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QUALITY ASSURANCE PLAN
FOR THE
OBJECTIVE SUPPLY CAPABILITY ADAPTIVE
REDESIGN (OSCAR) PROJECT

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MASTER

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Computational Physics and Engineering Division

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ABSTRACT

This document establishes the Quality Assurance Plan (QAP) for the National Guard Bureau Objective Supply Capability Adaptive Redesign (OSCAR) project activities under the Oak Ridge National Laboratory (ORNL) management. It defines the requirements and assigns responsibilities for ensuring, with a high degree of confidence, that project objectives will be achieved as planned.

The QAP outlined herein is responsive to and meets the Quality Assurance Program standards for the U.S. Department of Energy (DOE), Lockheed Martin Energy Research Corporation and ORNL and the ORNL Computing, Robotics, and Education Directorate (CRE). This document is intended to be in compliance with DOE Order 5700.6C, Quality Assurance Program, and the ORNL Standard Practice Procedure, SPP X-QA-8, Quality Assurance for ORNL Computing Software. This standard allows individual organizations to apply the stated requirements in a flexible manner suitable to the type of activity involved.

Section 1 of this document provides an introduction to the OSCAR project QAP; Sections 2 and 3 describe the specific aspects of quality assurance as applicable to the OSCAR project. Section 4 describes the project approach to risk management.

The Risk Management Matrix given in Appendix A is a tool to assess, prioritize, and prevent problems before they occur. Therefore, the matrix will be reviewed and revised on a periodic basis.
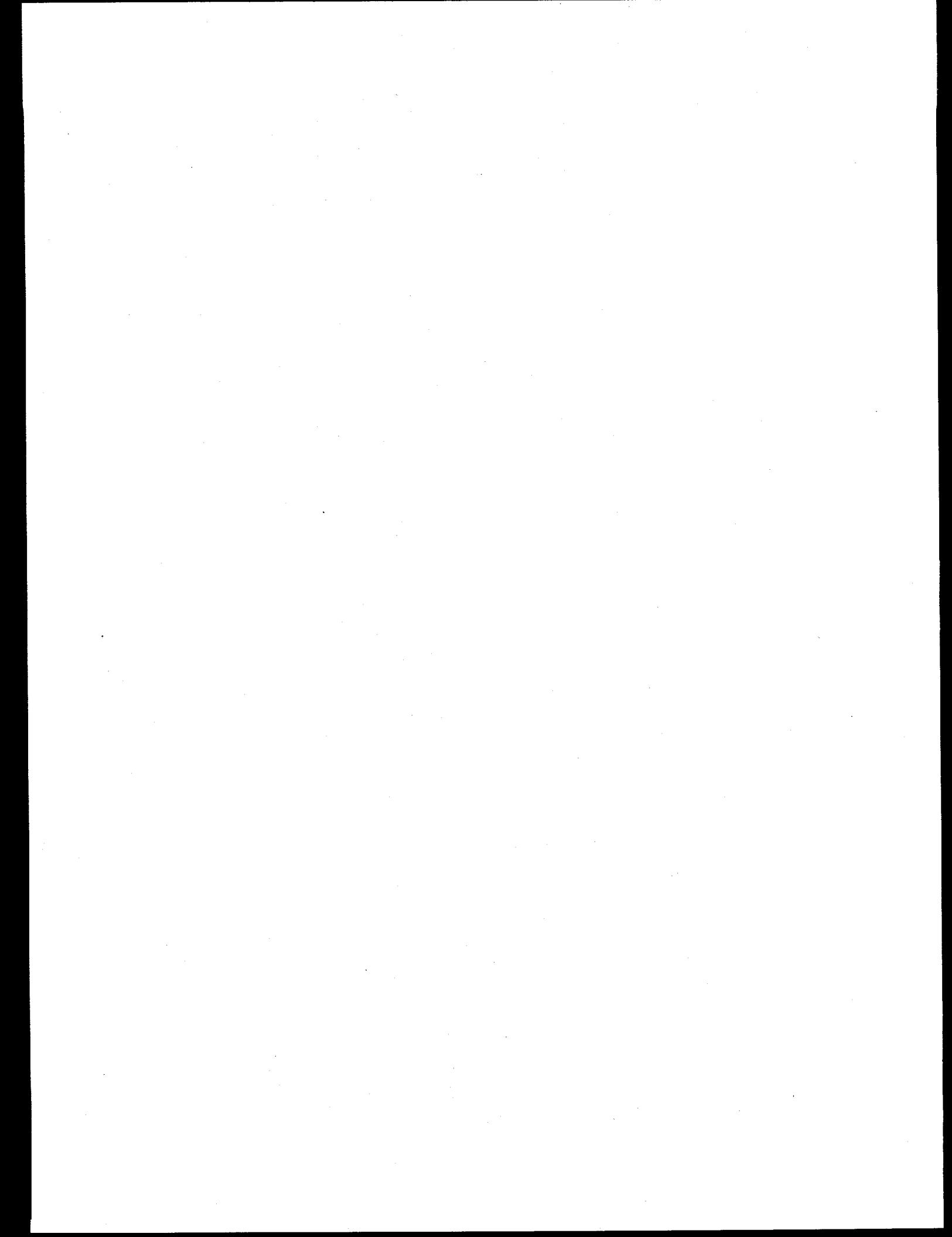
QUALITY ASSURANCE PLAN
FOR THE
OBJECTIVE SUPPLY CAPABILITY ADAPTIVE REDESIGN (OSCAR)
PROJECT

The following signatures indicate acceptance, concurrence, and support of this **Quality Assurance Plan for the Objective Supply Capability Adaptive Redesign (OSCAR) Project.**

