INDEPENDENT
VERIFICATION AND VALIDATION PLAN

ARC-IVVP-WDTIP-001

~~20 July 1999~~July 28, 1999

Unclassified

Prepared for:

Health and Welfare Data Center – Systems Integration Division
Statewide Automated Welfare System (SAWS)
Welfare Data Tracking Implementation Project (WDTIP)
1651 Alhambra Blvd
Sacramento, CA
95816

In Response To:

WDTIP IV&V
MSA Purchase Order Number – HW4847
and Job Duty Statement effective
24 June 1999

Prepared by:

Access Research Corporation
4704 Roseville Road, Suite 114
North Highlands, CA
95660

DRAFT

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Approved by:

Senior Technical Leader	Date
Application Analyst	Date
Project Manager	Date

REVISION HISTORY

Rev	Result of	Pages Affected	Approval	Date
-001	WDTIP IV&V	Initial Release. All pages.		7/280/99

FORWARD

This Independent Verification and Validation (IV&V) Plan describes the activities and responsibilities of Access Research Corporation for IV&V on the State of California, Health and Welfare Data Center – Systems Integration Division, Welfare Data Tracking Implementation Project (WDTIP). Access Research will perform parallel and totally independent verification and validation, which provides for a comprehensive evaluation throughout each life cycle phase of the project. This ensures that:

- Errors are detected and corrected as early as possible in the project.
- Project risk, cost and schedule effects are lessened.
- Software quality, reliability and maintainability are enhanced.
- Management visibility into the software process is improved.
- Proposed changes and their consequences are quickly assessed.

This plan applies to five of the seven IEEE phases of software life cycle activities: Requirements, Design, Implementation, Test and Installation and Checkout. The first phase, Concept, has been accomplished during an earlier part of the project. The last phase of a normal life cycle, Operation and Maintenance, is beyond the scope of this IV&V Plan.

The State has further grouped the five IEEE phases into three project phases. The Requirements and Design components have been grouped into project Phase I, the Detailed Design phase. The Implementation and Test components have been grouped into the project Phase II, the Construction and Testing phase. The Installation and Checkout component has been integrated into project Phase III, the Implementation phase.

Since this Plan will be activated during an early phase of the project, the maximum benefits to WDTIP will be realized. During each of the phases, the development of the project will be monitored, analyzed, evaluated, reviewed, audited and/or tested. Reports containing the results of IV&V activities will be submitted to WDTIP Executive Management for review.

ASSUMPTIONS

This section lists overall assumptions derived from the analysis of the WDTIP Job Duty Statement:

(4) (1) There will not be any out of local area IV&V travel associated with any phase of the project.

(6) (2) The developer shall perform Configuration and Data Management on the products they develop, and and that IV&V shall have access for monitoring and evaluation.

(8) (3) The developer shall perform Software Quality Assurance, and that IV&V shall have access for monitoring and evaluation.

(4) Access Research shall have open access to all developer activities.

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APPENDIX

1. Purpose

This Independent Verification and Validation (IV&V) Plan outlines Access Research Corporation's approach for IV&V activities using the ANSI/IEEE Std 1012-1986, Software Verification and Validation Plan standard as a guide.

Specifically, this Plan describes how Access Research Corporation's IV&V efforts will be used to support the State of California's Welfare Data Tracking Implementation Project (WDTIP). This will be accomplished using proven monitoring, analysis, review, and and evaluation procedures to track, audit, monitor and report on various tasks within the project. This will include participating in procedure, management, and and document reviews, code walkthroughs, and and testing.

This IV&V Plan utilizes selected portions of IEEE Std 1012's IV&V Plan which best meet the scope and needs of the WDTIP project.

2. Referenced Documents

Within this plan, the number in brackets (e.g., [1]) refers to the corresponding document listed below.The following documents are referenced in this IV&V Plan. The number in brackets is used throughout the Plan to refer to these documents.

[1] IEEE Std 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology.

[2] IEEE Std 730-1984, IEEE Standard for Software Quality Assurance Plans (ANSI).

[3] IEEE Std 730.1-1995, IEEE Guide for Software Quality Assurance Plans (ANSI).

[4] IEEE Std 1028-1988 (Reaff 1993), IEEE Standard for Software Reviews and Audits (ANSI).

[5] IEEE Std 828-1990, IEEE Standard for Software Configuration Management Plans (ANSI).

[6] IEEE Std 1042-1987 (Reaff 1993), IEEE Guide to Software Configuration Management (ANSI).

[7] IEEE Std 829-1983 (Reaff 1991), IEEE Standard for Software Test Documentation (ANSI).

[8] IEEE Std 830-1993, IEEE Recommended Practice for Software Requirements Specifications (ANSI).

[9] IEEE Std 1012-1986 (Reaff 1992), IEEE Standard for Software Verification and Validation Plans (ANSI).

[10] IEEE Std 1059-1993, IEEE Guide for Software Verification and Validation Plans (ANSI).

[11] IEEE Std 1058.1-1987 (Reaff 1993), IEEE Standard for Software Project Management Plans (ANSI).

[12] IEEE Std 1074-1995, IEEE Standard for Developing Software Life Cycle Processes (ANSI).

[13] IEEE Std 1074.1-1995, IEEE Guide for Developing Software Life Cycle Processes (ANSI).

[14] IEEE Std 1219-1992, IEEE Standard for Software Maintenance (ANSI).

[15] IEEE Std 1016-1987 (Reaff 1993), IEEE Recommended Practice for Software Design Descriptions (ANSI).

[16] IEEE Std 1016.1-1993, IEEE Guide to Software Design Descriptions (ANSI).

[17] IEEE Std 1063-1987 (Reaff 1993), IEEE Standard for Software User Documentation (ANSI).

[18] Mil-Std 1521B, Technical Reviews and Audits for Systems, Equipment's, and and Computer Programs, June 4, 1985, Notice 2, 17 July 1992

[19] Mil-Std 498, Software Development and Documentation, 5 December 1994.

[20] Developer's Project Management Plan, (TBD)

[21] Developer's Configuration Management Plan, (TBD)

[22] Developer's Design/Coding Standards Guide, file dated 24 June 1999.

[23] Department of Information Technology (DOIT), Cost Schedule Status Report, (*www.doit.ca.gov* checked)

[24] Master Service Agreement, Purchase Order Number HW4847, and Job Duty Statement, effective 24 June 1999.

3. Definitions

The following terms, including some defined in other standards, are used as indicated withinused in this Plan:.

Acceptance.– An action by an authorized representative of the acquirer by which the acquirer assumes ownership of software products as partial or complete performance of a contract.

Acquirer.– An organization that procures software products for itself or another organization (Health and Welfare Data Center – Systems Integration Division).

Anomaly.– Anything observed in the documentation or operation of software that deviates from expectations based on previously verified software products or reference documents.

Approval.– Written notification by an authorized representative of the acquirer that a developer's plans, design, or other aspects of the project appear to be sound and can be used as the basis for further work.– Such approval does not shift responsibility from the developer to meet contractual requirements.

Build.– (1) A version of software that meets a specified subset of the requirements that the completed software will meet.– (2) The period of time during which such a version is developed.– Note:– The relationship of the terms "build" and "version" is up to the developer; for example, it may take several versions to reach a build, a build may be released in several parallel versions (such as to different sites), or the terms may be used as synonyms.

Configuration item.– An aggregation of hardware, software, or both that satisfies an end use function and is designated for separate configuration management by the acquirer.

Critical software. Software whose failure could have an impact on safety, the mission of the Health and Welfare Data Center – Systems Integration Division, or could cause large financial loss.

Delivered. Unless otherwise defined in the contract, delivered documents shall be subject to approval by the WDTIP Project Manager and shall be deemed delivered upon the Manager's written acceptance/approval of the document.

Design phase. The period of time in the software life cycle during which the designs for architecture, software components, interfaces, and and data are created, documented, and and verified to satisfy requirements. (See ANSI/IEEE Std 729-1983 [1].)

HWDC. State of California, Health and Welfare Data Center – Systems Integration Division.

Document/documentation. A collection of data, regardless of the medium on which it is recorded, that generally has permanence and can be read by humans or machines.

Evaluation. The process of determining whether an item or activity meets specified criteria.

