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PROPOSAL TO PROVIDE  
TECHNICAL ASSISTANCE IN SUPPORT  
NRC PLANNING FUNCTION

VOLUME I  
TECHNICAL AND MANAGEMENT  
PROPOSAL

Submitted to  
U.S. Nuclear Regulatory Commission  
Division of Contracts  
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## TECHNICAL ASSISTANCE IN SUPPORT OF NRC PLANNING FUNCTION

### VOLUME I TECHNICAL AND MANAGEMENT APPROACH

#### 1.0 Introduction

##### 1.1 Executive Summary

The MAXIMA Corporation has been assisting organizations in government and industry to manage and apply their information resources more efficiently and effectively for over six years. Our growth has paralleled developments in office automation, computer applications and electronic information systems that promise to revolutionize the ways in which information is obtained, processed and applied. But our interest in the management of information as a valuable resource is not new—not merely the result of the latest trends. It has evolved from our solid base in the information industry. MAXIMA's principals and senior staff were pioneers in the information industry, having designed automated information systems since the early 1950's when the needs for gathering, classifying and disseminating large volumes of information were first defined.

It is difficult to quantify the characteristics that have made it possible for MAXIMA to expand from a staff of five people in 1978 to over 500 in six years. It seems obvious that the dedication, ability and intelligence of the people who make up MAXIMA have made a significant contribution to its success. Even more important than size are the professional capabilities of the staff. There are an increasing percentage of persons with degrees, including many with master and Ph.D. degrees.

Unlike larger corporations, in which no single project is critical, MAXIMA has had to prove itself with each new effort. A small company cannot afford mistakes. That is why we can speak proudly of our past accomplishments and the special capabilities of each member of our technical staff. MAXIMA has proven itself capable of managing and operating multiyear, multimillion-dollar projects, which represents an enormous advance from the short-term, limited efforts that characterized the initial projects begun in 1978. One of our current projects is for five years, with an additional five-year option, at a budget of about two million dollars per year. Although MAXIMA has consistently expanded its services and diversified its expertise, the commitment of the company has remained focused in the information industry. This commitment has ensured strict accountability within the profession, and it continues to assure our clients that we are concerned with fulfilling long-term objectives, not just with making a few short-term gains.

Whether involved in scientific, computer-related, engineering, project support, or management activities, each staff member knows that the success of the project is tied to his or her performance. A constant striving for excellence ensures that projects are successfully completed on schedule without cost overruns. Our continued growth is the obvious evidence of client satisfaction, but we also have a strong history of commendation.

In 1979, MAXIMA was selected by the Department of Energy as one of four outstanding small businesses demonstrating in-depth knowledge of the federal procurement process.

In 1981, the Union Carbide Corporation nominated MAXIMA for Small Business Subcontractor of the Year. In that same year, the U.S. Small Business Administration cited MAXIMA for its "outstanding contribution and service to the Nation's Need."

The following year MAXIMA was nominated by the Albuquerque Operations Office of the Department of Energy as Small Business Contractor of the Year.

And in 1983, MAXIMA was chosen as one of three top 8(a) firms nation-wide to be represented at the National Annual Procurement Conference of the U.S. Department of Energy's Office of Small and Disadvantaged Business Utilization.

- o MAXIMA Qualifications in ADP Services. The history of information systems and their management during the past 5 to 10 years has alternated between periods of remarkable and recognizable progress and periods of retreat, often in reaction to unrealized promises, unfulfilled projects, and projects seemingly always underestimated in cost. Failures were, in general, attributable to poor information systems management and design, not to inadequacies in the technology and equipment available at the time. Yet this period of alternating promise and disappointment was nonetheless characterized by steady growth and the increasing influence of systems on society and its varied organizations. Systems are ubiquitous, and the word has come to be commonly accepted in our culture. Along with this concept came a sharpened understanding of the role of automated information systems within activities by organization decisionmakers and implementers.

The continued rapid evaluation of technology has complicated information handling. Microprocessors now emerging on the scene rival medium-scale computers in their processing and execution capability but are priced only slightly above typewriters. With such changes in the scope of information technologies surfacing rapidly, the pressure on managers to keep themselves and their organizations abreast of the growth in technology will be accompanied by an increased complexity in organizations and the interrela-



tionships between organizations. It is essential that a decisionmaker's perspective on information be constantly updated and refreshed, because information use deals in activities that affect and are affected by the very foundations of his or her organization.

The MAXIMA Corporation began with a full-spectrum information services concept and has continued with that idea as its core. The essential objective driving MAXIMA, however, is to provide interdisciplinary, integrated information services. Most projects span more service areas than a typical information services firm can provide. Because the impact of technology on any organization reaches all parts of the organization, the response must be equally broad and must be finely coordinated as well. The MAXIMA Corporation was conceived from the start as a full-spectrum, integrated information service provider, to satisfy such complex, broad-based demands. The projects described below relate directly to this concept.

MAXIMA was selected by the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) in Aberdeen, Maryland to design, implement and operate an automated project management information system for a major chemical demilitarization effort. MAXIMA's chief obligation was to devise ways of meeting USATHAMA's need for an information system capable of serving all of their major requirements over a 9-year program span. During the early years of this program, the major information use of the system would be focused on the tracking of design costs and activities for the chemical demilitarization facility to be built on Johnston Atoll, approximately 700 miles southwest of Hawaii. Sequential activities to be managed during the post-design phase include facility construction, pilot operations, full-scale operations

cleanup activities. In addition, and due to the sensitive nature of the work involved, the information system must provide data retrieval mechanisms supportive of future congressional testimony. Since the Johnston Atoll Chemical Agent Disposal System (JACADS) also represents the first facility of its type, archival data relating to actual costs of design, construction and operation would also prove invaluable as baseline for projecting budgets for second generation facilities. MAXIMA's role in support of JACADS became a combination of information system architect and database administrator. MAXIMA analyzed the JACADS information and data-processing requirements, determined all hardware and software options and provided a cost-benefit analysis. During subsequent project phases, MAXIMA designed a relational database, procured and installed a Hewlett-Packard 1000 system and ARTEMIS software and established an ongoing management information system.