Date: 10/21/96

Dick Reid, Program Manager
Oak Ridge National Laboratory

Date: 10/21/96

Kevin Rasch, Project Manager
Oak Ridge National Laboratory

Date: 10/30/86

Ann Stewart, QA Specialist
Data Systems Research and Development

Date: 10/21/96
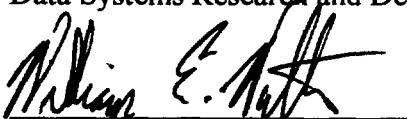
Bill Watkins, Sponsor Representative
National Guard Bureau
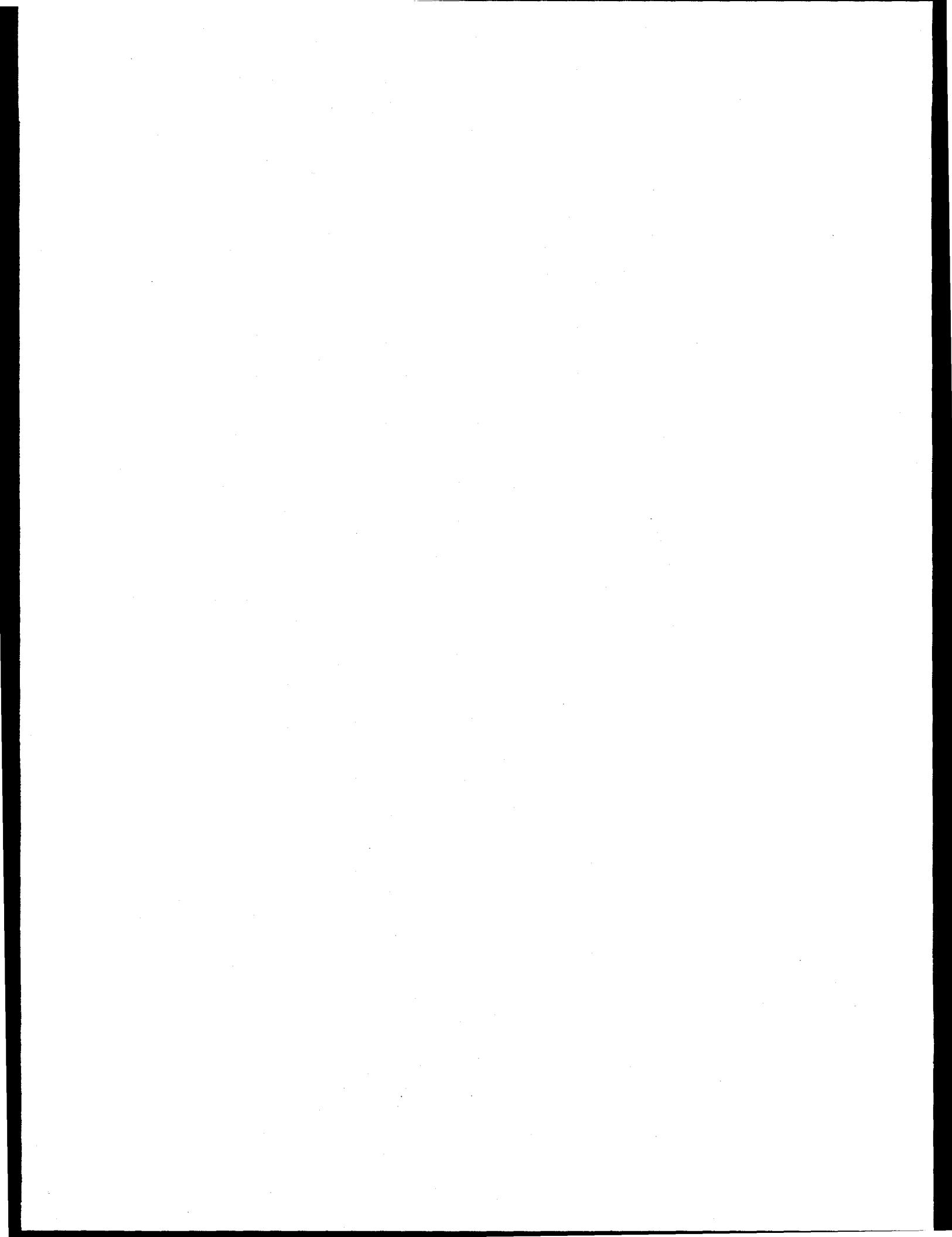
**Quality Policy
for the
Objective Supply Capability Adaptive Redesign (OSCAR) Project**