Independent Verification and Validation (IV&V). Systematic evaluation of products and activities by an agency that is independent of, and therefore not responsible for developing the product or performing the activity being evaluated.

Interface. In software development, a relationship among two or more entities in which the entities share, provide, or exchange data. An interface is not a CSCI, software unit, or other system component; it is the relationship among them.

Joint Review. A process or meeting involving representatives of both the acquirer and the developer, during which project status, software products, and and/or project issues are examined and discussed.

Life Cycle. A collective term which is used to identify the complete life of a product. This includes such steps as the development, acquisition, operation, support, and, where applicable, disposal of the product.

May. Indicates an item or activity appropriate under some, but not all, conditions; for which there are a number of acceptable alternatives; or for which there is no professional consensus.

Process. An organized set of activities performed for a given purpose; for example, the software development process.

Qualification testing. Testing performed to demonstrate to the acquirer that a CSCI or a system meets its specified requirements.

Reengineering. The process of examining and altering an existing system to reconstitute it in a new form. May include reverse engineering (analyzing a system and producing a representation at a higher level of abstraction, such as design from code), restructuring (transforming a system from one representation to another at the same level of abstraction), re-documentation (analyzing a system and producing user or support documentation), forward engineering (using software products derived from an existing system, together with new requirements, to produce a new system), re-targeting (transforming a system to install it on a different target system), and and translation (transforming source code from one language to another or from one version of a language to another).

Requirement.– (1) A characteristic that a system or CSCI must possess in order to be acceptable to the acquirer. – (2) A mandatory statement in the contract.

Shall.– Indicates an item or activity is required.

Should.– Indicates a recommended item or activity.

Software development.– A set of activities that results in software products. – Software development may include new development, modification, reuse, reengineering, maintenance, or any other activities that result in software products.

Software development library (SDL).– A controlled collection of software, documentation, other intermediate and final software products, and and associated tools and procedures used to facilitate the orderly development and subsequent support of software.

Software development process.– An organized set of activities performed to translate user needs into software products.

Software engineering.– In general usage, a synonym for software development.– As used in this standard, a subset of software development consisting of all activities except qualification testing.– The standard makes this distinction for the sole purpose of giving separate names to the software engineering and software test environments.

Software engineering environment.– The facilities, hardware, software, firmware, procedures, and and documentation needed to perform software engineering.– Elements may include but are not limited to computer-aided software engineering (CASE) tools, compilers, assemblers, linkers, loaders, operating systems, debuggers, simulators, emulators, documentation tools, and and database management systems.

Software product.– Software or associated information created, modified, or incorporated to satisfy a contract.– Examples include plans, requirements, design, code, databases, test information, and and manuals.

Software support.– The set of activities that takes place to ensure that software installed for operational use continues to perform as intended and fulfill its intended role in system operation. Software support includes software maintenance, aid to users, and and related activities.

Software system.– A system consisting solely of software and possibly the computer equipment on which the software operates.

Software test environment.– The facilities, hardware, software, firmware, procedures, and and documentation needed to perform qualification, and and possibly other, testing of software.– Elements may include but are not limited to simulators, code analyzers, test case generators, and and path analyzers, and may also include elements used in the software engineering environment.

Software transition.– The set of activities that enables responsibility for software development to pass from one organization, usually the organization that performs initial software development, to another, usually the organization that will perform software support.

Software unit.– An element in the design of a CSCIconfiguration item;, for example, a subdivision of a CSCIconfiguration item, a component of that subdivision, a class, object, module, function, routine, or database.– Software units may occur at different levels of a hierarchy and may consist of other software units.– Software units in the design may or may not have a one-to-one relationship with the code and data entities (routines, procedures, databases, data files, etc.) that implement them or with the computer files containing those entities.

Source Code (Source Code Listings).– Source code includes electronic listings and outputs from the development software package, as appropriate.

Submitted.– Unless otherwise defined in the contract, submitted documents are "working" documents. See Delivered.

System.– A collection of components organized to accomplish a specific function or set of functions.

Validation.– The process of evaluating a system or component during or at the end of the development process to determine whether it satisfies specified requirements.

Verification.– The process of evaluating a system or component to determine whether the products of a given development phase satisfyprocess of evaluating a system or component to determine whether the products of a given development phase satisfies the conditions imposed at the start of that phase.

Waiver.– A written authorization to accept a configuration item or other designated item which, during production or after having been submitted for inspection, is found to depart from specified requirements, but is nevertheless considered suitable for use as is or after rework by an approved method.

Will.– Indicates an item or activity is a goal, which may or may not be attainable.– See Shall.

3.1 Acronyms

The following acronyms appear in this Plan:

ANSI	American National Standards Institute
CM	Configuration Management
CMP	Configuration Management Plan
COTS	Commercial-off-the-shelf
DED	Deliverable Expectation Document
DM	Data Management
DOIT	Department of Information Technology
HWDC	Health and Welfare Data Center
IEEE	The Institute of Electrical and Electronics Engineers, Inc.
ISO	International Organization for Standardization
IV&V	Independent Verification and Validation
IVVP	Independent Verification and Validation Plan
JDS	Job Duty Statement
JRP	Joint Requirements Planning
MSA	Master Services Agreement

PMP	Project Management Plan
QA	Quality Assurance
SAWS-TA	Statewide Automation Welfare System-Technical Architecture
SDL	Software Development Library
SQA	Software Quality Assurance
SW	Software
TBD	To Be Determined
WBS	Work Breakdown Structure
WDTIP	Welfare Data Tracking Implementation Project

4. Verification and Validation Overview

Software Independent Verification and Validation (IV&V) is a disciplined approach for ensuring the compliance of all software related items with the defined requirements. An IV&V effort is typically applied in parallel with software development and other support activities and continues throughout a products life cycle. IV&V efforts consist of management tasks (e.g., planning, organizing, and monitoring the IV&V effort) and technical tasks (e.g., analyzing, evaluating, reviewing, and testing the software development process and products). The IV&V effort focuses on ensuring that the appropriate level of engineering and quality is built into the software, and that the software satisfies all of the acquirer's requirements. In order to accomplish this, IV&V provides project management with timely insights into the status of the software project and products, thereby allowing timely changes in the development process.

In addition to monitoring quality attributes (usability, efficiency, maintainability, manageability, etc.), the IV&V effort will include analysis to find defects and to determine if all required functions and attributes are being built into the software system. All of Access Research's functions shall be independent of the development and acquisition functions. This process is known as Independent Verification and Validation, or IV&V [1].

Access Research will perform the appropriate analysis, evaluation, review or test on the product, then generate a report providing a summary, conclusions and recommendations, along with any significant and general findings. This report will be submitted to the appropriate State point of contact for their review and action, if any. Access Research will be available to provide additional briefing on the report, if requested. To ensure requirements are fully understood and traceable, Access Research will use such sources as the Job Duty Statement [24] (the "Statement of Work," or "SOW"), business requirements documents, and any applicable standards which may apply during analysis or evaluations which may apply.

The overall schedule for this project was defined in the Master Services Agreement and Job Duty Statement [24]. The project master schedule has been reviewed, and an IV&V master schedule defined. The IV&V effort has been structured to provide one person on-site, with expert support personnel off-site to provide a rapid turn around.

4.1 Organization

Access Research's IV&V function is shall be independent, financially and organizationally, of the development and acquisition functions.

A detailed project organization chart can be found in Access Research's response to the Request For Proposal. A simplified version of the organizational chart can be found in Figure 4.1-1. Appendix B, Responsibility Assignment Matrix, indicates specific responsibilities assigned to each position in Figure 4.1-1.

