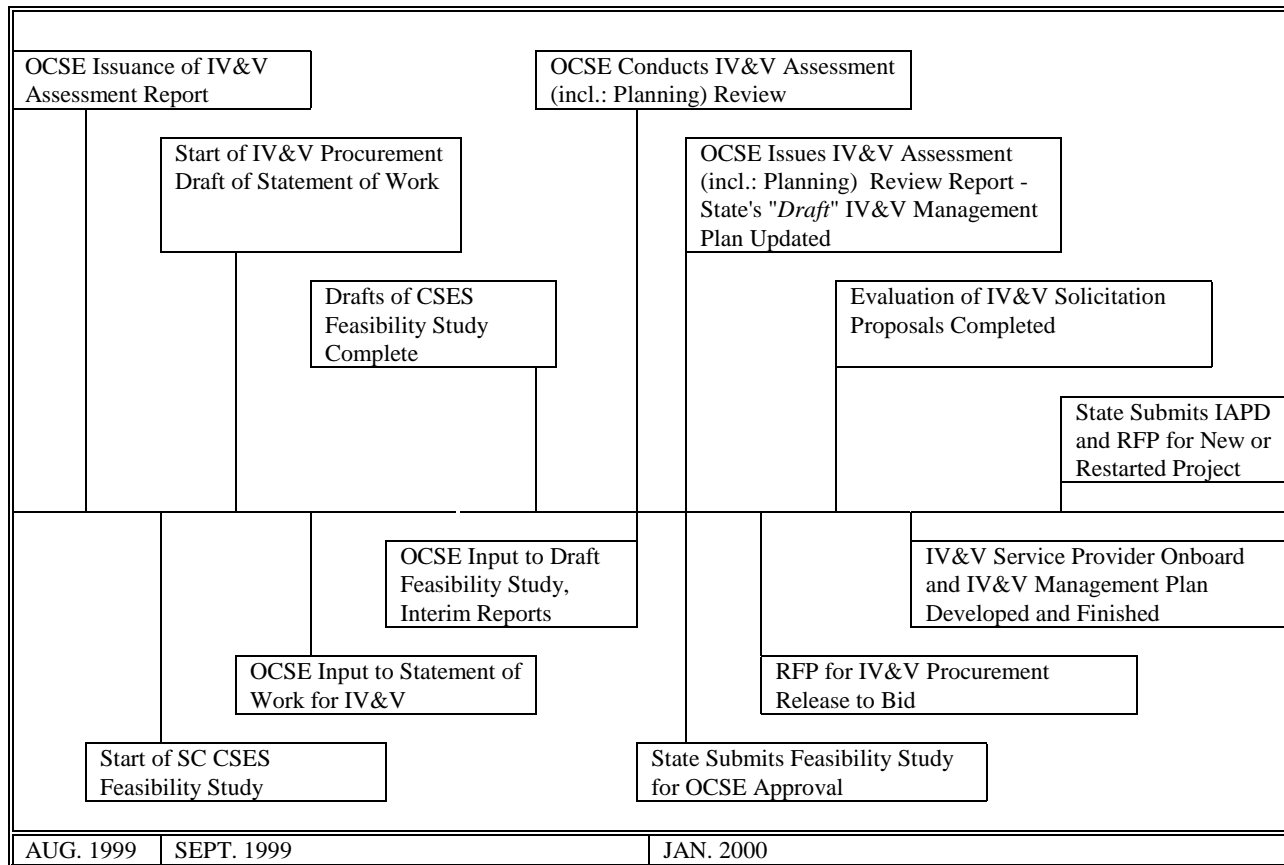
Many of the recommendations contained in this report are presented to the State in the form of general requirements for the State to incorporate into what this review refers to as an "IV&V Management Plan¹." The plan should be one of the first deliverables created by the State in collaboration with its IV&V Service Provider. Further input to the State's development of the IV&V Management Plan will be provided as part of OCSE's subsequent *IV&V Assessment Review*, which will include an *IV&V Planning Review* to examine the State's project feasibility study². These recommendations are intended to assist the State in the creation, and refinement of an acquisition/procurement document's Scope of Work for the eventual solicitation of an IV&V Service Provider. This IV&V Management Plan will then be refined and finalized based upon the IV&V Service Provider's detailed Technical Proposal to the State's IV&V solicitation (e.g., Scope of Work in a Request for Proposal) document. If the IV&V Service Provider is to be a State agency, the IV&V Management Plan, incorporating these recommendations, will be jointly constructed as part of an interagency agreement defining the roles and responsibilities between the Title IV-D agency and the State agency serving as the IV&V Service Provider. OCSE is committed to providing ongoing technical assistance to the State relative to the creation and finalization of a comprehensive Statement of Work for the acquisition of a IV&V Service Provider, as well as in consultation and coordination with the State on all aspects of project management and organization.