- o MAXIMA Qualifications in Telecommunications. MAXIMA provides technical support in analyzing and establishing equipment requirements necessary to improve the technical and economic performance of existing voice and data telecommunications systems. Areas of specialization include usage and feasibility studies, requirements analysis/definition, traffic flow, end-user requirements, proposing design and configuration alternatives of voice and data telecommunications systems and networks, and implementation of systems networks and management of Communication Security (COMSEC) cryptographic accounts. We also provide technical support for the development of radio systems and radio frequency management standards and criteria; provide radio spectrum-dependent services in support of all existing and new DOE/ORO assigned frequencies in compliance with DOE and National Agency Directives; deploy, when required, with the DOE/ORO Emerging Response Vehi-

cle to support agency emergencies; provide technical support in DOE/ORO review process for telecommunications proposals, radio equipment acquisitions, radio maintenance standards and frequency requests; conduct related interference and modulation studies. In related areas MAXIMA has extensive experience and state-of-the-art capabilities in operation of switchboard and word processing centers.

At the telecommunications center located in the Oak Ridge Operations Office, MAXIMA provides technical expertise and personnel resources to operate SACNET Mohawk programmable terminal (PT) and associated equipment; data card, facsimile, magnetic tape, teletype data terminals, commercial TWX/TELEX, high- and low-speed facsimile equipment, modems and other input-output processing equipment. We administer and maintain the DOE/ORO COMSEC account in accordance with DOE and National Agency Directives, and develop and maintain Standard Operating Procedures to ensure the proper handling of transmissions.

In addition, MAXIMA is designing, developing and implementing the Equipment Management and Control System (EMACS). EMACS will track and provide information reports for DLA capital investment equipment over \$3,000. The system development efforts performed by MAXIMA include hardware and software analysis and selection and utilization of a relational Data Base Management System (DBMS). EMACS is to be implemented worldwide at approximately 40 DLA sites.

The MAXIMA Corporation designed, built and implemented a new computer facility in the Oak Ridge Valley Industrial Park for the operation of the Navy

Civilian Personnel Data System. MAXIMA provides computer operations, systems support and telecommunications services for this project, an online and overnight batch system that supports the entire personnel life-cycle of each Navy civilian employee. Data exchange with the Navy military personnel system facilitates total force management. The system is designed to support 150 civilian personnel offices worldwide. Approximately 1,500 terminals and remote line printers will be connected to the computer center via a telecommunications network. Four mid-size Burroughs computers and peripherals connected by a shared system processor, and two front-end communications processors provide computing support for the project.

MAXIMA has designed a comprehensive office automation plan for the Department of Transportation, Urban Mass Transit Administration. This plan will provide an integrated data processing, management analysis, information management, word processing, electronic mail, graphics and administrative support system to UMTA's staff of 500 located in numerous Headquarters program offices and 10 regional sites across the United States. The configuration designed by MAXIMA will include local area networked multifunctional workstations and graphics stations serving as distributed processing links to shared databases and other system-wide, mainframe-based resources.

The MAXIMA Corporation, within the scope of a support services contract with the Department of Energy's Technical Information Center (TIC), provides support for document control and distribution activities. Services include systems analysis, systems development, programming and operation of an automated inventory control and document registry system; maintenance of the registry master file; customer assistance, request evaluation, and

online request processing. Expertise is provided in machine/equipment setup and operation, inventory control, materials handling and product dissemination.

MAXIMA's team of experienced staff have expertise in all phases of planning, development, implementation and operation of integrated information, ADP and communications systems.

- o MAXIMA Qualifications in Training. At MAXIMA, we believe proper educational and training programs are just as essential as appropriate technologies and management structures. An informed, knowledgeable work force is more likely to be productive, efficient and satisfied. Costly errors are reduced and people are better able to respond quickly to unusual situations. The nature of training programs is that they must be specifically designed to meet the requirements of individual situations. By conducting a training needs assessment—involving interviews with managers, users and technical representatives—actual strengths and weaknesses can be identified, and proposals can be developed that respond directly to particular needs. Once an approach has been determined, the development of training materials—such as audio/visual presentations, workbooks, pamphlets and automated instruction programs—becomes the focus of activity. Materials and modes of presentation must be appropriate to the situation. The implementation of training programs is an art in itself. Coordinating the activities of instructors, trainees and support personnel requires a great deal of attention to planning and supervision. MAXIMA has conducted a variety of seminars, workshops, conferences and on-the-job programs, each requiring its own particular blend of logistical and strategic planning and over-



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sight. A followup assessment of a training program not only provides useful information on how successful the training was, but it is also the first step to determining future training need. Evaluation also provides a means of measuring actual effects, such as increasing productivity, reduced error and greater employee satisfaction. MAXIMA has been involved in developing many such specialized training programs, including an innovative approach emphasizing individual input into training evaluation and implementation, on-the-job experience and feedback, trainee development of job aids and instructional materials, and the preparation of trainees to instruct future recruits. But the crucial point is that training and educational programs must be designed to meet the special needs of each organization and each situation.

During the past 6 years, MAXIMA has performed several projects that focused on training support for a variety of clients. These projects encompass the full range of training activities including needs assessment, materials development, program implementation and evaluation.

- o Executive Training Seminar for DOE/NRC/ORNL on the Nuclear Materials Management and Safeguards Systems (NMMSS) databases
- o Development of a Training Delivery System for Caribbean Countries regarding on-the-job training for water quality personnel - World Health Organization
- o Development of an Evaluation System for Training Materials for Water and Wastewater Treatment Plant Operators for the Joint Training Coordinating Committee, Ames, Iowa
- o Maryland Management Information System (MD/MIS) Design and Training Needs Assessment



- o Develop State-of-the-Art Paper on Grant Support for Academic Training Programs - American Academy of Environmental Engineers and U.S. Environmental Protection Agency
- o System Design for Evaluation of In-Plant Training Programs, U.S. Environmental Protection Agency
- o System Design Services for the Education and Training Department, World Bank
- o Computer Education and Training Program for the National Aeronautics and Space Administration (NASA)

#### 1.2 Understanding the Procurement Description

The diversity of the information industry is evidence of its importance to virtually every facet of contemporary society, but it is also the source of much error and confusion. The MAXIMA Corporation is as diversified as the industry it supports. MAXIMA has given careful consideration to your needs as expressed in The Technical Assistance In Support of NRC ADP Planning Functions (RFP RS-ORM-84-396) and has prepared the following technical approach to assist you in:

- o Technical Support of NRC ADP Planning Functions
- o Identification of Required Tasking to Provide Required Services
- o Provide you with a core of personnel with extensive expertise, experience and education in ADP technologies

The Corporate Data Network (CLN) is a long range plan developed by the ADP planning staff of NRC to modernize the ADP environment using new technologies and methodologies and to evolve into an end user-oriented operating environment. Upon receipt of task orders, MAXIMA technical, management and support personnel will provide technical assistance in support of the NRC ADP planning functions

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as discussed below. In addition to implementing the CDN concept over the next 4 years, plans must be made to address the Commission's immediate and ongoing data processing, word processing, office automation and telecommunications needs and ensure an orderly transition from the current ADP environment to the CDN without sacrificing support for current operations.