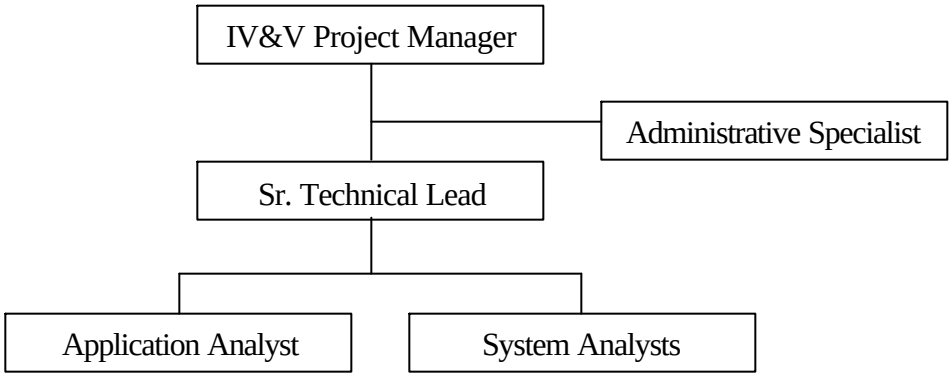

Figure 4.1-1, Access Research Organizational Chart

The responsibilities of each functional team member are outlined in the Section 4.4, Responsibilities, section of in this plan.

The major communication lines between WDTIP Project Management and the various teams are shown below.

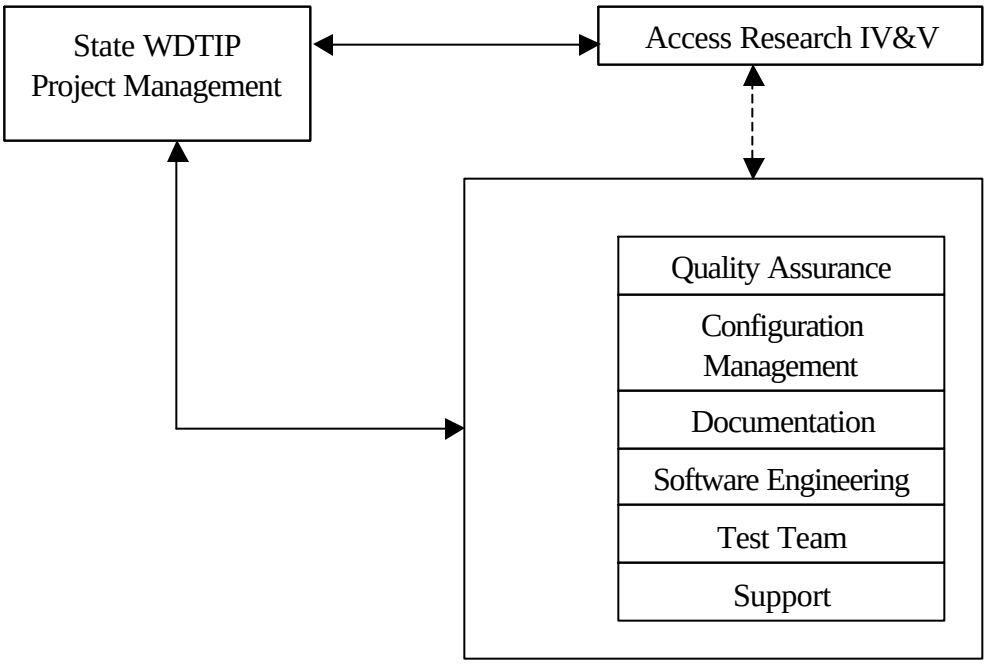

Figure 4.1-2, Relationship of Access Research within the project

Issues raised through normal IV&V efforts shall be passed on through the appropriate major communications line (as depicted in Figure 4.1-2) for approval and actions. The final authority for approving Access Research's submitted IV&V products rests with the WDTIP Project

ManagementManager.– The appropriately designated WDTIP representative(s) have the responsibility to review the IV&V reports and, based on the recommendations, decide which (if any) of the deficiencies require corrective action.– It will be WDTIP's responsibility to resolve deficiencies with the developer.– Access Research will be available to assist with background information gathered during the analysis or evaluation.

Following resolution and correction, IV&V shall again be performed on the product.– The follow-up IV&V review provides closure on WDTIP directed corrective actions.

4.2 Master Schedule

The milestones depicted within this section reflect those extracted from the IV&V Job Duty Statement (JDS) [24] and will be updated following the acceptance of the developer's Project Management Plan [20], and periodically during the project.– The IV&V Master Schedule has been indexed by elapsed time and contains IV&V events and milestones. – The master schedule is located in Appendix A of this Plan.

The Master Schedule is based upon our overall understanding of the goals of the JSDJDS. . Our analysis indicates that tThe project has beenis organized into three phases.– Each phase in the master schedule is described in terms of planned development contractor actions, what is to be accomplished, the deliverable products of each phase and the anticipated accomplishment date.– For this project, three phases have been identified; Detailed Design, Construction and Testing, and and Implementation.

Each phase has required inputs and outputs.– Required inputs and outputs of one phase, automatically become available for use by all succeeding life cycle phases.– Required outputs are used as inputs by succeeding phases.– This aids in the traceability of requirements.– Each of the phases is further described in the following sub-sections.

Prior to starting any succeeding phase, the current phase must have State approval.

4.2.1 Startup Activities

During the startup activities, Access Research will become familiar with the project's history and requirements.– Also, the IV&V Plan will be developed and delivered.

4.2.2 Continuing Activities

For the life of the contract, Access Research shall provide a Monthly Status reportReport containing which contains several sub-components.– Those components include:;

- Activities, accomplishments, budget status, and expenditures.,
- Technical development monitoring findings.,
- Application development support monitoring.;
- System Development Methodologies.,

- Configuration Management.,
- Quality Management.,
- Project Monitoring.,
- Communications Management.,
- Implementation status.,
- Risk Assessment., and
- IV&V findings on deliverables during the reporting period.,

Access Research shall perform a minimum of three Quality Assurance (QA), and Configuration and Data Management (CM/DM) evaluations [2, 3, 4, 5, 6, 21] over the course of the project. Initial formal evaluations of both the QA and CM/DM activities shall be performed as indicated in the master schedule. Periodic and random informal evaluations shall be performed throughout the project to ensure continued compliance with established procedures. The frequency of the informal evaluations shall be dependent upon the results of prior evaluations (a high rate of defects will equate to an increase in the number of evaluations.). The results of evaluations performed during a particular reporting period shall be provided in the appropriate Monthly Rreport.

Access Research shall also represent IV&V at technical meetings with the State, all related organizations and all relevant contractors. IV&V management will attend all pertinent reviews and prepare review IV&V technical responses as required.

4.2.3 Detailed Design Phase

The Detailed Design phase shall focus primarily on overall project management, reviewing and developing project standards, reviewing business requirements, reviewing detailed design and architecture models for the system, reviewing the implementation strategy, and and updating the stakeholder communication plan. The work plan for the next phase will also be reviewed.

IV&V process inputs include a Project Management Plan, Configuration Management Plan, Updated Business Requirements document, Design/Coding Standards Guide, Detailed Design Specification Document, System Architecture Model, Updated Stakeholder Communication Plan, Implementation Strategy, and and a Phase 2 Work plan.

Access Research will apply appropriate analysis, evaluation, or review evaluation techniques [4, 18] as outlined in section Section 6 on each of the deliverables. As process outputs, Access Research will provide reports as defined in section Section 5 of this Plan.

4.2.4 Construction and Testing Phase

The Construction and Testing phase shall focus primarily on overall project management, Code and Unit Testing, preparations for Integration/System and User Acceptance testing, developing the user-training curriculum, and and the implementation planning. On-going activities include CM and QA monitoring.

IV&V process inputs include Completed Source Modules/Unit Test results, Implementation Plan, Training Curriculum, Integration/System Test Sign-off, and and a Phase 3 Work plan.

As a minimum, Access Research will perform Requirements requirements traceability analysis [12, 13, 14, 24], Requirements evaluation [8], Code traceability analysis [12,14], high level Code evaluation [14, 19], Interface analysis [8], Design traceability analysis [4, 18], Documentation evaluations [4, 18], and and Test Plan evaluation [7].

Access Research will then apply appropriate analysis, evaluation or review evaluation techniques as outlined in section Section 6. As process outputs, Access Research will provide reports as defined in section Section 5 of this Plan.

4.2.5 Implementation Phase

The Implementation phase shall focus primarily on overall project management, User Acceptance testing, county data Conversion Loads, User Training, and and getting the system into Production.

Access Research will apply appropriate analysis, evaluation or review evaluation techniques as outlined in section Section 6. As process outputs, Access Research will provide reports as defined in section Section 5 of this Plan.