It is the policy of the Objective Supply Capability Adaptive Redesign (OSCAR) project to support the ORNL Computing, Robotics, and Education Directorate (CRE) goal of producing quality software by applying quality assurance processes in a risk-based, graded approach and to execute activities to successfully achieve project objectives. The OSCAR team will adopt and implement the applicable policies, procedures, and Quality Assurance Programs of DOE, Lockheed Martin Energy Research, and CRE.
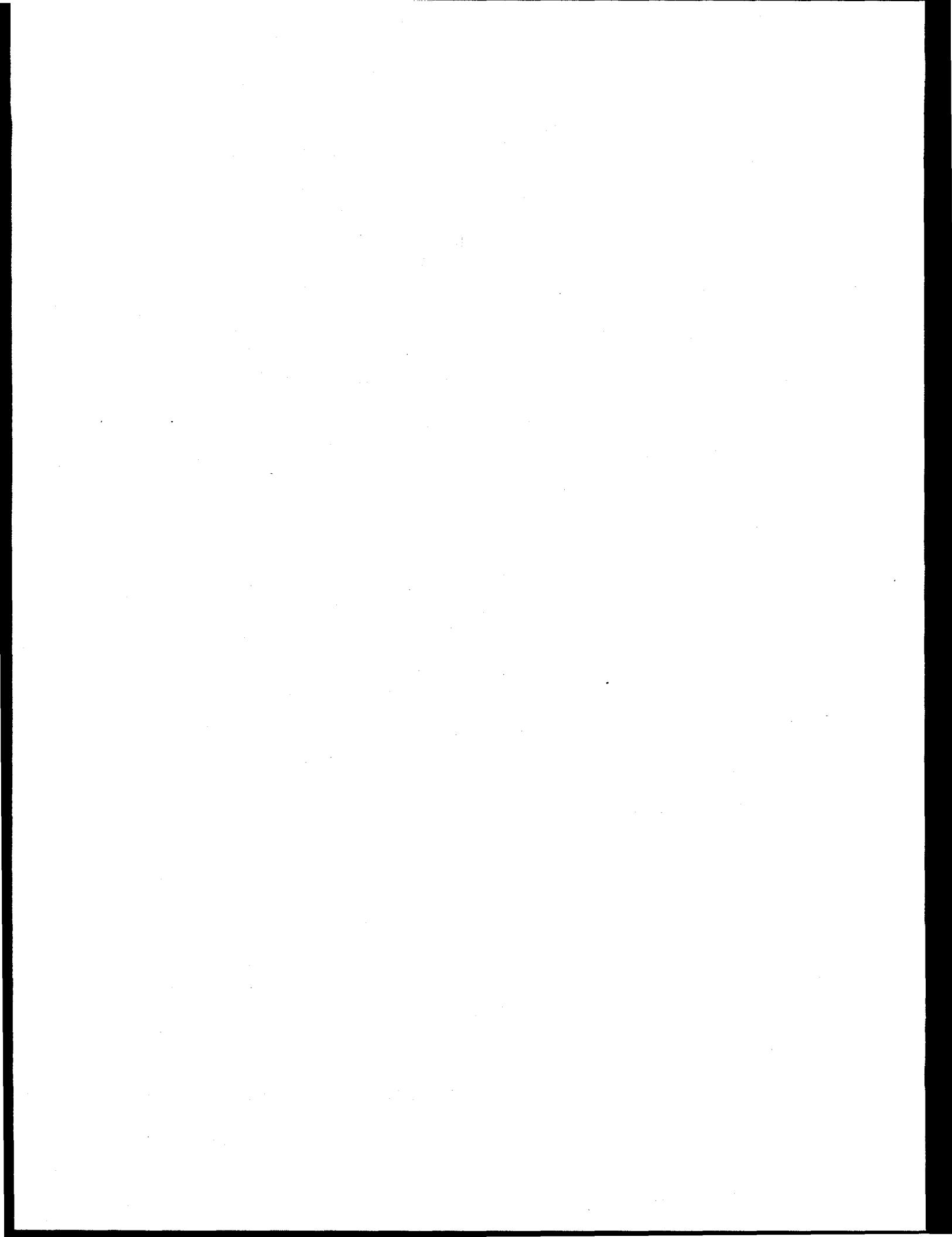
ACRONYMS AND ABBREVIATIONS

CRE	Computing, Robotics, and Education Directorate (ORNL)
DOE	U.S. Department of Energy
LMER	Lockheed Martin Energy Research Corp.
NGB	National Guard Bureau
ORNL	Oak Ridge National Laboratory
ORSE	Optimal Redistribution of Supply Excess
OSC	Objective Supply Capability
OSCAR	Objective Supply Capability Adaptive Redesign (program)
QA	quality assurance
QAP	quality assurance plan
SARSS	Standard Army Retail Supply System
SPP	standard practice procedure
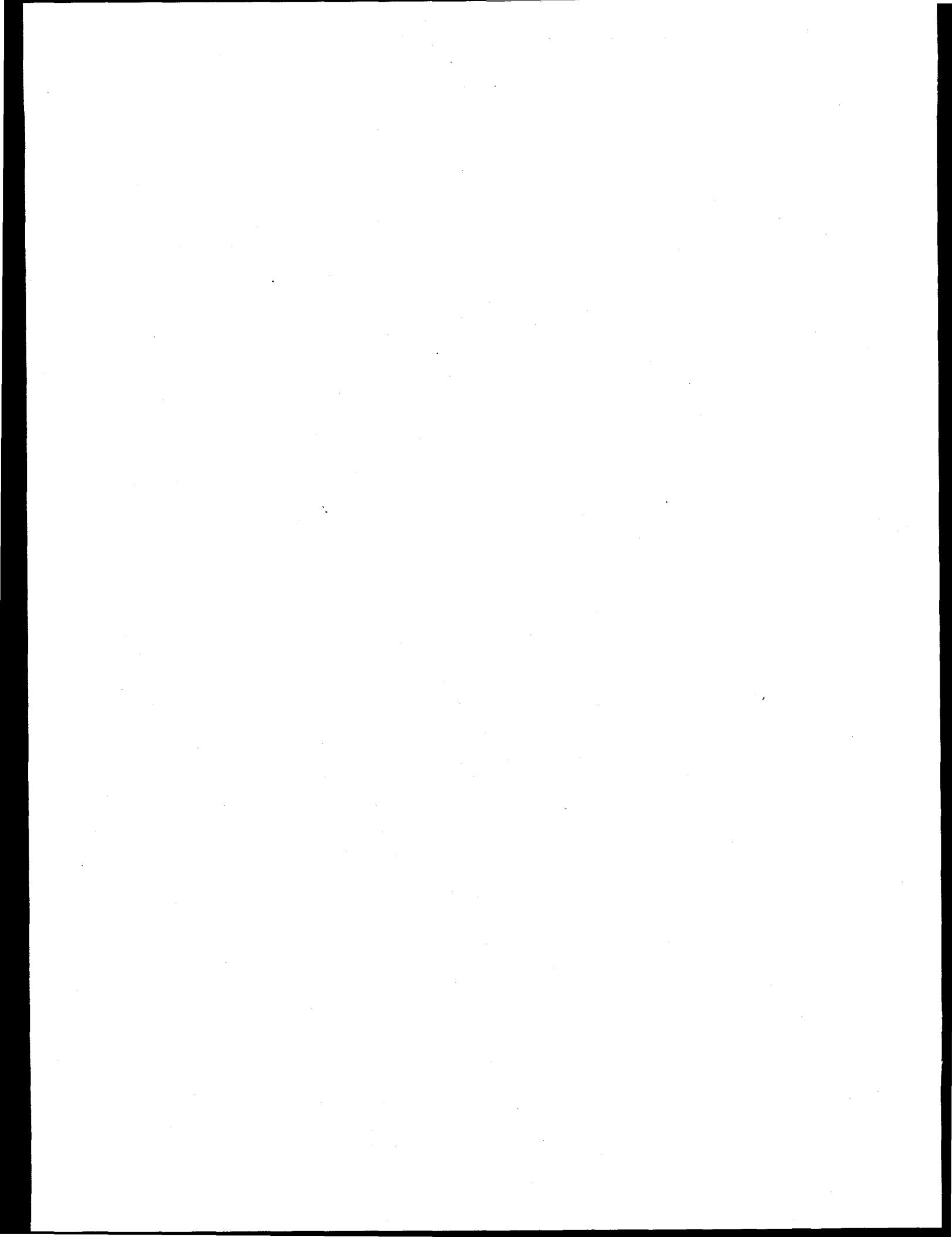
1. INTRODUCTION