To ensure the orderly transition from the current operating environment at NRC, MAXIMA will assist NRC in developing a long range ADP plan that includes the data processing, word processing, office automation and telecommunications functions. This detailed plan and schedule must address not only the procurement of new hardware and software for the CDN, but how the old NRC systems will be replaced with new systems in the CDN. All pertinent activities such as procurement, benchmarking, system installation, system development, testing, user training, integration of word processing and office automation, facility and capacity planning, etc. must be included in the plan. Since a separate long range telecommunications plan will be developed by the NRC Telecommunications Branch, the ADP plan must be coordinated with and include information from the telecommunications plan.

MAXIMA will provide technical expertise in the analysis and evaluation of proposed new ADP concepts and techniques both for existing ADP systems and new systems being developed for the CDN. Typical tasks shall include the review and evaluation of database design specifications for compatibility with the proposed hardware and software, new software packages under consideration for use at the NRC, new computer equipment proposed for use by the NRC, and proposed configurations of equipment, software and telecommunications services.

A number of competitive procurements for hardware and software studies, ADP services, requirements analysis, database and system design, etc., relative to the development of the CDN will be made by NRC. MAXIMA understands that

it will be ineligible to participate as either a prime or subcontractor on these projects. However, MAXIMA will provide the technical expertise to prepare the technical specifications for use by the NRC in the preparation of statements of work for these procurements.

MAXIMA will provide technical assistance in identifying the ADP skills necessary to support the CDN and identify the requirements for training the existing staff in those areas where necessary skills to support the CDN are not presently available from the existing staff.

MAXIMA will conduct independent lifecycle validation, verification and testing for systems developed for the CDN. MAXIMA will develop a quality assurance program for use by the NRC in the development of the CDN, and will assist NRC in assuring compliance with all applicable ADP policies, procedures and standards through the use of comprehensive validation, verification and testing procedures.

MAXIMA will research other agencies and the private sector to identify management techniques and philosophies, planning methodologies and techniques for potential productivity improvements that may be applicable to NRC projects. These methods will be analyzed for ways they can be used effectively by the NRC.

MAXIMA will prepare estimated schedules and resource estimates for proposed planning activities, new projects and systems, and for contracted services to support the ADP plans of NRC. For each SOW, MAXIMA will estimate the labor hours and categories required and an estimated schedule to complete the tasks in the SOW.

MAXIMA will assist the NRC in developing and documenting agency-wide policies, procedures and standards that are beneficial to NRC in managing the ADP functions and improving the development and operation of ADP systems within

the agency. MAXIMA will research all existing relevant policies, procedures and standards issued by the General Services Administration, National Bureau of Standards, Office of Management and Budget and other organizations which have the responsibility for issuance of directives for management of ADP functions within the Federal Government. Research must be done by MAXIMA to verify that policies, procedures or standards adopted by the NRC are not in conflict with any official directives already issued.

Benchmarks will be developed by MAXIMA and used to evaluate the performance of all proposed new computer equipment, software and time sharing services. A description of the benchmark tests and a discussion and evaluation of the benchmark results will be prepared by MAXIMA in a written report for the NRC.

### 1.3 Organization of this Proposal

MAXIMA has organized this proposal into two major parts, a technical proposal and a separate cost proposal. The technical proposal derives its form from two sources, the RFP and the letter of transmittal for the RFP.

The letter of transmittal called for the inclusion of the following sections in the technical proposal.

- o Understanding of the Procurement Description
- o Technical Approach
- o Uncertainties and Problems
- o Interpretations, Requirements and Assumptions
- o Management
- o Milestone Chart
- o Management Controls

These requirements have formed the component sections of the technical approach.

Subordinate to Section 2.0, Technical Approach, MAXIMA addresses the nine functional areas identified in the scope of work of the RFP.

For each area, MAXIMA has discussed the nature of the area specified in greater detail than appears in the RFP so that some aspects of MAXIMA's interpretation of the requirements are made clear. Following this elaborative step, MAXIMA describes its technical approach to solving the problems that would arise in the nine areas.

## 2.0 Technical Approach

### 2.1 Assist NRC in the Development of a Long Range ADP Plan

Long range planning provides management of NRC with a decision-making framework in which to control the development of the Corporate Data Network (CDN). The goal of long range planning is to be able to anticipate the future needs of an organization and provide the means to develop solutions that satisfy these needs before they become problems that impact an organization's operation.

The process of formulating a long range plan involves several steps. An analysis of workload information and other operating information for the various organizations comprising the NRC can be used to identify real or potential problems that would affect the ability of the NRC to accomplish its mission in an efficient and effective manner. This information coupled with projections are then used to identify the requirements of NRC. Next, new technology and methodologies in the areas of data processing, word processing, office automation and telecommunication are reviewed to identify alternatives that will meet the requirements of NRC. Now management has all the data necessary to develop long range plans which will set the objectives of an organization and specify the policies, procedures and resources necessary to achieve these objectives. In



this way, long range planning can be used to control the selection of alternatives to accomplish the workload of an organization in a timely and efficient manner.

When tasked, MAXIMA will assist NRC in the development of a long range ADP plan for data processing, word processing, office automation and telecommunications the methodology to be used is discussed below.

#### 2.1.1 Data Processing

The preparation of a long range plan will follow the steps discussed in the introduction above. First the corporate goals and objectives must be identified. The main objectives of the data processing part of the CDN can be summarized as follows:

- o Acquire and promote the use of DataBase Management Systems Software to provide common access to single sources of information to be shared by multiple simultaneous users and to minimize the potential occurrence of data redundancy.
- o Acquire and promote the use of state-of-the-art hardware and software to provide a more efficient ADP environment that is easier to use and more responsive to the needs of end users.
- o Develop and operate the Information Technology Center to support the CDN and provide end users with easy access to data processing support.
- o Acquire and promote the use of microcomputers such as the IBM PC which allow users to access central computer services and databases or perform local data processing functions in a standalone mode.
- o Acquire hardware and software to permit data processing functions to be integrated with word processing and office automation functions.