4.2.6 Testing Report

Reports from this phase shall A report contain ing the findings of the IV&V review and monitoring of Unit, System, Integration, Acceptance, and and Year 2000 testing.

shall be provided, as defined in section 5.

4.3 Resources Summary

The resources required to perform each phase shall depend upon the final determination of the tasks that will be required during that phase. This will be accomplished initially using the tasks identified within the Master Schedule and the developer's Project Management Plan, and will be updated as required over the life of the project. Basic resources include the following items:

(1) ARC Resources:

- The IV&V team consists of seven personnel.
- The application analyst will be stationed on-site.
- Six expert support personnel will be stationed off-site to provide the rapid turnaround requirements of the project.
- Office facilities, computers, analytical and reporting software will be provided by Access Research for all off-site personnel.

(2) State Resources (support of the Applications Analyst stationed on-site):

- Office facilities (desks, chairs, document storage facilities, copier access, telephone, IBM compatible PC with local network and e-mail capability).

? Personnel staffing shall be as outlined with the Work Breakdown Structure in Appendix B.

- Appropriate badges, identification, etc. for easy daily entrance into WDTIP office area. Access Research can provide non-disclosure agreements and security clearance information as required.
- Access to, and authorization to copy selected documents from the project Library. – All copies of documents shall be placed under Access Research's internal document control.– At the conclusion of the project, copied documents may be either returned to the library or safely disposed of, as directed by WDTIP management.
- Access to appropriate WDTIP personnel for timely and pre-scheduled interviews.

? (3) (3) Finances shall be in accordance with the contracted agreement reached between Access
Research and WDTIP.

4.4 Responsibilities

Access Research shall provide IV&V activities analysis for each of the tasks and phases defined in the Master Schedule.– For each phase, every member of the IV&V team shall have some tasks to perform.– In order to accomplish this, responsibilities shall be as outlined below:;

- Project Manager - Shall perform the management functions outlined in section 5.1for the IV&V effort and represent Access Research in major reviews.
- Senior Technical Lead - Shall review document(s) for compliance with applicable standards, readability, and and adherence to approved life cycle processes; identify and update project risk; monitor schedule progreass; author andnad/or review technical comments for IV&V reports; and attend designated meetings.
- Application Analyst - Shall review documents/code/listings for sound software practices, requirements traceability, and and maintainability.– Shall be on-site to facilitate access to developer activities, and consultation with WDTIP management and early problem detection/correction.
- Systems Analyst – Shall review documents/code/listings for sound software and management practices, correct implementation, configuration management practices and provide written reports and input to the monthly status report.
- Administrative Specialist - Shall combine the findings of the team and generate a report providing summary, conclusions and recommendations, along with any significant and general findings and analyze the structure of documents provided for IV&V review.

WDTIP wishall be responsible for providing the following support to the IV&V contractor:

- Timely review of deliverables.
- Access to business and technical documentation as necessary for the IV&V contractor to complete the tasks identified within the developer's Project Management Plan.

- Provide aAccess to department staff, management, offices and operation areas as required to complete the tasks and activities identified under any order issued as a result of the JDS.– This support will be scheduled as far in advance as is practical.
- It is requested that "Vendor" badges be provided for those who will be regularly be entering the WDTIP building.
- Provide the IV&V contractor with aAccess to the developer's development environment.

The developer shall be responsible for providing provides the following support to the IV&V contractor:

- Provide rRequired DEDs and draft documents as early as possible and final deliverables on-time, and and in accordance with the WDTIP approved Master Schedule and Project Management Plan.
- Provide Access Research with cCopies of draft submittals to WDTIP, including draft progress reports.
- Access to facility to perform CM/DM and QA reviews.

? Utilization of cComputer resources used in support of work to be performed by IV&V.

- Provide vVisibility into anomaly reconciliation process.

4.5 Tools, Techniques, and and Methodologies

Access Research will be utilizing internal IV&V procedures proven to meet the needs of various levels of IV&V contracts.

The review mechanism is as follows:

- Establish tracabilitytraceability from higher documents –trace and log.
- Check for internal consistency.
- Ensure compliance with standards and the agreed methodology –compare to DEDs.
- Employ internal checklists.
- Generate action item lists.
- Review plan and checklist tailored to agreed methodology.
- Perform structural checks --does the table of contents agree with the actual paragraph headings?

Using the appropriate SAWS-TA requirements in conjunction with requirements which were validated through the Joint Requirements Planning (JRP) sessions, resulting requirements will be placed into a traceability matrix and tracked throughout the life of the project.. An analysis will also be performed to determine the testability and performance criteria associated with each requirement.

Access Research will be using Microsoft Word™ , and Excel™ in a Windows and Macintosh environment. As appropriate, additional tools and resources may be utilized. For verification and illustration purposes, data flow and entity relationship diagrams using Access Research owned Computer Aided Software Engineering Tools may be employed.

Microsoft Word will be utilized for report generation, and wherever general word processing is required. Microsoft Excel will be used wherever spreadsheet, matrix, or graphical representation of data is required. Since these tools are part of the Microsoft Office 95 Suite™ of tools, it is very easy to integrate and pass data between these packages. The media used in deliveries will be compatible with current project storage devices.

Utilizing the appropriate SAWS-TA requirements in conjunction with requirements which were validated through the Joint Requirements Planning (JRP) sessions, resulting requirements will be placed into a traceability matrix and tracked throughout the life of the project.

An analysis will also be performed to determine the testability and performance criteria associated with each requirement.

5. Life Cycle Verification and Validation

This section of the IV&V Plan provides the details for accomplishing the three phases within the Welfare Data Tracking Implementation Project.

5.1 Management of IV&V

Access Research will provide project management support on the WDTIP project by providing IV&V tasks in the following areas:

(1) Generation of a living Independent Verification and Validation Plan [9, 10] (IV&VP - this document). The IV&VP shall be submitted to WDTIP during the first 30 days of the contract. The IV&VP shall go through the WDTIP approval process. The IV&V Plan also shall be updated as a part of the closing activities for each phase, as required.

The following items are some of the required inputs to the IV&V Plan updates (to be used as they are developed and accepted):

- Project Management Plan,
- Configuration Management Plan,
- Updated Business Requirements Document,
- Design/Coding Standards Guide,
- Detailed Design Specification Document,
- Updated Stakeholder Communication Plan,
- Source Code Listing(s),

- Executable Code.,
- Data Conversion effort data.,
- Test Plan and Procedures.,
- User Training documentation., and
- Proposed changes.

(2) Baseline Change Assessment.– Access Research will evaluate proposed software changes (for example, anomaly corrections, performance enhancements, requirement changes, and and clarifications) for effects on previously completed IV&V tasks and risks. – When WDTIP approved changes are made, the effects will be noted in the next update of the IV&V Plan and the traceability matrix.

(4) (3) Management Review.– The Access Research Project Manager and the Senior Technical Lead shall conduct periodic reviews of IV&V efforts, technical accomplishments, application development, resource utilization, future planning, and and risk management.– Based upon development schedules and the various IV&V outputs, Task Reports, and and Monthly summary reports will be generated.– The Project Manager and the Senior Technical Leas shall also:

- Support daily IV&V phase activities, including assuring the technical quality of IV&V reports and results and availability of resources to support IV&V analysts.,
- Evaluate IV&V results and anomaly resolution, and define changes to IV&V tasks to improve the IV&V effort., and
- Coordinate with WDTIP for determination of when to proceed to the next project phase.
- Participate in WDTIP meetings and reviews as required.

(6) (4) Review Support.– The IV&V Plan identifies key review support milestones and shall schedule IV&V tasks to meet these milestones.– Procedures shall behave been established to ensure timely exchange of IV&V data and results with the developerWDTIP.– Two of the primary tools for accomplishing this support will beare Task reports Reports and Code Anomaly reportsReports.

(8) (5) Access to IV&V Activities.– The Access Research Project Manager shall ensure that Access Research's IV&V activities are open to for inspections of the "in-process" materials by WDTIP personnel.

(10) (6) Monthly Project Status Reporting.– A monthly IV&V status reportReport shall be generated and delivered to WDTIP.– The reportReport's format and content shall be as defined in section Section 6.1 of this plan.– The delivery schedule shall be as defined in the Master Schedule in Appendix A of this plan.