Table 2. presents an estimated timeline representing an appropriate order for the major milestones in the planning phase, from the issuance of this report through to the final submission for Federal review and approval of an Implementation Advance Planning Document (and if needed, a Request for Proposal for Implementation of a SC CSES.).

¹ The need for an IV&V Management Plan, beyond its use as a basis for a Scope of Work for an IV&V Service Provider (whether contract or State agency) is as a detailed plan of action for periodic independent reviews of the SC CSES project's critical development and implementation phase procurements, milestones and deliverables. In addition, it serves as vital documentation to the State's forthcoming Implementation Advance Planning Document Update and Corrective Compliance Plan.

² OCSE anticipates the SC CSES project feasibility study to be completed by early in January 2000, with OCSE review of the study being accomplished both during its final draft stage and as a final deliverable as part of an ongoing technical assistance effort.

Table 2. Estimated Critical Milestones Schedule in CSES Project Planning Phase



3.2 PROJECT INITIATION

As part of any IV&V Management Plan, the ongoing IV&V reviews should include tasks to ensure continued proactive user, management, and organizational involvement and commitment to the project. Such buy-in and communication, as observed during this assessment review, will be a critical factor throughout the development and implementation phases of the project. This specific IV&V task will give Federal and State leadership the ongoing assurance that strong commitment to the project persists among all stakeholders, and that problems with acceptance of the completed system should not arise as an impediment to the project's successful conclusion.

3.3 PROJECT PERSONNEL

The IV&V Management Plan for the SC CSES must include an immediate tasking to ensure that the appropriate personnel, both in terms of quantity and skill sets, are adequately defined throughout the course of project's development and implementation lifecycle. In addition, the IV&V Management Plan must also provide for the periodic review of, and recommendation to,

State project leadership of ongoing staffing level adequacy, as well as any potential for fluctuations in staffing requirements by project phase, relative to various lifecycle factors, such as alterations in schedule, milestones, and deliverables.

For the immediate project planning phase through restart of the CSES development phase, the IV&V Management Plan must identify appropriate numbers of personnel by experience level, necessary to appropriately manage and coordinate the project. The IV&V Service Provider must, based upon State budget constraints and personnel ceilings, consider and provide as appropriate a clearly defined vendor procurement and acquisition schedule to supplement project staffing. This vendor schedule must also include an analysis and recommendation as to the appropriate scope or work, service levels, and schedule of procurement and deliverables relative to vendor-provided Software Quality Assurance support, as discussed later in this report.

3.4 PROJECT ORGANIZATION

The SC CSES IV&V Management Plan must provide recommendations to the State regarding project organizational structure and reporting. These recommendations must include well-executed definitions for technical and managerial oversight responsibilities and authorities within the project. The organization plan must define such areas as: software development, training, quality assurance, configuration management, testing, project planning documentation and reporting, and such other functions as may be deemed critical to the projects' overall success. Upon review and acceptance of these organizational recommendations by the State, the project organization plans and charts must be incorporated to the State's APD Update and Corrective Compliance Plan.

3.5 EXTERNAL STAFF

It is evident the State will require a significant amount of contract resources to complete the project. To that end, the IV&V Management Plan must present a methodology for personnel requirements estimation, as well as provide for the periodic performance of staffing reviews to assess the ongoing accuracy of the project management plans' personnel loading and workload estimations. Further, the IV&V Management Plan must ensure continuous assessments of the project's contract resources to ensure vendors have employed the appropriate skill sets and experience levels to contract tasks. The IV&V Management Plan must also review and provide opinion on the State's adherence to Federal procurement regulations and policies regarding contracting and Federal financial participation. Specific attention must be focused on the efficacy of the State's procurement vehicles, procedures and adherence to Federal prior approval requirements as defined in applicable Federal regulations at 45 CFR Parts 74, 95 and 307.

3.6 DOCUMENTATION

Once the State determines the direction it will take to complete the project, all applicable, usable system documentation must be brought up-to-date. Locating softcopy (electronic) versions of the existing documentation will obviously help. The State should be working now to locate updates to all documentation related to: requirements, dictionaries, libraries, program modules and routines, testing, operation, and maintenance, as well as any tools that may be used to identify changes made to the system since the original documentation was developed. Possible tools discussed with State technical staff include the Intersolv version control software as well as “Build Reports” generated for each new version of the software. The IV&V Management Plan must include periodic technical reviews of the system documentation. The IV&V Management Plan must also execute the verification and validation of the project's Quality Assurance function, its processes, application and efficacy.