- o Institute a Software Improvement Program for existing systems to assist in the transition to the CDN.
- o Introduce new technologies and methodologies into the NRC to improve productivity and provide a more efficient and effective ADP environment.
- o Acquire new hardware and software to improve the quality and integrity of data used by the NRC.
- c Develop an environment where all ADP equipment, software and systems are as fully integrated and compatible as possible.
- o Develop uniform policies, standards and procedures for all new systems developed to operate under the CDN.

The next step involves interviewing managers and end users who are tasked with the planning function for their organizations. The individual organization plans must be known and approved as part of an overall NRC ADP plan. Development of separate databases by individual organizations to run on either a mainframe or a mini or micro-computer does not promote the concept of sharing common sources of data with other users and minimizing data redundancy. To avoid this, procedures should be set up for a planning committee or data administration function to review all proposed new system developments and hardware acquisitions for all organizations in the NRC.

Once the organizational plans and objectives are reconciled with the overall corporate objectives, a single long range plan can be formulated. Elements to be incorporated in the long range plan include technical data as well as cost and budgetary data. A comprehensive long range plan for data processing should include the following planning phases:

- o Conception of Initial System
- o Preliminary Requirements Study

- o Feasibility Study
- o Cost/Benefit Analysis
- o Detailed Functional Specifications
- o Detailed Systems Specifications
- o Detailed Systems Design
- o Procurement Phase
- o Test Plan
- o Conversion Plan
- o Programming Specifications
- o Programming and Unit Testing
- o System Testing
- o Documentation
- o System Installation
- o Training
- o Parallel Operation
- o Conversion and Operational Start-Up
- o Post-Implementation Review
- o Maintenance

The plan should contain some detailed information for each phase on what tasks are necessary to accomplish each phase. The detailed information on each task should provide answers to the following:

- o What work is to be done
- o How the work is to be done
- o When the work is to be done
- o Who will do the work
- o The specific results of each task
- o Organization of all of the defined work into the proposed sequence

- o Priority of critical tasks
- o Estimated cost and budget data

The long range plans developed by MAXIMA under task orders will be prepared using an IBM PC microcomputer. In this way, the plan can be dynamic and evolve as changes need to be made to it. MAXIMA will use the IBM PC and its word processing functions to produce written reports on the long range plan for NRC to review as required by the contract. Changes to the plan can be made at any time with a minimum of effort using the IBM PC.

#### 2.1.2 Word Processing and Office Automation

The purpose of using a technology like word processing and planning to use new state-of-the-art word processing and office automation technology is to improve the quantity and quality of an office's work product. Initial word processing systems and office automation efforts were aimed at solving the typical problems associated with producing written documents in the office as quickly and efficiently as possible. This has resulted in an improvement in the quality of the products produced, faster response to the needs of management for written documents, and in some cases allowed for a reduction in clerical staff.

With the advent of more sophisticated microcomputers, higher quality printers, terminals, better software and local area networks, the technical advances in office automation technology make it wise to re-evaluate the requirements of today's offices at the NRC. The next step would be to match NRC's current and future needs to the new technological capabilities to determine if it is cost effective to replace the older word processing equipment, which essentially provided just word processing capability, with higher technology equipment which can provide a wide range of office automation services. The results of this study can be formulated into long range plan and submitted to NRC for review.

The approved office automation plan would then become part of the long range plan for the CDN.

Some examples of new technology that need to be considered in addressing the current problems and future needs of NRC include the use of intelligent software that is integrated with a word processing package such as a spelling checker, automatic indexing and table of contents generation, document generators, graphics capabilities to produce charts and figures, new telecommunications equipment and software that allow broadcasting messages and notices and the use of electronic mail through NRC. The potential use of intelligent word processing work stations will allow an office to have multiple uses for its hardware including word processing, electronic mail, document preparation, transmission and receipt of printed material, and an interface to data residing at other work stations or at a central computer facility. MAXIMA has the experience and knowledge to re-evaluate the needs of NRC in terms of the overall objectives of the CDN and to prepare a plan recommending alternatives that are available, both hardware and software, that can be used as part of the CDN approach to improve the quality and quantity of work performed at NRC offices with current staff.

#### 2.1.2.1 Word Processing

If tasked, MAXIMA will work with NRC's ADP Steering Group in developing appropriate interfaces between word processing and data processing hardware and software. Requirements for interface between existing word processors like the IBM 5520 word processors and IBM displaywriters and data processing mainframes will be defined in activities performed in the Office Automation Section (2.1.3). Some alternatives that will be considered in the development of interface are:

- o Using the IBM PC as a intermediate communications processor for editing file formats between word processors and data processors.
- o Utilize diskette, cassette, tape and/or removable disks for transferring files between word processing and data processing hardware.
- o Use either dumb terminal or smart terminal modes to interface machines like the IBM PC. Combined use for word processing entry and data processing is a feasible alternative.

One other special consideration regarding word processing merits note here. In the procurement of equipment, selection criteria should include noting which equipment is user friendly. Equipment which is user friendly promotes higher production and requires less training.

Another factor to be watchful of is the performance and maintenance record of vendors whose products and service will be proposed to the NRC.

If tasked for its evaluation of word processing systems and subsystems, MAXIMA will include in its investigation reliability in terms of mean time between failures and maintenance in terms of mean time to repair.

#### 2.1.2.2 Office Automation

Upon receipt of a task order, MAXIMA, in its technical approach to NRC's office automation, will assist NRC management in examining office functions, examining data flows, performing requirements analysis, examining existing equipment specifications, determining hardware relationships with the Corporate Data Network, recommending alternative system developments, specifying system development requirements, and implementing new system developments. This will lead NRC to the integration of their IBM 5520 centralized word processing CPU with the IBM displaywriter, other word processors and general data processing equipment utilized in the database management system (e.g. DG's MV8000). Functional



corrections between payroll, personnel, IFMIS, DCS, PDR and NRC's central office will be improved utilizing IBM PC compatible microcomputer technology and other telecommunications equipment.

The following sections briefly describe the activities that MAXIMA is prepared to assist management with in the performance of the Office Automation Process, upon receipt of a task order.