5.2 5.2 Startup Activities

Traceability will be continuous throughout the IV&V effort. Requirements from all sources will be gathered and recorded in a spreadsheet. Sources of requirements are the development contractor's

contract and job duty statement/statement of work, California and federal laws and regulations, business requirements documents, concepts of operation and any other documents or agreements reflecting the scope of requirements to be implemented in WDTIP. The requirements matrix shall be updated upon WDTIP acceptance of developer authored documentation and code. The traceability matrix is used to assure no requirements are dropped or changed in an unacceptable manner. It is also used to determine that only requirements for which there is an authorized basis are designed into WDTIP.

The traceability matrix shall indicate the source of each requirement tracked (source document, page and paragraph). As documents and code are produced by the developer and accepted by the WDTIP project, the traceability matrix shall be updated to record the document or module title and the page and paragraph where each requirement is addressed in each downstream document, test procedure and the code.

During the startup activities, Access Research will become familiar with the project's history and requirements. Then, as part of the Monthly Report ARC will provide a Project Risk Assessment [12, 13, 14]. Also, the IV&V Plan will be developed and delivered within 30 days of the execution of the JDS. Inputs to the startup phase are from the developers Project Management Plan [20] and documents from the WDTIP project library.

Inputs to these stages the startup phase are from the developers Project Management Plan [20] and documents from the WDTIP project library. These documents will go through the WDTIP approval process.

5.3 Continuing Activities

Traceability will be continuous throughout the IV&V effort. Requirements from all sources will be gathered and recorded in a spreadsheet. Sources of requirements are the development contractor's contract and job duty statement/statement of work, California and federal laws and regulations, business requirements documents, concepts of operation and any other documents or agreements reflecting the scope of requirements to be implemented in WDTIP. The requirements matrix shall be updated upon WDTIP acceptance of developer authored documentation and code. The traceability matrix is used to assure no requirements are dropped or changed in an unacceptable manner. It is also used to determine that oly requirements for which there is unauthorized basis are designed into WDTIP.

The traceability matrix shall indicate the source of each requirement tracked (source document, page and paragraph). As documents and code are produced by the developer and accepted by the WDTIP project, the traceability matrix shall be updated to record the document or module title and the page and paragraph where each requirement is addressed in each downstream document, test procedure and the code.

Access Research shall perform a minimum of three Quality Assurance (QA), and three Configuration and Data Management (CM/DM) evaluations over the course of the project. Initial formal evaluations of both the QA and CM/DM activities shall be performed as indicated in the master schedule. Periodic informal evaluations shall be performed throughout the project to ensure continued compliance with established procedures [20, 21, 22]. The frequency of the informal evaluations shall be dependent upon the results of prior evaluations (a high rate of defects will equate to an increase in the number of evaluations). Results of all evaluations shall be provided in the appropriate Monthly reportReport.

5.4 Detailed Design Phase IV&V

During the Detailed Design phase, Access Research will evaluate definition documentation to determine if the proposed definition satisfies the stated user needs and project objectives. In addition to taking into account constraints or limitations of the proposed approach, Access Research will assess the allocation of functions to hardware and software items, where appropriate. The criticality of each software item shall be defined jointly between Access Research and WDTIP, then placed into the traceability matrix for ease in tracking.

In order to provide Task and Code Anomaly reportReports, the following types of input data will be required:

(1) Definition documentation. For example;, business requirements and rules, process model diagrams, advance planning reports, relevant studies, policies, acceptance criteria, and and governing regulations, policies and procedures.

In support of the Detailed Design phase, Access Research will perform the following IV&V efforts:

(2) (1) Project Management Plan. This analysis shall focus on standard project management concepts and standards utilizing IEEE [11] and internal Deliverable Expectation Documents (DEDs). Milestones and other key events shall be placed within the IV&V Plan's master schedule to enhance coordination between the two plans.. The normal output from this task is a Task reportingReport.

(3) (2) Configuration Management Plan. Using established standards [4, 5, 6] and applicable DEDs, the CM Plan shall be evaluated for content, usability, and and traceability to other documents.. The normal output from this task is a Task reportingReport.

(4) (3) Design/Coding Standards Guide. The guide shall be reviewed for usability and conformity with existing coding standards [19]. Maintainability of the deliverable product upon completion of the project will also be a factor in our evaluation of this guide. The output from this task is a Task Report.The normal output from this task is Task reporting.

(5) (4) Updated Stakeholder Communication Plan. The analysis will focus on the functionality update of the Stakeholder Communication Plan and the usability of the document as a communication tool between the WDTIP group and the Stakeholders.. The output from this task is a Task Report.. The normal output from this task is Task reporting.

(6) (5) Updated Business Requirements Document.– The Updated Business Requirements document provides the basic requirements for the WDTIP effort. A concerted effort will be made to verify and validate those. requirements Requirements finalized by the prior project will be verified and validated. to ensure that this project has a firm foundation upon which to build. Any direction changes, stakeholder inputs, and and legislation will be consideredincorporated. The output from this task is a Task Report.The normal output from this task is Task reporting.

(7) (6) System Architecture Model.– The System Architecture model will provide both a hardware and software model through which the business requirements may be accomplished. – Analysis will focus on verifying the model for completeness and accuracy. . The output from this task is a Task Report.The normal output from this task is Task reporting.

(8) (7) Detailed Design Specification Document.– The Detailed Design Specification [8, 15] shall be evaluated for correctness, consistency, completeness, accuracy, readability, and and testability. . Requirements will be traced using both the Updated Business Requirements document and the System Architecture Model to ensure proper agreement.– In addition, the Detailed Design Specification will be evaluated to determine how well it satisfies software system objectives. . and criticality of requirements to identify key performance or critical areas of the software. The criticality of each software item shall be determined and placed intoincluded in the IV&V the traceability matrix along with an assessment of the method of testing. . The output from this task is a Task Report The normal output from this task is Task reporting.

(9) (8) Implementation Strategy. – The strategy needed to guide the WDTIP effort to a successful conclusion shall be implemented and reviewed during this phase.– A review of the strategy will be performed with attention to completeness, risks, and and stakeholder achievable goals [12, 13, 20]. . The output from this task is a Task Report. The normal output from this task is Task reporting.

(10) (9) Phase 2 Work Plan.– The work plan for accomplishment of the next Phase will be reviewed for risks and completeness [12, 13, 20]. . The output from this task is a Task ReportThe normal output from this task is Task reporting.

Since some of the items will be refined during the Detailed Design phase, the IV&V Plan will be updated to reflect the direction decided up by WDTIP management at the conclusion of the Detailed Design phaseany changes.

5.5 Construction and Testing Phase IV&V

In support of the Construction and Testing phase, Access Research will perform the following IV&V efforts:

(1) Completed Source Modules-/-Unit Test.– To accomplish this task, Access Research will verify that requirement traceability exists between the Detailed Design Specification Document and developed tests [7]. – This will ensure the identified relationships are correct, consistent, complete, and and accurate. – The Configuration Management and Quality Assurance processes will be monitored. Source code functionality will be evaluated o a sampling basis. . The normal output from this task is a Task reportingReport.

(2) Integration-/-System Test Sign-off.– Access Research will evaluate the integration and system test procedures for completeness, accuracy, and and readability [7].– Required inputs are the Updated Business Requirements, Detailed Design Specification Document, Source source Code code Listingslistings, and and User user documentation.– The normal output from this task will be a Task report Report and any Code Anomaly reportsReports, if required.

(3) Training Curriculum.– Access Research will evaluate the training curriculum to ensure it meets the needs expressed by the stakeholders [17].– The normal output from this task is a Task reportingReport.

(4) Implementation Plan.– The Implementation plan will be evaluated to ensure it properly depicts the implementation strategy and the needs expressed by the stakeholders [12, 13, 20].– The normal output from this task is a Task reportingReport.

(5) Phase 3 Work Plan.–. The work plan for accomplishment of the next Phase phase will be reviewed for risks and completeness [12, 13, 20].–. The normal output from this task is Task reporting.