1.1 PURPOSE

The purpose of this Quality Assurance Plan (QAP) is to provide the necessary guidance to ensure and formally demonstrate that the Objective Supply Capability Adaptive Redesign (OSCAR) project satisfies its contractual requirements and performs according to the approved project specification documents. The QAP intent is to establish formal quality assurance (QA) methods and to implement sound practices such as independent monitoring and assessment. Project efforts will focus on identifying and mitigating risks that could have an impact on project success.

1.2 GENERAL DESCRIPTION

The OSCAR system consists of three subsystems: the State Objective Supply Capability (OSC) Gateway, the Excess Management Gateway, and the National Guard Bureau (NGB) OSC Gateway.

1.2.1 State OSC Gateway

Each state will run this subsystem on a workstation at its site. This subsystem will control communications between each state and the other two systems (which will both be running on a workstation at the NGB site in Arlington, Virginia). It will also be responsible for converting input data from multiple National Guard systems into a common format.

NGB will develop this subsystem internally. ORNL will be responsible for ensuring that communication and interfaces between the gateways and the other subsystems are established and perform effectively.

1.2.2 Excess Management Gateway

This subsystem will streamline management of excess equipment that affects a unit's readiness to go to war. This streamlining will be achieved by automating some of the tasks that asset managers currently perform manually.

1.2.3 NGB OSC Gateway

This subsystem will store information about supply excess at National Guard units across the country. When a unit orders new supplies, this subsystem will determine whether the supplies are available as excess from another National Guard site. If so, it will effect a transfer of the supplies.
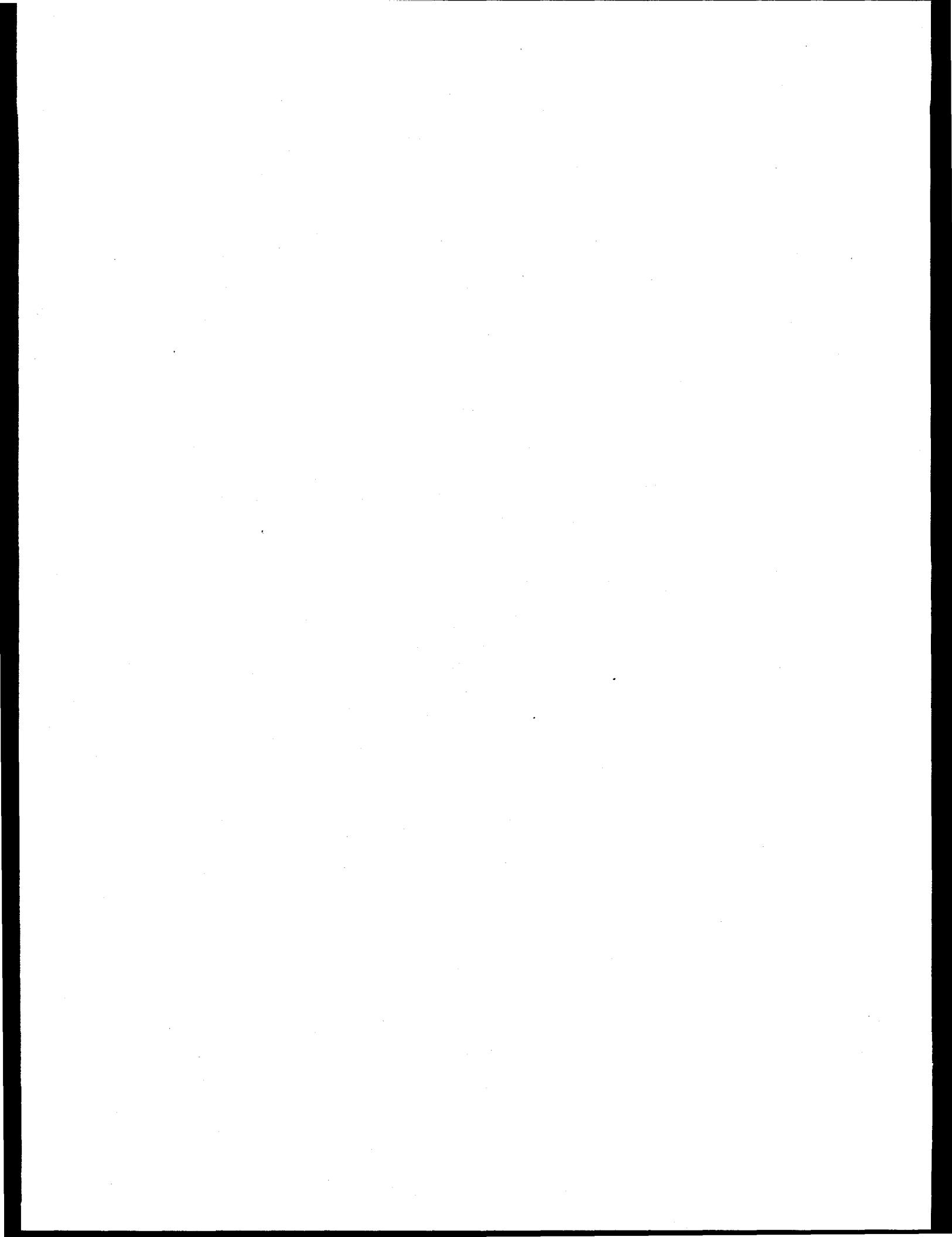
This subsystem will replace the Optimal Redistribution of Supply Excess (ORSE) system that has already been successfully implemented by ORNL for NGB. Unlike ORSE, this system will utilize the Standard Army Retail Supply System (SARSS), which will allow much of the manual processing at the state level to be automated.