The first steps of NRC office automation is to survey NRC's functional structure and data flows. NRC, like any other organization, has a management structure and the departmental or divisional breakdown is a potential guide to the office automation system designer. Constraints on information flow, required interaction with management, and general data flow will be found in an organization's structure. Going further within the management structure, the system designer will examine data flows both ADP and other. In general, samples of inputs, typical reports, and databases within each group should be examined. This survey information will then be used to perform a requirements analysis.

After determining data flows, data content and organizational structure, a requirements analysis will be performed. Examining data developed within organizational structures should lead directly to the description of possible developments that may be made. Users, managers and CDN managers should be able to identify all types of automation possibilities. The possibilities will be examined and prioritized by management and a package of functional automation system proposals will be recommended. Office managers will also recommend a planned development strategy and on how the new functions will be integrated from lower levels up to the CDN level if appropriate.

Each department has at its disposal in one format or another, office automation systems equipment. This hardware is used to perform functions and move



data. The IBM 5520, IBM displaywriter, other word processing equipment and DG MV8000 are all used to support the functional level data flow. These devices need to be surveyed and analyzed in terms of their current effectiveness. Functional system capabilities and hardware system capabilities should be described for each piece of equipment in each department. Actual data flows accomplished by the existing hardware should also be described. Relationships to the CDN will be defined by the CDN management staff. Both CDN and non-CDN equipment will be considered.

After existing data flows and hardware have been surveyed and identified, a cost effectiveness analysis should be performed. Consideration of time phased development of functional systems (2.1.3.2) should be reconsidered. Alternative system developments will be considered and recommendations will follow that present general cost and a schedule of development. Hardware procurements should follow after CDN's review with functional management.

After hardware selection, redefinition of system development and requirement for that functional system will be made. Hardware will be specified in terms of the system capacity, peripheral capacities, etc. Software specification will be required for data entry, report generation, updating archiving. Interaction with the DataBase Management Systems at the functional level and at the CDN level should be developed. Where appropriate, communication interactions and equipment should be specified.

Implementation of office automation systems will be planned. Phased development if necessary will be considered where existing systems or non-systems require it. Integration into the CDN will be done. This will require additional software and potentially more hardware to accomplish. Benchmarking, testing, and modifications will be made prior to actual installation. Recommended train-

ing will follow if necessary. Reconsiderations and refinements of the new system will be considered in the Productivity Improvements Section 2.6.

### 2.1.3 Telecommunications

Telecommunications planning and technology evaluation require a number of activities to be performed before implementation of a communications system installation or change. Coordination with the NRC long range telecommunication plan, interfacing with users, hardware specification, quality assurance and testing, and integration into the overall CON plan is required. If tasked, MAXIMA will carry out the following tasks:

#### 2.1.3.1 Coordinate with the NRC Telecommunications Branch's Long Range Plan

Definition of the existing telecommunications system should be ascertained along with any designed or expected changes that have already been planned. Restatement of the system definition into a form compatible with MAXIMA communication planning will be performed. This system definition will be used as a format for designing hardware limitations and statements regarding possible database distribution.

#### 2.1.3.2 Requirements Research

MAXIMA will conduct its requirements research by interfacing with users or user representatives in order to acquire appropriate guidance for staff in defining communications requirements. Part of this research will require additional input of data from the data analysis and categorization study and the analysis of requirements for office automation. Definition of the database is essential. Definition of the hardware that contains, controls or requires

the data is also essential. Through this interfacing and research, a determination may be made about the types of networking schemes, hardware, software and techniques that may be employed in the planned CDN.

#### 2.1.3.3 Telecommunication Hardware Requirements

All hardware specifications will be input for the specification of hardware requirements for telecommunications. All host computers will be defined in terms of their central processor memory, storage media and capacity, controller characteristics and data transfer capabilities (serial/parallel, asynchronous/synchronous, blocked/unblocked) and transmission rates. Front end processor or multiplexors will be defined in the same manner. Modem requirements will be derived from the definitions of CPU and terminal configuration. Terminal requirements will be derived from database and host processor definition as well as individual requirement specifications produced in the office automation study. Line types and conditioning, if necessary, will follow the hardware definition.

Specification of the hardware configuration in terms of protocol, type of transmission, baud, etc., should be made in advance of hardware selection. Alternative communications hardware will be evaluated based on configuration definition, compatibility, CPU vendor acceptance, availability, cost effectiveness considerations and quality of transmission over phone lines.

#### 2.1.3.4 Compatibility Between the CDN Long Range Plan and that of the Telecommunications Branch

After full consideration is complete, a check should be made of the recommended communication system changes with the existing long-range communication

plan. Variations should be evaluated and associated points within the long range plan or implementation plan should be modified.

## 2.2 Analysis and Evaluation of Proposed New ADP Concepts and Techniques

The NRC will be constantly in receipt of proposals containing new ADP concepts and techniques. Some of the proposals will seek to advance new ideas fresh from the imagination of the authors; some will advance the use of new commercially available software and hardware, implementing the ideas that were only pipe dreams a few years ago. As NRC is well aware, the advances being made today in ADP technology are very often obsolete in a year or two; fresh ideas are hot on their heels.

NRC will, from time to time, require assistance in the analysis and evaluation of these proposed new concepts and techniques: an analysis to see what the proposal says and an evaluation to determine the following: (1) relevance; (2) effectiveness; (3) completeness; (4) costs versus benefits; and (5) compatibility of a proposal to the NRC's planned or evolving Corporate Data Network.

Where multiple related proposals are being evaluated at once, an evaluation will be needed which compares the proposals and ranks them according to the above criteria and in terms of overall worth in pursuing. Even when only one proposal is undergoing evaluation, it will need to be compared with any relevant knowledge already at hand about the topic.

MAXIMA recognizes that NRC desires a CDN that is modern, flexible, effective and efficient. MAXIMA also recognizes that many state-of-the-art techniques, equipment and software will not be applicable to the CDN after a certain point in its evolution: they will simply be precluded by decisions already made. While there is time to incorporate new techniques, etc., MAXIMA will evaluate those proposed as to the above criteria. The same criteria will apply even

after such things as hardware, operating system and network architectures have been selected. Though the field will have been narrowed considerably, the details about individual proposed hardware to be attached, software to be made resident and techniques to be applied will have to be analyzed even more carefully to leave no stone unturned in the evaluative search for the best proposal that will enhance the CDN.