3.7 QUALITY ASSURANCE

Based upon the size and complexity of the SC CSES project, we recommend the State acquire Quality Assurance (QA) services support. The QA services provider should be required to define, provide and support a thorough QA methodology. Once the State has the appropriate QA processes and product review methodologies defined and in place, the QA job will consist primarily of ensuring the processes are followed, measuring product quality, and working on continuous improvement of the process in order to further improve product quality. The QA organization must exist independently from other functional areas of the project's organization, though ultimately the QA provider must report to the State's software project manager. The software project manager will work with and, therefore, ultimately be responsible for ensuring that defined and required QA tasks are conducted and that all project processes are being followed.

In addition, the periodic IV&V reviews delineated in this report will monitor the QA functions. These IV&V reviews, as defined in the IV&V Management Plan to be created by the State (and IV&V Service Provider) must provide for the periodic assessment of the QA function and of its adherence to the prescribed standards and methodologies, as well as the efficacy of the approach to project QA.

3.8 CONFIGURATION MANAGEMENT

As a lesson learned, the State should change their process for Configuration Management to require **all** changes to the code to be documented with a Change Request. Quick fixes to the code can still be implemented as temporary fixes, which can become approved fixes once the Change Request is approved and tested. This will also allow staff from other areas (testing, training, QA, etc.) to be made aware of these changes for possible impact on their functions. In addition, the IV&V Management Plan must include periodic assessments of the project's Configuration Management process standards, and of adherence by project staff, both State and contractor, to those standards.

3.9 SOFTWARE AND HARDWARE

We concur with the State's plan to hire a vendor to analyze options for completing the SC CSES software development. OCSE review of the Scope of Work for this task has been conducted and comments have been provided to the State in a separate letter. Upon completion of the feasibility study to determine the best option for completion of the SC CSES, OCSE will perform an IV&V review of the feasibility study. The requirements for this IV&V review are provided in more detail in Section 3.10.

On a project lifecycle level, the State's IV&V Management Plan must include periodic software quality reviews, incorporating the elements of peer review with the participation of the software development teams and the QA services provider. These reviews should be scheduled at predetermined milestones, such as major software version or software module deliveries. The State should also consider incorporation to the project's IV&V Management Plan of a hardware capacity analysis and stress test, as well as application and system performance testing. The IV&V Service Provider could then present specific recommendations for improvement, as appropriate, in the hardware, software or unified processing environments.

3.10 INDEPENDENT VERIFICATION AND VALIDATION (IV&V)

The State must acquire Independent Verification and Validation services in accordance with 45 CFR 307.15(b)(10). These services can be obtained from a contractor via a Request for Proposal (RFP) or from an independent State agency. If a contractor is used, the RFP and contract must be submitted to ACF for prior approval, regardless of the cost or thresholds. The contract must include the names, experience, and skills of key personnel who will actually perform the IV&V analyses. If IV&V is performed by another State agency, similar, equivalent documentation must be submitted, usually taking the form of a detailed Interagency Cooperative Agreement. The State must then submit an Advance Planning Document Update (APDU) describing in sufficient detail, the prescribed IV&V activities, work products, and costs eligible for Federal financial participation.

This IV&V activity should describe three separate levels of IV&V services:

1. The first level is an initial, one-time review of the methodologies used in the State's project feasibility study. Called an *IV&V Assessment Review*, the review ensures that the study was conducted in a manner that was measurable, repeatable, and with a verifiable methodology. This first-level *IV&V Assessment Review* will consist of two distinct activities - an *IV&V Planning Review* and a general *IV&V Assessment Review*. The *IV&V Planning Review* portion will concentrate on analysis of the feasibility study. The remainder of the *IV&V Assessment Review* will focus on the project's overall management, resources, schedules, budget and organizational structure. This *IV&V Assessment Review* will be performed by OCSE. A consequence of this review will be our providing supplemental input for the State to use in creating its IV&V Management Plan for the SC CSES project. This report's recommendations, and those to be presented in our next *IV&V Assessment Review* report are intended by OCSE to assist the State in defining in some detail the required scope and frequency of future IV&V reviews, a primary purpose of the State's IV&V Management Plan.
2. The second level of IV&V services will consist of periodic reviews to monitor the overall status and management of the project's development effort. Many aspects of this level of IV&V services are briefly described in this report, and will be further defined by the *IV&V Assessment Review*, by the State's own IV&V Service Provider, and of course by the State's IV&V Management Plan.
3. The third level of IV&V services are full technical reviews of various facets of the system's software and hardware operations and performance, documentation, and maintenance, as needed. Each of these levels of IV&V services is discussed in detail below. **In each case, the IV&V Service Provider must supply all plans and reports of findings and recommendations to OCSE Central and Regional Offices at the same time that they are supplied to the State, including draft documents submitted for comment.**