1.3 QUALITY ASSURANCE REFERENCES AND REQUIREMENTS

The following standards, policies, and procedures provided guidance in the development of this document and are recommended as references::

- DOE Order 5700.6C, Quality Assurance Program;

- SPP X-QA-8, Quality Assurance for ORNL Computer Software; and

- QAP-X-96-CRE-001, ORNL Computing, Robotics, and Education Directorate (CRE) Management Plan, 1995.

The software produced by the OSCAR project has been designated for QA purposes as category 2 software. The ORNL SPP X-QA-8, Quality Assurance for ORNL Computer Software, defines category 2 software as "software where failure will not cause the failure of a project or endanger personnel but whose failure will have a serious effect on project deliverables, projection schedules, and/or cost."
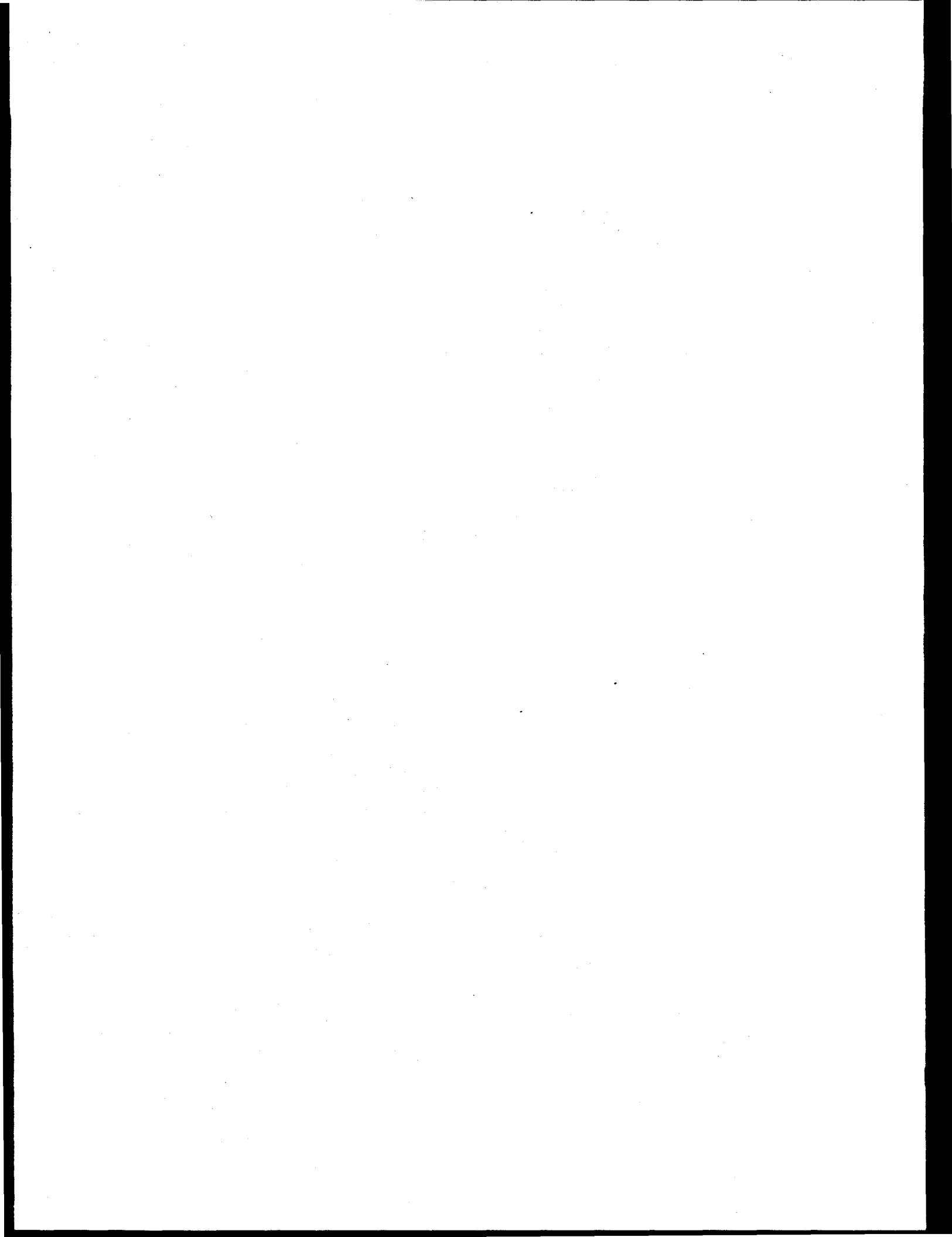
2. ORGANIZATION AND MANAGEMENT

2.1 QA TASKS AND RESPONSIBILITIES

All OSCAR project team members are expected to maintain responsibility for the quality of products and services designed and delivered for the support of OSCAR. General quality-related task descriptions and responsible team members are listed below. Also refer to Appendix A for preventive actions and responsible team members.

2.1.1 Program Manager

- Prepares periodic reports and budget requests.
- Participates in planning and briefing sessions as required.

2.1.2 Project Manager

- Prepares monthly progress reports, the project schedule, and the project management plan.
- Monitors task progress and reports any known or suspected schedule deviation to the OSCAR program manager.

- Maintains responsibility for financial and contractual direction.

- Assists in the development of the QAPs and commits required resources to implement the plans.