5.7 Implementation Phase IV&V

In support of the Implementation phase, Access Research will perform the following IV&V efforts:

(1) User Acceptance Test Sign-off.– Access Research will evaluate the User Acceptance Test procedures for completeness, accuracy, and and readability [7].– The normal output from this task will beis a Task report Report and any Code Anomaly rReports, if required.

(2) Conversion Loads.– County data conversions will be very critical to the successful completion of the WDTIP effort.– -Therefore, Access Research will actively monitor the preparations for converting the county data, testing of received data, the batch software required to perform the tasks, and and the implementation of ongoing data conversion packages [7, 20, 22].–. The normal output from this task will be a Task reportReport, and any Code Anomaly rReports, if required.

(3) System in Production.– Access Research will evaluate the products associated with configuring the system for production [12, 13, 20].– The normal output from this task will be a Task reportReport, and any Code Anomaly rReports, if required.

6. Software Verification and Validation Reporting

All findings from participation in design or management reviews and walk-throughs, as well as IV&V monitoring, analysis, evaluations, reviews, and and/or tests will be documented. – The appropriate documents will be routed, with necessary informational copies, to WDTIP Project Management.

The timing of the IV&V reports is linked to their function, audience, and and the Master Schedule. The great cost multiplier for software errors is their latency period;: the time between the introduction of the defect, its detection, and and subsequent removal.– By performing IV&V activities in parallel with development, delays will be minimized.

The following table contains the estimated time periods for review of the IV&V deliverables.

Phase 1 Deliverables

Deliverable	Prepare	Develop	Review	Resolve	Approve
Monthly Status Reports	On-going	On-going	On-going	On-going	On-going
Project Management Plan	3 days	15 days	5 days	5 days	2 days
Updated Stakeholder Communication Plan	3 days	10 days	2 days	5 days	2 days
Configuration Management Plan	3 days	15 days	2 days	5 days	2 days
Updated Business Requirements Document	3 days	25 days	5 days	5 days	2 days
Design/Coding Standards Guide	3 days	10 days	2 days	5 days	2 days
System Architecture Model	3 days	40 days	3 days	5 days	2 days
Implementation Strategy	3 days	45 days	5 days	10 days	2 days
Detailed Design Specifications Document	3 days	41 days	5 days	10 days	2 days
WDTIP Phase 2 Workplan	3 days	10 days	3 days	2 days	2 days

Phase 2 Deliverables

~~Access Research will utilize established checklists, based upon industry standards, as one of the tools for document reviews. The results gathered using these tools will be provided within the reports.~~

~~The format of the reports will all be basically the same, in that they will conform to established standards [1, 4, 18].~~

Deliverable	Prepare	Develop	Review	Resolve	Approve
Monthly Status Reports	On-going	On-going	On-going	On-going	On-going
Completed Source Code/Unit Test	3 days	72 days	3 days	5 days	2 days

Deliverable	Prepare	Develop	Review	Resolve	Approve
Implementation Plan	3 days	56 days	5 days	5 days	2 days
Integration/System Test Sign-Off	3 days	32 days	3 days	5 days	2 days
Training Curriculum	3 days	32 days	3 days	5 days	2 days
WDTIP Phase 3 Workplan	3 days	10 days	3 days	2 days	2 days

Phase 3 Deliverables

Deliverable	Prepare	Develop	Review	Resolve	Approve
Monthly Status Reports	On-going	On-going	On-going	On-going	On-going
User Acceptance Test Sign-off	3 days	20 days	3 days	3 days	2 days
System In Production	3 days	32 days	3 days	5 days	2 days
Conversion Loads	3 days	50 days	3 days	5 days	2 days
Users Training	3 days	64 days	2 days	2 days	2 days

~~The JDS defines the deliverable development and review process by providing guidelines and a five-phase approach (Prepare, Develop, Review, Resolve, and Approve). As part of the guidelines, estimated time periods for review of the deliverables have been created. The IV&V times range from two to five days depending upon the document. The table is located on Page 17 of the Master Services Agreement (MSA) between the State and the developer (Purchase Order Number HW 4627).~~

Access Research shall maintain all project documents under internal Configuration/Data Management control. The following sub-sections define the various types of reports that will be generated under this plan, their format~~, and~~ and content ~~that will be generated under this plan~~.

6.1 Required Reports

This section describes the format and minimum content for the various types of reports that will be generated during the accomplishment of the IV&V Plan.

6.1.1 Monthly Project Status Reports

Access Research shall provide WDTIP with M~~m~~onthly ~~report~~Reports by the ~~10~~th tenth of the month for the duration of the contract. The Monthly Project Status Reports, at a minimum, will contain summaries and findings for each of the following areas:

- Activities, accomplishments, budget status~~, and~~ and expenditures.~~,~~
- Status of technical development monitoring and its findings.~~,~~
- Status of application development support monitoring and its findings on the following areas:~~;~~
  - System Development Methodologies.
  - Configuration Management.
  - Quality Management.
  - Project Monitoring.
  - Communications Management.
- Status of implementation of the WDTIP application and its findings~~,~~.

- Risk assessment section, including recommendations for mitigation and prevention strategies, and.
- Findings of any IV&V review of deliverables.

Additionally, the Monthly Project Status Rreport will also contain financial data, specific to IV&V operations, which clearly shows the budgeted costs, by month, for completing each general task and/or deliverable, and and the actual costs incurred to date by the IV&V contractor. Costs will be determined and set forth in the monthly reports in accordance with project cost reporting methodology.

The risk assessment section shall record the results of Access Research's on-going risk assessment of the WDTIP effort. This assessment includes general risks such as process risks, product risks and technology risks. In addition, the assessment includes schedule risks such as schedule creation risks, project organization risks, development environment risks, customer risks, consultant risks, requirements risks, external environment risks, personnel risks, design and implementation risks, and and process administration risks.

The reports will be provided in Microsoft Office 95 (or later) format, including processing documents, spreadsheets, presentations, and and databases. The media of delivery will be compatible with current project storage devices. Three paper copies and one electronic copy will be provided.

6.1.2 Independent Verification and Validation Plan

Access Research shall also provide anThis Independent Verification and Validation Plan (IV&V Plan) outlinges the activities to be undertaken to support the IV&V effort [9, 10].

This document is that plan.

6.1.3 Task Reports ing

Task reportReportsing shall report on the various individual IV&V tasks, and shall be issued as stated in the approved IV&V Plan. Task reports may be either working/draft or final as required by the phase and master schedule. If the report is draft, it shall be clearly identified as being draft. The task report will be in a format appropriate for technical reports and memos. Technical reports will follow the WDTIP established format. Content shall be proposed by Access Research and approved by WDTIP.

(1) Format: Text shall be prepared on standard letter size paper (8-½" by 11"). When attachments are included, they shall be fully identified, referenced in the text, and and folded to conform to the size paper used in the report. An electronic copy of the document shall be placed on an IBM compatible, formatted, 3-½" diskette, with appropriate label, in the file format specified in section Section 3.2, Document Format, of the Master Services Agreement.

(2) Content: The report shall contain of the following sections and information;

(a) Transmittal Letter - Identifies the report by providing contract number, project and task name, report date, a unique document tracking/reference number, and and signature of the approver. The transmittal letter shall provide a summary of the findings and a recommendation for either rejection or acceptance for the deliverable.

(b) Attachments

(1) Attachment A shall contain Access Research's findings on the subject deliverable. . This will be reported in a ten-column spreadsheet format. . The ten columns will be titled: item number, page number, section, title, description, findings, recommendations, status, comments and rank. . The last column "rank" will be rated over a range of "A" (highest) to "C" (lowest).

(2) Additional attachments may be added to the report as required.

(23) Deliverables - : – All reports shall be delivered to the appropriate WDTIP representative, and and shall have all necessary signatures. – A deliverable shall consist of the following items:a master report, and two printed copies and an electronic copy.

? An IBM compatible, formatted, 3-½" diskette, with appropriate label, containing the electronic copy of the deliverable,

? A printed Master Report, and

? Three (3) printed copies of the Master Report.

(3) Content: The report shall contain of the following sections and information;

(a) Title Page – Identifies the report by providing contract number, project name, task name, report date, release restrictions (if any), who the report is prepared for, who prepared the report, a unique document tracking/reference number, and signatures of the approver. The title page shall also provide a recommendation of either Rejection or Acceptance for the deliverable.