If tasked, MAXIMA is prepared to assist the NRC by performing the analysis and evaluations of all proposed new ADP concepts and techniques.

MAXIMA wishes to demonstrate some aspects of its approaches to four areas that will be of recurring concern to the NRC. These four areas are:

1. Databases
2. Software
3. Equipment Proposals
4. Multiple Configurations

#### 2.2.1 Database Management Systems (DBMS)

MAXIMA, upon receipt of task orders to analyze and evaluate proposals about database management systems, including database machines, will embark on its analysis and evaluation employing the criteria of relevance, effectiveness, completeness, costs versus benefits and compatibility.

Specifically, MAXIMA will read the proposal and note all of the features of the proposed system, essentially developing a structured list of the system's functional specifications and characteristics. Special note will be taken of new concepts or techniques alleged to be employed in the proposed system. Data captured and evaluations performed will be stored in data files on IBM personal computers.

Assuming that a proposed database management system were compatible with the CDN hardware and software characteristics already settled on, MAXIMA would continue to examine and evaluate the proposed DBMS for additional criteria by asking the following questions of the proposal:

- o Can the proposed DBMS support shared data access?
- o Does the DBMS minimize redundancy in the DBMS and the CDN?
- o Does a user-friendly interface exist that permits on-line inquiry?
- o Does the interface permit the creation of ad hoc reports?
- o Does the DBMS support geographical distribution of the data?
- o Does the DBMS function via compatible software in micro computers, such as the personal computers?
- o Do programming languages interfaces exist to such languages as FORTRAN, COBOL, PL/I, PASCAL?

MAXIMA will compare proposed database management systems against all comparable systems proposed or known to be on the market at the time and additionally evaluate them with respect to costs and consequences for the CDN.

Comparisons will not only be based on the technical specifications provided by the proposers but also on the results of any testing or benchmarking information available. MAXIMA will then produce a formal report on its evaluation of the proposed database management systems, the concepts they implement and techniques employed.

#### 2.2.2 Software

Upon receipt of notice to proceed on a task calling for the analysis and evaluation of one or more proposed software packages, MAXIMA will commence its



analysis and evaluation considering factors of relevance, effectiveness, completeness, costs versus benefits, and compatibility. Any specific technical guidance provided by the NRC will also be complied with.

Specifically, MAXIMA will read the proposal(s) and note all the features of the software package(s) proposed. Essentially, MAXIMA will develop a structured list of the functional specifications and characteristics of the package(s).

MAXIMA will capture all of this technical data and the results of its evaluation in data files maintained on its IBM personal computers. This will provide NRC with easily managed information suitable for the production of the final report and for rapid response queries about the software.

MAXIMA will establish the specific criteria for the evaluation of software packages and submit them for NRC approval. MAXIMA will then apply these criteria to the software package(s) proposed.

Since the CDN will contain a wide variety of hardware, mainframes, minicomputers, personal computers and word processors, MAXIMA will be especially watchful for a number of important features, notably:

- o File compatibility with respect to accepted software packages.
- o Ease of file conversion where required.
- o User-friendly menu-driven.
- o Programming languages meet national standards.
- o Good documentation.
- o Availability of training or training material.
- o Computer aided instruction (CAI).

MAXIMA will compare the software proposed with other comparable software on the market at the time, not only with respect to technical specifications, but with any testing or benchmarking information available. The costs and conse-

quences of implementing the software will be documented. MAXIMA will then produce a final report on its evaluation of the proposed software package(s) documenting its findings and recommendations.

### 2.2.3 Equipment Proposals

Upon receipt of notice to proceed with work on tasks calling for the analysis and evaluation of proposed equipment, MAXIMA will begin work in the following manner.

MAXIMA will develop a means for capturing the technical data contained in the proposals on its IBM personal computers. The same programs or software packages will provide room for MAXIMA's evaluation as well. The means employed will be logically similar for all types of equipment, merely tuned to cope with the different features of the various types of equipment.

MAXIMA will then read the proposals, note the technical aspects of the equipment proposed and transfer the data to the automated system prepared for this purpose.

Proposals will be evaluated for relevance, effectiveness, completeness, costs versus benefits and compatibility.

Most proposals will be submitted to NRC in response to some form of RFP, whether as a formal solicitation in the open market or an internal request for the presentation of ideas on a particular problem whose solution involves hardware. As such, the proposals will be evaluated with respect to the specifications provided in the "RFP". Where the proposals are competitive, they will be evaluated within that framework. Where they are simply the submission of ideas, the ideas will be evaluated and synthesized into a point paper or other suitable document by MAXIMA.

Equipment has its unique criteria for evaluation. Equipment needs to be compatible. That is stating the obvious. What is not obvious is how much compatibility there must be.

MAXIMA will be watchful that:

- o electrical interfaces be compatible
- o data formats be compatible
- o communications protocols be shared among devices
- o that environmental constraints are met

The list goes on. MAXIMA will be comparing the specifications in the proposals to the requirements already established for the CDN.

MAXIMA will conclude tasks of this nature with a formal report or other documentation containing its findings and recommendations as specified by the NRC in its task order.

#### 2.2.4 Multiple Configurations

Proposals will be called for that deal with the configurations of computer equipment and the telecommunications network. If tasked, MAXIMA will bring its experience in the configuration management and communications network areas to bear on the analysis and evaluation of various new configurations proposed as task orders for this kind of work arrive.

Configurations will be evaluated for efficacy, efficiency and consequences for the component system(s) and the network. The evaluations will require a thorough knowledge of database operations, data file distribution, anticipated data volumes, bandwidth requirements, computer and peripheral device performance characteristics and options available for configuration and routing in the telecommunications network.

MAXIMA has the resources which it can combine to perform the configuration evaluations that the NRC requires.

Following any analysis or evaluations MAXIMA will submit formal reports to the NRC containing its findings and recommendations or other documentation as requested in task orders.

### 2.3 Development of Technical Specifications

To accomplish the goals and objectives of the CDN, NRC will be procuring various equipments and services in each of the functional areas discussed in Section 1.2. Documentation required for acquisitions includes the technical specification, the Statement of Work (SOW) and the Contract Data Requirements List (CDRL). The technical specification is a document intended primarily for use in procurement. It clearly and accurately describes the essential requirements for items, material or services and includes the procedures for determining that requirements have been met. The SOW is the document which establishes and defines all nonspecification requirements for a contractor's effort. When properly written, the SOW defines tasks and identifies the work effort to be performed by a contractor. The CDRL identifies individual items of data required for delivery during the performance of a contract. This section presents the methodology used by MAXIMA to evaluate the CDN and prepare technical specifications and SOWs.