- Ensures that all QA tasks are incorporated into the project schedule.

- Coordinates the development of external systems interfaces.

- Provides technical direction.

2.1.3 Development Staff

- Review requirements of this QAP.
- Develop software in accordance with standards stated in this QAP.
- Ensure that OSCAR test plan is followed.
- Participate in QA reviews.

2.1.4 Technical Contact

- Resolves technical issues with sponsor.

- Is responsible for communicating sponsor's direction.

- Is responsible for resolving issues involving systems external to the project.

- Participates with the program manager in the definition of the functional requirements of the system.

- Is responsible for obtaining system data.

- Prepares the OSCAR Acceptance Test Plan.

2.1.5 Quality Assurance Specialist

- Develops internal project-specific plans and procedures that incorporate QA requirements, and ensures that project team are kept current and knowledgeable.

- Performs reviews, approvals, and verification of documents and activities affecting quality according to the QAP.

- Reviews or establishes planning milestones when additional QA planning or activities are required.

- Ensures that official copies of all QA records are kept in accordance with ORNL X-AD-8.

2.1.6 System Administrator

- Participates in appropriate system administrator training.

- Prepares system administrator portion of the user manual.

2.2 PROJECT TEAM MEMBERS

The following staff make up the project team:

Sponsor representative	Bill Watkins
Program manager	Dick Reid
Project manager	Kevin Rasch
Development staff	Kevin Rasch
Technical contact	CW3 Bobby Pelath/CW4 Jerry McMillen
Quality assurance specialist	Ann Stewart
System administrator	SGT Tammy Snyder

2.3 MANAGEMENT

The OSCAR project will be managed by the project manager who is responsible for the technical aspects of the project/system and will work closely with the technical contact. The quality assurance specialist will maintain responsibility for conducting QA reviews and certifying the quality of project deliverables as a function independent of development.

2.4 SCHEDULING

The schedule for performing QA functions will be established in conjunction with the project's development schedule. From this schedule it will be possible to identify the resources required to effectively support the required QA activities. Major milestone events will be signified by the completion, submission, and official review of deliverables.

2.5 REPORTING

The progress and status of the OSCAR project, and completion of milestones, will be communicated to project management and the sponsor through monthly progress reports, division highlights, development meetings, and other methods as required and deemed necessary.

2.6 QA REVIEWS

A QA review will be conducted upon the completion of each major milestone and deliverable. This review will utilize a predefined checklist of QA activities based on the requirements of this plan.
The completed checklist will be placed in the project files and controlled as a QA record.

2.7 RECORD MANAGEMENT

Project QA records will be retained in accordance with CRE Management Plan for the lifetime of the project plus 3 years. The following are OSCAR QA records:

- OSCAR Quality Assurance Plan,
- OSCAR Quality Review Checklists.

3. SOFTWARE DEVELOPMENT METHODOLOGY

3.1 SOFTWARE METHODOLOGY

The software development methodology that will be followed for the OSCAR project consists of four phases: system definition, system design, system development, and system testing. The system definition phase commences with the development of the project requirements, the project management plan, task breakdown and prioritization, resource allocation, identification of milestones, and estimation of delivery dates. During the system design phase the baselined requirements are used for prototype development of interfaces, screens, reports, and the physical database. During this phase, test plans and configuration procedures are developed. Phase 3, system development, includes the coding, testing, and installation of the systems as defined in phases 1 and 2. The last phase, system testing, includes validation testing to assess the extent to which the systems meet the baselined requirements.

3.2 VERIFICATION AND VALIDATION

Verification can be defined as a set of activities to ensure that software correctly implements a specific function. The primary method of software verification used throughout the OSCAR project will consist of functional testing by the developer and software reviews by the technical contact. Because of the size of the project team this was determined to be was the most effective method of verification to ensure the correctness and quality of the software products developed.

Validation of the system refers to a set of activities that ensures that all system requirements have been met. Validation methods are described in the OSCAR Test Plan.

3.3 SOFTWARE TOOLS AND TECHNIQUES

Logic Works ERWIN ERX 2.5 has been chosen as the data modeling tool for the OSCAR project. This tool will enable the developers to produce entity and relationship diagrams that will be used to document the database design. ERWIN capabilities aid in the reengineering of databases by providing automated methods of database documentation.

3.4 DOCUMENTS

The following life-cycle documents will be developed:

1. Functional Requirements,
2. Database Design,
3. Test Plan,
4. Configuration Plan, and
5. User Manual.
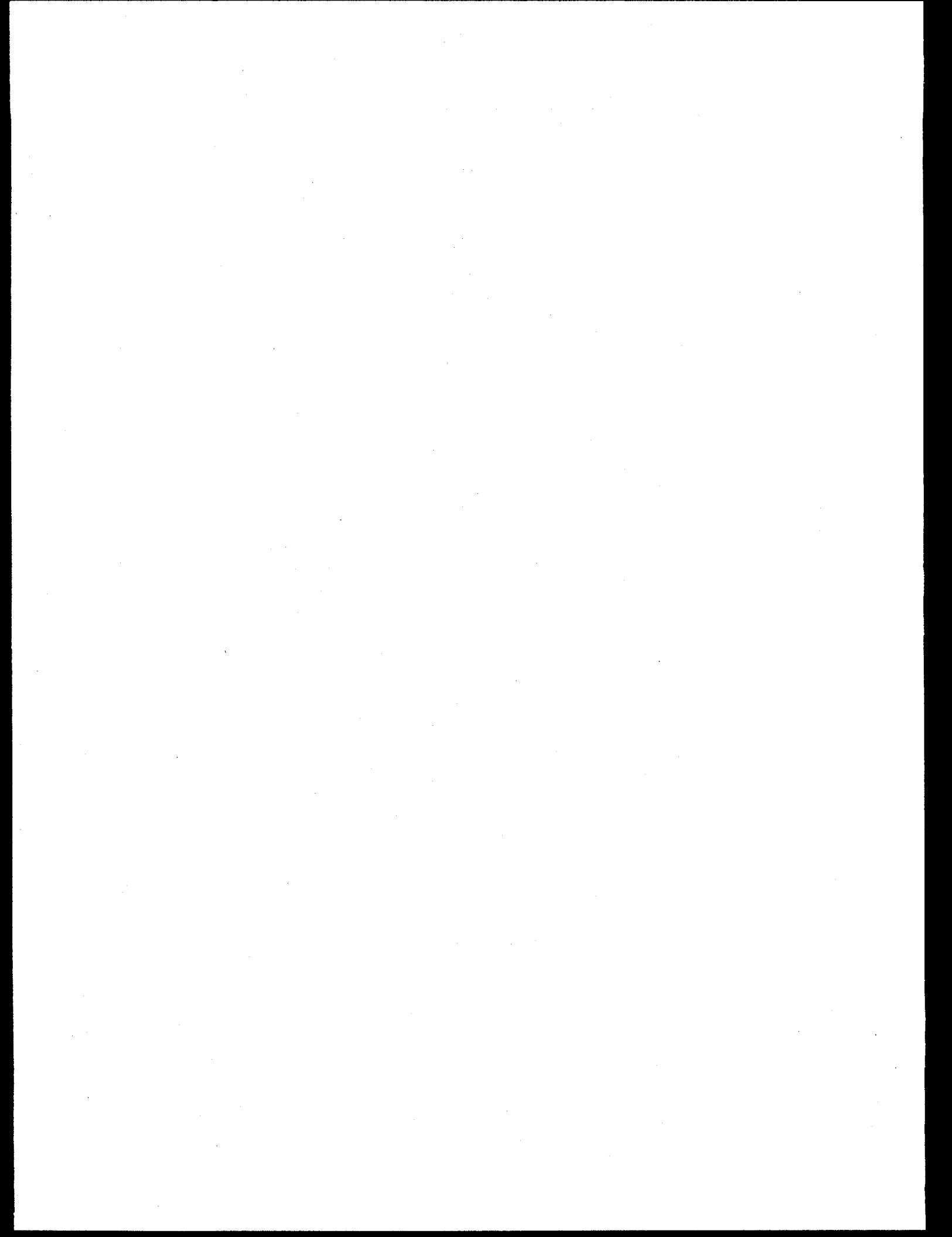
4. RISK MANAGEMENT

4.1 RISK MANAGEMENT APPROACH

Determining potential problems and taking actions to minimize their impact on the project are a primary focus of the OSCAR QA program. The Risk Assessment Matrix listed in Appendix A is the result of identifying and prioritizing problems. The matrix lists is each potential problem with its associated cause and its effect on the project. Each problem was assigned a probability of occurring, designated as low, (0–30%), medium, (31–50%), medium high, (51– 60%), and high, (61 –100%). Also assigned to each problem was a risk-to-the-project factor: low (no or minimal impact), medium (minor schedule delays or budget increases), medium high (major schedule delays or budget increases), or high (may cause project failure). Specific preventive actions to address each problem were then determined and listed, with the responsible person and schedule indicated.

4.2 REVIEW SCHEDULE

The Risk Assessment Matrix will be reviewed and updated periodically. The project manager ensures that the actions are incorporated in the project schedule. The QA specialist will review the actions during QA reviews.
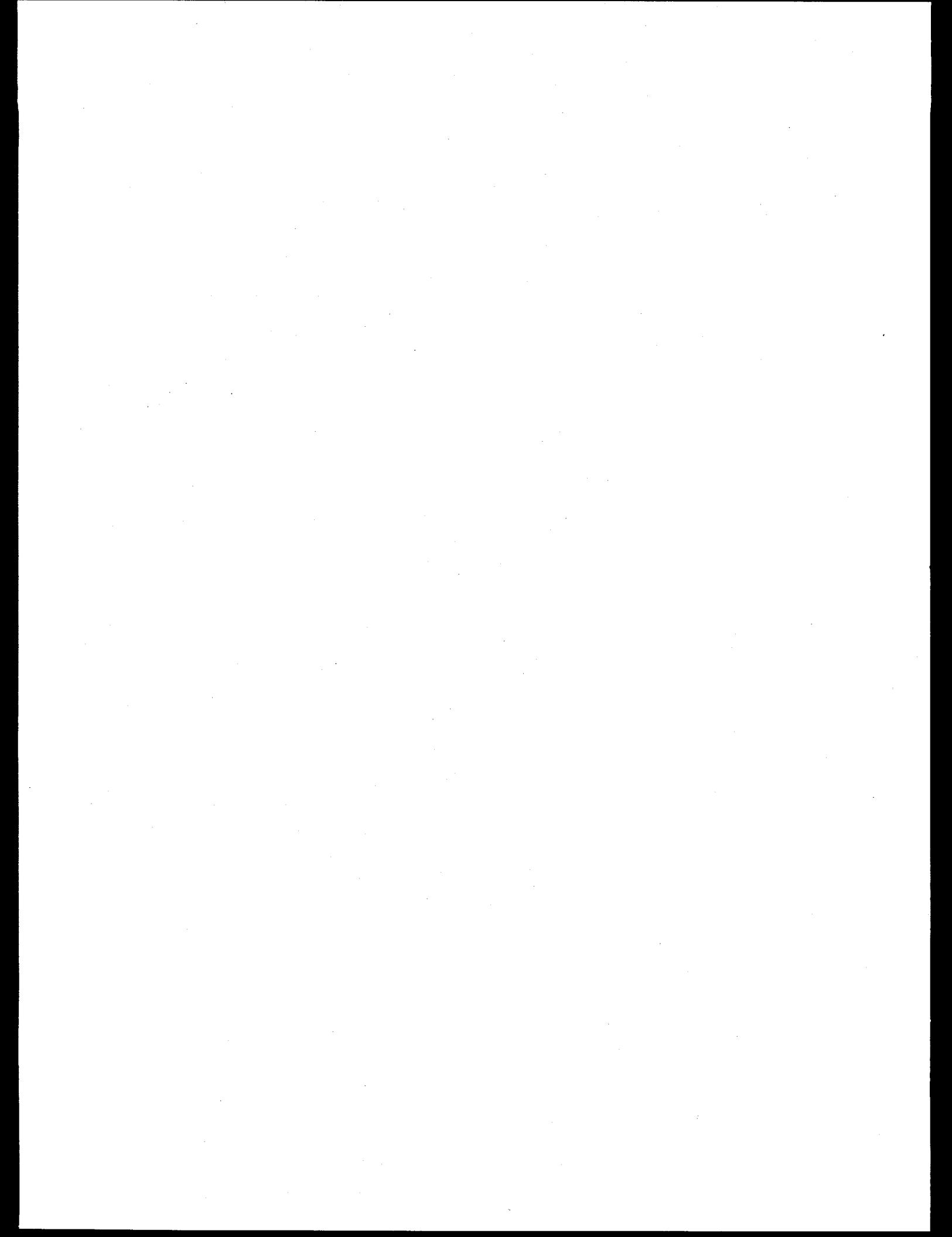
APPENDIX A
Quality Assurance Risk Assessment Matrix
for the
Objective Supply Capability Adaptive Redesign (OSCAR) Project