3.10.1 IV&V ASSESSMENT (AND PLANNING) REVIEW

OCSE will conduct an *IV&V Planning Review* as part of its *IV&V Assessment Review*, to provide OCSE and the State assurance that the methodology used to conduct the feasibility study for the SC CSES project was objective, measurable, repeatable and verifiable. This review will concentrate on the verification and validation of the feasibility study's documentation and processes used to perform this analysis. In addition to doing an *IV&V Planning Review* of the feasibility study, OCSE's *IV&V Assessment Review* will assess the project's overall organization and management structure and capacity. A work product of this secondary part of the review will be supplemental input, as needed, to the State's IV&V Management Plan and by extension, to the State's IV&V Service Provider. This input to the IV&V Management Plan is intended to help the State better define the scope, schedule, and level of effort of their IV&V Service Provider in its future conduct of periodic IV&V reviews for the SC CSES project. Finally, this review will supplement information to be included in the State's forthcoming Implementation Advance Planning Document (IAPD) and Corrective Compliance Plan (CCP).

3.10.2 PERIODIC IV&V REVIEWS

Once the system development effort has restarted, periodic IV&V reviews will be required to ensure the project is on schedule and that requirements are being met for Federal certification. The frequency and task level of these reviews will be defined in the IV&V Management Plan. These periodic reviews will require the IV&V Service Provider to assess system development in areas including, but not limited to, the following:

- a) Analyze project management and organization, evaluate project progress, resources, budget, schedules, work flow, reporting and contractor oversight.
- b) Review and analyze project management planning documents.
- c) Review and analyze project software development documents.
- d) Review and analyze processes to ensure they are being documented, carried out, and analyzed for improvement.
- e) Monitor the performance of the QA contractor by reviewing its reports and performing spot checks of system documentation.
- f) Assess and recommend improvement, as needed, to assure continuous stakeholder buy-in, support and commitment, and that open pathways of communication exist among all stakeholders.
- g) Assess and recommend improvement, as needed, to assure lines of communication between vendor staff and State management are in place and engaged.
- h) Assess and recommend improvement, as needed, to assure appropriate user and developer training is planned and carried out.
- i) Assess and recommend improvement, as needed, to assure establishment and maintenance of a data center, including data center input to the project regarding operational and maintenance performance of the application.
- j) Develop/update a risk management plan and conduct periodic risk analyses to identify, analyze, and mitigate risks.
- k) Review and analyze system capacity studies.
- l) Review system hardware and software configuration and report on any compatibility and obsolescence issues.
- m) Assess and recommend improvement, as needed, to assure software testing is being performed adequately through review of test plans or other documentation and through direct observation of testing where appropriate, including participation in and coordination of peer reviews.
- n) Develop performance metrics, which allow tracking of project completion against milestones set by the State.

- o) Report on the State's efforts to address the findings and recommendations from this *IV&V Assessment Review Report*.

Some of the above tasks may already be assigned to the State's QA provider. In that case, the IV&V Service Provider would be responsible for ensuring these tasks are being performed through the review of QA products and reports.³

3.10.3 FULL TECHNICAL IV&V REVIEW

In addition to the periodic reviews discussed in the previous section, the State should consider employing full technical (software and hardware) IV&V reviews. These reviews could be prompted by major milestones in the project's development cycle such as program version turnover or completion of a test phase. A full technical review may also become necessary as a result of significant findings during the periodic IV&V reviews, such as a need to assess application performance or system capacity issues. These reviews may also be initiated by the State to give itself assurance that the project's code base, documentation, etc., is in good shape and to identify and address any problems before they become unmanageable. Full technical IV&V reviews may include, but not be limited to the following areas of review for remediation and elimination of deficiencies:

- a) Perform a detailed review of the system documentation (Requirements, Design, Training, Test, Management Plans, etc.) for accuracy and completeness.
- b) Perform a detailed review of the software architecture for feasibility, consistency, and adherence to industry standards.
- c) Inventory and review the application software for completeness and adherence to programming standards for the project.
- d) Review the traceability of system requirements to design, code, test, and training.
- e) Analyze application, network, hardware and software operating platform performance characteristics relative to expected/anticipated/contractually guaranteed results and industry standards/expectations.

³ The procurement of a contracted Quality Assurance/Quality Control vendor for the SC CSES project should include a thorough review by the IV&V Service Provider both prior to and immediately after the actual solicitation. This IV&V review should, at a minimum, verify and validate for the State: the scope of work proposed for (and by) the QA/QC vendor (is it appropriate to the type of QA/QC work, or does the scope of work include activities not normally found in QA/QC work, and which could be perceived as outside of the normal QA/QC role in a development project); the amount of QA/QC resources proposed by the vendor against the scope of work relative to the project's schedule; whether standards and tools used in the QA/QC process are supportable by the State after completion of the SC CSES project (including whether there is any proprietary nature to any tools); and, whether any real or perceived conflicts-of-interest exists for the QA/QC vendor in its hiring practices or in other contracts associated with and relative to the SC CSES project (including with the IV&V Service Provider).