#### 2.3.1 Examination/Evaluation of CDN

Technical specifications will have to be written describing the various equipments, software and services required to implement the CDN. In the areas of software development for new applications and software improvements for existing applications, SOWs may be required for feasibility studies, requirements

studies, cost/benefit analyses, developing detailed functional specifications and system specifications, performing detailed systems design, programming specifications preparation, programming services, system testing, system installation, conversion and operational start-up, training, documentation and maintenance.

Since the CDN will be initially developed on a timesharing computer facility, a technical specification and SOW are required to define the services required by a timesharing facility to develop the databases and systems required in the CDN plan. Both specific hardware and software packages must be specified as well as NRC's requirements for time (access and usage), file space security and privacy, training and documentation. The types of computer terminals and microcomputers available to access the timesharing services must also be included.

In the area of requirements studies and evaluations, the detailed requirements for new and existing applications and the acquisition of new equipment must be evaluated for compatibility and suitability with the objectives of the CDN. If tasked, technical specifications and SOWs will be written to procure services to accomplish these tasks.

Equipment acquisitions require technical specifications that describe the features required and performance expected to meet the needs of NRC. Included in the SOW must be a clear and accurate description of the equipment and functions it must perform and information on the quantity, types and models required. In addition, details on the acceptance criteria and testing procedures should be included.

If NRC elects to procure and select a computer configuration to be installed and operated within NRC, it may be necessary to issue a long term Facilities Operations Management Contract. The technical specifications and the SOW must detail all the operations and management functions required of the contractor



such as equipment operation, tape library services, production operations, work control, facility access and scheduling, peripheral equipment operation, hot line services, usage statistics, maintenance, acquisition of additional equipment and supplies, workload analysis, system software maintenance, system tuning, telecommunications services, etc.

In many cases it is more cost effective to acquire proprietary software packages to meet the ADP requirements of NRC. Technical specifications and SOWs must clearly state the features, capabilities and capacities required to meet the application and operating requirements prescribed by the CDN. In addition, details on acceptance criteria and testing procedures should be included.

#### 2.3.2 Statements of Work

The Statement of Work describes precisely what a contractor must accomplish to fulfill the requirements of a task. It can include but is not limited to the following:

- o General background information about the project and tasks involved in the procurement.
- o Detailed information on each work item for the tasks involved in the procurement.
- o Deliverables and schedules for delivery of items, reports, etc., for each task.
- o Procedures for determining if the work has been accomplished according to specification and is acceptable.

The SOW must have information as part of the SOW or references to attachments to provide the contract with enough details to understand what is required by each item in the SOW. The SOW is derived from the technical specification document and can refer to it to provide the necessary technical details.

For equipment being procured, the SOW is more of list of technical specifications describing the features and functions of the required equipment together with the quantity and test procedures for accepting the equipment that is delivered under the procurement.

For services such as feasibility studies, requirements analysis, database designs, application systems designs, hardware studies, software studies and time sharing services, the SOW must provide information on the objectives and scope of the study or service, quantifiable data on the nature and extent of the services to be provided, and deliverable products to be produced by the contractor. Information on when and how the work being performed is to be reviewed and accepted by the NRC should also be included in the SOW.

The MAXIMA Corporation will assist the NRC in preparing SOWs for procurement actions relative to the CDN. SOWs will be produced using IBM PCs or word processing services at MAXIMA and submitted to the NRC for review and comment. Corrections and changes can easily be made to the SOW before final versions are produced and delivered to NRC for inclusion in RFPs.

#### 2.4 Analysis of CDN Support Functions

Once a comprehensive technical plan for implementing the CDN has been approved by the NRC, an analysis of the skills needed to implement and support the CDN must be made. The primary objectives of the analysis are as follows:

- o Identification of the specific technical skills required to implement and support the CDN.
- o Assessment of current proficiency levels of NRC staff in the required skills.
- o Identification of the types of skills needed that current NRC staff does not possess.

- o Development of a detailed training plan for achieving the required skills.
- o Developing a plan to re-evaluate the list of required skills and revise the staff training plans as the CDN evolves.

Sections 2.4.1-2.4.5 discuss MAXIMA's proposed approach to accomplishing these five objectives.

#### 2.4.1 Identification of Skills Required to Implement and Support the CDN

To identify all of the skills needed to support the CDN, an analysis of the intermediate and long range plans must be made. This analysis must examine all the projects and tasks being proposed to identify the types of work and technical personnel needed to perform the work. Interviews with personnel specialists and technical specialists in appropriate work areas, information from the Office of Personnel Management, and the professional knowledge of MAXIMA staff will be used to identify specific skills necessary to implement and support the CDN. All the technical areas such as new hardware and equipment, software packages, applications and programming productivity tools, policies and procedures, decision support systems, word processing, office automation, etc., must be examined to identify all the skills and personnel that will be required to support the CDN.

The identification of skills required not only depends on the technology and methodology being considered, but also on the type of personnel using that technology. Hence, skill levels for all levels of ADP staff and users having either ADP skills from none to very sophisticated must be addressed for each technical area identified from the plans for the CDN.

The result of such research will be a comprehensive list of skills keyed to the job title most likely to perform the CDN task. This list will be used

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to compare with the list of the skills possessed by the current staff to determine skill deficiencies that must be addressed in order to implement and support the CDN.

#### 2.4.2 Current Skills Assessment

The skills of current NRC employees can be identified by researching the position description of each employee and by interviews with managers and supervisors in each functional area. These can be checked against a matrix of the skills needed to implement and support the CDN to identify the areas of deficiency. In identifying current skills, it is also important to document not only the skill but the level of proficiency in that skill. These levels may include:

- o no knowledge
- o have studies
- o limited working knowledge
- o extensive working knowledge

The result of this study would be a list of individual personnel with the current skill levels and areas where extra training is required to accomplish the objectives of the CDN. In addition, the number of people requiring various skills compared to current staffing levels can be used to plan for the staffing needs of the NRC.