(b) Attachments.

(1)Attachment A shall contain Access Research's findings on the subject deliverable. The format of the attachment shall be compatible with the WDTIP anomaly tracking process.

(2)In addition to the reporting requirements of the WDTIP anomaly tracking process, Access Research will also add a Severity column in which reported anomalies will be rated over a range of 1 (highest) to 5 (lowest).

(3)Additional attachments may be added to the report as required.

6.1.4 IV&V Testing Findings

Access Research shall develop the format and required content list of the IV&V Testing Findings reports defined below in accordance with WDTIP defined 'look and feel.' . . The Access Research report shall cover findings of the IV&V review monitoring efforts in the following areas:

- Unit Testing. ,
- System Testing, .
- Integration Testing. ,
- Acceptance Testing, and .

- Year 2000 Testing. .

The report shall, as a minimum, provide the same level of detail as found in Task Reporting for the standard report format and deliverable quantities.

6.2 Optional Reports

This section covers IV&V reports not covered within the standard life cycle phases.

6.2.1 Special Studies Report

If required, this report shall describe any special studies conducted during any life cycle phase. The report will include the purpose, objective, and and approach sections in addition to the sections defined in the Task Report section. The resulting report(s) shall be in conformance with Task Reports and the Task Iteration Policy. .

At this time, there are no unanticipated tasks. No work shall be accomplished without WDTIP's prior approval.

7. Verification and Validation Administrative Procedures

This section describes Access Research's IV&V administrative procedures.

7.1 Anomaly Reporting and Resolution

Access Research shall, after review of the developer's Project Management Plan [20], and after consultation with the developer and WDTIP, define the Anomaly Report format. This will be done to provide for timely turn-around of this important report.

Access Research will declare an anomaly when code analysis shows one of the following:

- Pproposed code does not link to project requirements.,
- Pproposed code does not execute as defined by project requirements.,
- Ssignificant savings in execution time can be realized by proposed recommendation., or
- Aan opportunity for decreased long termlong-term maintainability costs.

Using the approved report, Access Research shall submit the report to the WDTIP Project Manager, with an information copy to the developer. It willshall be the WDTIP's responsibility to direct the developer to respond to the report. A copy of WDTIP's response to the developer (either to ignore or respond) willshall be returned to Access Research for anomaly process tracking. Anomaly reporting is very time critical if costs are to be controlled and schedules are to be met. Access Research will review the WDTIP approved developer's anomaly handling procedure, and will modify this section of the IV&V Plan to conform with reviews and reporting schedules.

An example of various priorities might be; Serious, Urgent, and and Routine.– Serious would include the following items:;

- Compromise of database security.,
- Loss of data.,
- Activity would result in sSystem shut-down.,
- Required function missing, or inoperative as defined.

Urgent would include the following items:;

- Serious degradation of the system.,
- Potential loss of data.,
- Result in pProject schedule slippage or increased cost.,
- Functionality added for which no requirement can be found.

Routine would be assigned to all requests that do not meet the criteria for Severe or Urgent.– This might include the following items:;

- Misspelled text,Minor administration errors that might degrade understandability.
- Incorrect shade of color on a screen background.Incorrect placement of fields on a screen.

7.2 Task Iteration Policy

Access Research shall require 'draft' version(s) of the developer's deliverables. This will allow As early a practical, Access Research will obtain draft version(s) of the developer's deliverables for review:. . to review draft deliverables and provide draft recommendations. During the 'draft' iteration(s), the use of To Be Determined (TBD) will be acceptable, provided the number of occurrences is appropriate for that time in the deliverable cycle. For example, finding three-fourths of the deliverable marked TBD when the deliverable should be three-fourths complete, may be unacceptable.

By using this 'draft' review process, the time and associated cost to produce, review, and accept a deliverable should be reduced while maintaining the schedule and improving the quality of the deliverable.

Access Research shall review internally developed deliverables that have received prior WDTIP acceptance for any required modifications as the project evolves. The updates shall be provided at the end of the current phase for WDTIP approval, unless otherwise identified within this plan.The following PERT chart represents the iterative review process of IV&V review/HWDC acceptance/developer modification of a deliverable documented.:

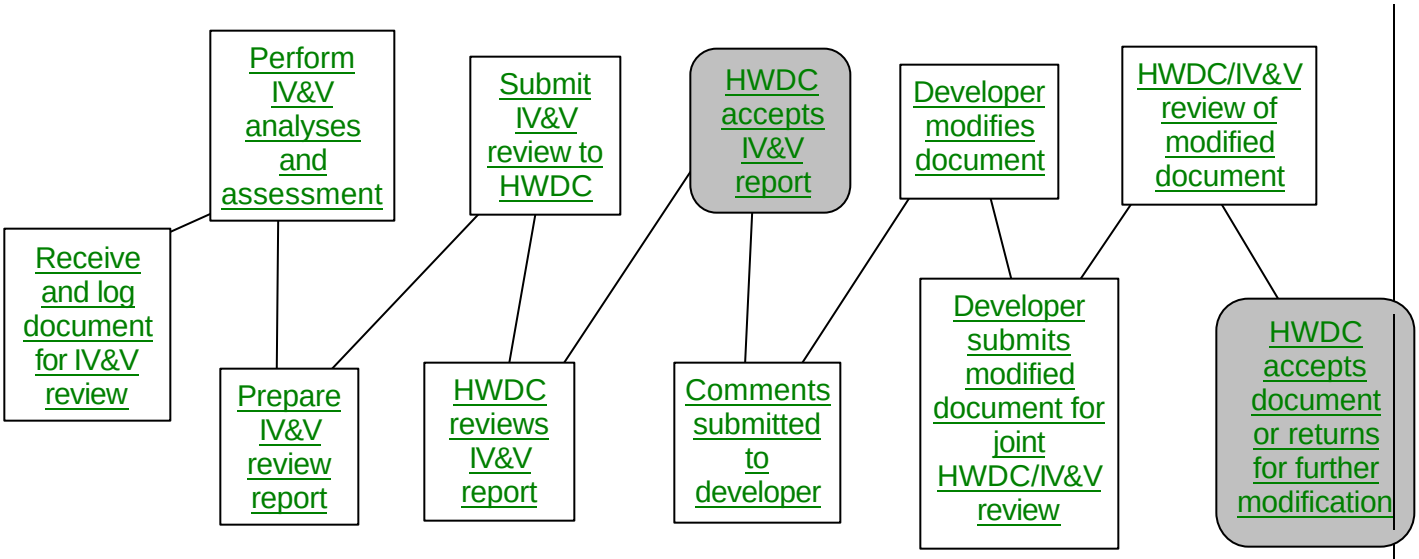

Figure 7.2, Access Research Corporation Task Iteration Policy

Rounded corner shaded boxes indicate decision milestones.

7.3 Deviation Policy

Any WDTIP approved deviation from the approved IV&V Plan shall be handled using the Special Studies Report process.Project changes or external factors may make it necessary to deviate from this IV&V Plan. . In the event it becomes necessary to deviate from this IV&V Plan, a memo will be prepared which shall include task identification, deviation rationale, and and effect on software quality. . The Access Research Project Manager is responsible for approval and shall have the authority to sign this memo.

7.4 Control Procedures

The developer shall be responsible for performing standard Configuration/Data Management (CM/DM) functions for the products they develop or receive from other sources. The project deliverable and WDTIP approved Configuration Management Plan (CMP) [21] shall be used as the controlling standard.

The developer shall be responsible for performing standard Software Quality Assurance (SQA) functions for the products they develop. The appropriate section of the WDTIP approved Project Management Plan (PMP) [20] dealing with Quality Assurance shall be used as the controlling standard.

Access Research shall perform a minimum of three Quality Assurance (QA), and three Configuration and Data Management (CM/DM) evaluations over the course of the project. Initial formal evaluations of both the QA and CM/DM activities shall be performed as indicated in the master schedule. Periodic informal evaluations shall be performed throughout the project to ensure continued compliance with established procedures. The frequency of the informal evaluations shall be dependent upon the results of prior evaluations (a high percentage of defects will equate to an increase in the number of evaluations). Standard industry algorithms for determining the proper sample size shall be used. A task report shall be generated and delivered to WDTIP for each evaluation.