Category	Potential Problems	Cause/Effect	P¹	R²	Preventive Actions	Resp. for action³	Scheduled
Customer	1. Sponsor's technical contact is taken off the project.	Changes in assignments, health, etc. / Tasks must be assigned to others, resulting in delays in schedule	L	M+	1.1 Weekly or more frequent communication with technical contact	P M	Yes
					1.2 Written task descriptions and assignments	PM, TC	Yes
					1.3 Project Manager reviews and understands technical contact's tasks	PM, TC	Yes
					1.4 Sponsor assigns backup person	S	Yes
	2. Ineffective communication/ miscommunications between sponsor, users, and project team	Distance of sponsor and diverse location of users / Delays in schedule or requirements not satisfied	H	M+	2.1 Weekly or more frequent communication with technical contact	PM, TC	Yes
					2.2 Reviews with sponsor at their sponsor's location	PM, S	Yes
					2.3 Working meetings with technical contact at ORNL	PM, TC	Yes
					2.4 Monthly project progress reports to sponsor	PM	Yes
	3. Technical contact's lack of time to complete assigned tasks	Other commitments/ Delays in schedule	H	M+	3.1 Weekly or more frequent communication with technical contact	PM. TC	Yes
					3.2 Technical contact works with sponsor to ensure that time is available for tasks	TC, S	Yes
	4. Sponsor's system administrator not named in time to train	No one available / No one from the sponsor's organization will understand how to use the system upon completion.	H	M+	4.1 Sponsor designates person as system administrator	S	Yes
					4.2 Working meetings with system administrator	PM, SA	No
					4.3 Development of a system user manual included in the schedule	PM,SA	No
Information	5. Unable to obtain the best catalog data	Many different catalogs in use and unknown format / Schedule delayed because of time involved to gather information	M	M	5.1 Technical contact made responsible for resolving issues related to different catalogs and format	TC	No
					5.2 Technical contact provides sample data to developers in advance for review	PC,D	Yes

Appendix A (continued)

Category	Potential Problems	Cause/Effect	R¹	R²	Preventive Actions	Resp.³ for action	Scheduled
	6. DODAAC data cannot be obtained	Necessary data resides in and belongs to the states / Delays in schedule due to time involved to gather data	M	M	6.1 Technical contact resolves issues related to determining and collecting data 6.2 Program Manager defines / provides data query	TC PM	No No
System	7. Communications with SARSS require excessive development time	Lack of documentation on source code / Delays in schedule due to time to learn SARSS	H	H	7.1 Obtain OSC source code 7.2 Technical contact resolves issues related to coordinating with SARSS	PM TC	Yes
	8. Communications with DAAS require excessive development time	Development external to the project / Delays in schedule	L	L	8.1 Technical contact resolves issues related to coordinating with the sites.	TC	No
Schedule	9. Existing system requires emergency maintenance work	System crash / Schedule delay due to project manager's commitment to existing system	L	M	9.1 Latest revision system includes fixes for problems that resulted in system crashes 9.2 Sponsor kept informed of potential problems to system.	PM PM	Yes Yes
	10. Two-week planned absence of project manager delays schedule	Birth of child / Delays in schedule	H	L	10.1 Factor in absence in project schedule during planning phase 10.2 Inform team and sponsor of absence.	PM PM,TC,S	Yes Yes
	11. Inadequate time to complete testing	Overly ambitious schedule / Deliverable is compromised	M	M+	11.1 Complete test plan in project planning phase 11.2 Schedule adequate test time based on test plan and document in project schedule	PM,TC PM,TC	No No
	12. Timing of phase 1 installation conflicts with installation of operating system	Upgrade to Window NT scheduled close to phase 1 completion/ May need to install on both Windows 3.1 and NT	H	M	12.1 Develop NT version of the software 12.2 Purchase vendor maintenance on tools 12.3 Provide additional time in schedule for two installations on some machines	D PM PM	No No No
Software	13. New tools do not perform as expected	Lack of understanding of the tool and lack of experience in using it / Revert to original tool and language	M	L	13.1 Evaluate tool prior to use 13.2 Purchase technical support from vendor 13.3 Schedule time to acquire experience with tool	PM PM PM	Yes Yes Yes

¹P = Probability of problem occurring:

L	Low	0–30%
M	Medium	31–50%
M+	Medium High	51–60%
H	High	61–100%

²R = Risk to project

L	Low	No minimum impact
M	Medium	Minor delays or budget increases
M+	Medium High	Major delays or budget increases
H	High	May cause project failure

³Responsibility for actions

PM	Project manager	SA	System administrator
TC	Technical contact	QAS	Quality assurance specialist
S	Sponsor		
D	Developer		

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