Access Research will utilize internally developed processes for the control of project materials (software, listings, documentation, etc.). – Project materials received from external sources shall be logged and stored in appropriate locations (file cabinet, book-case, or cabinet) so that they are protected from loss. - Master electronic media (diskettes) shall be stored in a locked cabinet. . Files residing on the Access Research internal network shall be protected in accordance with internal network access and control policies. . -Those requiring access to project materials can obtain a copy in accordance with internal procedures. - Documents under review, electronically, shall be protected from erasure or modification using standard file attribute controls. Printed documents are not subject to change in this manner. - Printed documents shall be appropriately secured to prevent page loss.

7.5 Standards, Practices, and and Conventions

The following standards, practices, and and conventions will govern the performance of IV&V activities:

[1] IEEE Std 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology.

This standard contains definitions for more than 1000 terms, establishing the basic vocabulary of software engineering. Building on a foundation of American National Standards Institute (ANSI) and International Organization for Standardization (ISO) terms, it promotes clarity and consistency in the vocabulary of software engineering and associated fields.

[2] IEEE Std 730-1984, IEEE Standard for Software Quality Assurance Plans (ANSI).

This standard is directed toward the development and maintenance of critical software, that is, where failure could impact safety or cause large financial or social losses. The standard establishes a required format and a set of minimum contents for Software Quality Assurance Plans.

[3] IEEE Std 730.1-1995, IEEE Guide for Software Quality Assurance Plans (ANSI).

The purpose of this guide is to identify approaches to good Software Quality Assurance practices in support of IEEE Std 730.

[4] IEEE Std 1028-1988 (Reaff 1993), IEEE Standard for Software Reviews and Audits (ANSI).

Software review and audits are a basic part of the ongoing evaluation of software products as they pass along the software development life cycle. This standard provides direction to the reviewer (IV&V) on the conduct of evaluations.

[5] IEEE Std 828-1990, IEEE Standard for Software Configuration Management Plans (ANSI).

This standard is similar in format to IEEE Std 730, but deals with the more limited subject of software configuration management. When followed, this standard provides assurance of the integrity of the software product items as they evolve through the software development and maintenance life cycle.

[6] IEEE Std 1042-1987 (Reaff 1993), IEEE Guide to Software Configuration Management (ANSI).

The purpose of this guide is to provide guidance in planning good software configuration management practices that are compatible with IEEE Std 828.

[7] IEEE Std 829-1983 (Reaff 1991), IEEE Standard for Software Test Documentation (ANSI).

This standard defines the content and format of the eight documents that cover the entire testing process. The standard shows the relationships of these documents to one another as they are developed, and to the test process they document.

[8] IEEE Std 830-1993, IEEE Recommended Practice for Software Requirements Specifications (ANSI).

This guide provides definitions of selected measures. The guide covers the attributes of a good software requirements specification, as well as specification methodologies and associated formats.

[9] IEEE Std 1012-1986 (Reaff 1992), IEEE Standard for Software Verification and Validation Plans (ANSI).

This standard provides uniform and minimum requirements for the format and content of IV&V Plans, and further defines specific minimum IV&V tasks with appropriate inputs and outputs.

[10] IEEE Std 1059-1993, IEEE Guide for Software Verification and Validation Plans (ANSI).

This guide helps users prepare IV&V Plans that comply with IEEE Std 1012 by suggesting approaches to IV&V planning.

[11] IEEE Std 1058.1-1987 (Reaff 1993), IEEE Standard for Software Project Management Plans (ANSI).

This standard specifies the format and content of software project management plans.

[12] IEEE Std 1074-1995, IEEE Standard for Developing Software Life Cycle Processes (ANSI).

This standard defines a set of activities that constitute the mandatory processes for the development and maintenance of software.

[13] IEEE Std 1074.1-1995, IEEE Guide for Developing Software Life Cycle Processes (ANSI).

This guide provides approaches to the implementation of IEEE Std 1074.

[14] IEEE Std 1219-1992, IEEE Standard for Software Maintenance (ANSI).

This standard defines the process for performing the maintenance of software. IV&V will use this standard to ensure that the software developer meets maintenance requirements.

[15] IEEE Std 1016-1987 (Reaff 1993), IEEE Recommended Practice for Software Design Descriptions (ANSI).

A software design description is a representation of a software system. It specifies the necessary information content and the recommended organization for a software design description.

[16] IEEE Std 1016.1-1993, IEEE Guide to Software Design Descriptions (ANSI).

The application of design methods and design documentation recommended in IEEE Std 1016 is described.

[17] IEEE Std 1063-1987 (Reaff 1993), IEEE Standard for Software User Documentation (ANSI).

This standard provides minimum requirements on the structure and information content of user documentation.

[18] Mil-Std 1521B, Technical Reviews and Audits for Systems, Equipment's, and and Computer Programs, June 4, 1985, Notice 2, 17 July 1992.

This standard provides guidance for performing and properly documenting technical reviews and various audits.

[19] Mil-Std 498, Software Development and Documentation, 5 December 994.

This standard provides guidance on various life cycle development styles.

[20] Developer's Project Management Plan

This document will be used to verify the developer's performanceprogress.

[21] Developer's Configuration Management Plan.

This WDTIP approved document provides guidance for control of the various products generated during the WDTIP effort. The plan will also be utilized by the IV&V effort during various reviews and audits.

[22] Developer's Design/Coding Standards Guide.

This WDTIP approved document provides guidance for design and coding issues to be utilized during the WDTIP effort. The guide will also be utilized by the IV&V effort during various reviews and audits.

[23] Department of Information Technology (DOIT) documentation.

Required documentation to accomplish selected tasks. Access Research will meet with WDTIP management and determine deliverable format requirements that simplify WDTIP required reporting.

AFSC/AFLC Pamphlet 800-5, Software Independent Verification and Validation (IV&V), 20 May 1988.

This pamphlet provides insight and guidance for performing IV&V activities.

Access Research Corporation's, Company Standard Practice Manual

This corporate manual provides Access Research's internally documented standard practices which govern daily activities. The practices cover such areas as; financial, ethical conduct, equal employment/affirmative action, discrimination, security, and and benefits

Access Research Corporation's Locally Generated Policies and Procedures Manual

This manual provides Access Research's internally documented standard practices whichpractices, which govern daily activities. The practices cover such areas as; meeting agenda's and reports, interview forms, document tracking, and and standards library maintenance.

8. IEEE Waiver

Not applicable for this project.

Appendix – A

IV&V Master Schedule

This appendix contains the IV&V Master Schedule for the Welfare Data Tracking Implementation Project. – . Access Research's Project Manager, using Microsoft Project™ software maintains the schedule. – . The schedule shall be updated to reflect changes and the effects of those changes on future activities. – . The updated Master Schedule shall be included as a part of the Monthly Report. The Master Schedule will be updated upon completion of each development phase of the project.

Appendix A

A.1 Introduction

This appendix contains the IV&V Master Schedule for the Welfare Data Tracking Implementation Project. Access Research's Project Manager, using Microsoft Project software maintains the schedule. The schedule shall be updated monthly to reflect changes during the past month and the effects of those changes on future activities. The updated Master Schedule shall be included as a part of the Monthly Report.

A.2 IV&V Master Schedule

The IV&V Master Schedule begins on the next page.

Appendix – B

IV&V Work Breakdown Structure/Responsibility Assignment Matrix

This appendix contains the IV&V Work Breakdown Structure (WBS) for the Welfare Data Tracking Implementation Project. Access Research's Project Manager maintains the WBS. The schedule shall be updated monthly to reflect changes during the past month and the effects of those changes on future activities. The updated Master Schedule shall be included as a part of the Monthly Report.

Appendix B

B.1 Introduction

This appendix contains the IV&V Work Breakdown Structure (WBS) for the Welfare Data Tracking Implementation Project. Access Research's Project Manager, using Microsoft Project software maintains the WBS. The schedule shall be updated monthly to reflect changes during the past month and the effects of those changes on future activities. The updated Master Schedule shall be included as a part of the Monthly Report.

B.2 IV&V Work Breakdown Structure (WBS)

The IV&V Work Breakdown Structure begins on the next page.