#### 2.4.2 Training Requirements

Once the required skills and current proficiency levels of NRC employees are compared, a comprehensive plan for obtaining personnel with the appropriate skill levels can be formulated. The gaps in skill levels or personnel can be addressed in several ways. Current employees from other areas in NRC can be

detailed to functional areas supporting the CDN or plans to hire additional staff can be made. Once the staff is in place, any skill deficiencies can be corrected by either formal classroom training, on-the-job training or contracting out certain functions that NRC chooses not to maintain full-time staff to perform.

#### 2.4.4 Skill Level Development Plan

MAXIMA will develop a detailed training plan showing the skills needed, number of personnel, proposed curriculum, schedule for training, cost and possible sources of the training. This plan together with MAXIMA's recommendations for the best alternatives will be compiled in a draft report and submitted to NRC for review.

In addition, to training current NRC staff, NRC has the option to hire additional personnel with specific or hard to get skills or contract out for those phases of the development and support of the CDN when it is not cost effective to training NRC personnel.

#### 2.4.5 Re-Evaluation/Revision of Required Skills

As the concept of the CDN evolves and each phase is implemented, new tasks will be identified as the result plans to use new technologies, methodologies and equipment. Consequently, there will be a need to periodically re-evaluate the proposed skill assessment and improvement plans and make appropriate revisions. Skills may be added or deleted and personnel changes may require revisions in training plans. MAXIMA plans to develop and revise the detailed plan on an IBM PC XT so that revisions and changes can be quickly made and new drafts produced for review by the NRC.



## 2.5 Comprehensive Validation, Verification, Testing of CDN

If tasked, a comprehensive validation, verification and testing of the CDN will be carried out for the CDN. It will include the development of a quality assurance program for use by the NRC in development of the CDN. It will also assist the NRC in assuring compliance with applicable ADP policies, procedures and standards through an independent life cycle validation, verification and testing of the CDN.

### 2.5.1 Quality Assurance Program Development

A quality assurance program will be developed. The purpose of the quality assurance program is to insure that the development contractor meets all standards and specifications for deliverables imposed on him by NRC. The program will ensure that contractor materials, components, equipment, computer programs and documentation will maintain a quality level consistent with NRC requirements. The program will be divided into the development phases of the CDN: concept exploration, demonstration/validation and installation and testing. The program will be comprehensive enough so that it can be imposed on the development contractor by NRC using the MAXIMA deliverables.

#### 2.5.1.1 Concept Exploration

This effort is restricted to familiarization and planning. The following work will be performed:

- o Development of a preliminary quality assurance plan, based on proposed alternative approaches.
- o Development of preliminary quality assurance criteria to be imposed on the contractor's quality assurance efforts.

The quality assurance effort will encompass proposed database design specifications, software packages, computer equipment and configurations.

#### 2.5.1.2 Demonstration/Validation

The quality assurance program will continue until the initial demonstration and validation of the initial CDN. The purpose during this phase is to assure that the initially procured system will meet NRC requirements. Quality assurance criteria will be imposed on the procurement, installation and test of both hardware and software. Specifications developed during this period will be used to validate and verify the results from the demonstration of the initial CDN. Quality assurance will be imposed on all software packages to insure that they meet the requirements of NRC.

Specific efforts to be completed include:

- o A quality assurance plan will be developed based on the demonstration system procured.
- o Hardware and software quality assurance criteria will be developed based on NRC requirements.
- o Provide support to NRC in the imposition of the quality assurance plan and criteria on contractor quality assurance activities.
- o Verify and validate that the quality assurance plan and criteria are being carried out by the contractor.

#### 2.5.1.3 Installation and Testing

This effort will provide quality assurance between the initial demonstration of the CDN and the point in time when the initial system installation has been completed. The initial demonstration will provide the validation of the concept. It will not include the entire initial system. Quality assurance during

this phase will insure that installation and testing will result in an initial CDN which will satisfy NRC requirements.

The work to be performed consists of:

- o A quality assurance test plan will be provided to be implemented during installation and testing of the initial system.
- o Quality assurance engineering will be monitored after the tests of the initial system to correct performance failures and make any accompanying design corrections.

#### 2.5.2 Independent Life Cycle Validation, Verification and Testing

During the entire development, procurement and operation of the CDN, an independent validation, verification and testing program will be developed and carried out. This program will operate in parallel and independent of the above quality assurance effort and will continue after the initial system has been tested. The purpose of the program is to ensure that the CDN system hardware, software and operation complies with applicable policies, procedures and standards of NRC. The effort will provide a continuous watchdog surveillance of the entire development, procurement and operation activities of the CDN. When a CDN configuration does not comply with NRC policies, procedures and standards, a written report will be provided stating the exception and recommending changes required to correct the situation. The effort will include the following:

- o A single point of contact will be provided by MAXIMA to organize and manage the support of this effort.
- o Current NRC policies, procedures and standards will be used to validate, verify and test for exceptions on a continuous basis.
- o Written exception reports will be provided on a timely basis, so that corrections can be made as soon as possible.

- o During the development phase, verbal exception reports will be provided within one week of the detection of an exception. If further investigation reveals no exception, a verbal notice of this will be provided.

#### 2.5.3 IBM 5520/PC Validation, Verification and Testing

The current configuration at NRC has an IBM PC network connected to an IBM 5520 and a mainframe. An independent validation, verification and testing program will be carried out for this configuration. The purpose of the program will be to assure that this configuration complies with the applicable policies, procedures and standards of the NRC. Emphasis will be placed on the PC dependence on telephone lines for communication.

#### 2.6 Potential Productivity Improvements, Planning Methodologies and Management Processes

Upon receipt of a task order, MAXIMA will assist NRC CDN Management with the development of potential productivity improvements, new planning methodologies and improved management processes. In doing so, MAXIMA will assist in researching organizations and literature, performing management alternatives analysis, recommending computerized management assistance tools, and implementing procedures for the effective evolution of management.

##### 2.6.1 Research Organizations and Literature

Researching organizations and literature will start with a review of existing ADP management processes and planning methodologies with respect to the CDN and in NRC in general. The assessment will be inclusive of all functional systems. Unique single users which are not part of the "shared" CDN database

will be considered separately and as potentially included. 'Sensitive' database systems that should remain isolated or separate will be identified.

Literature from both public and private sources will be screened for planning methodologies and management processes which may lead to productivity improvements if utilized. GSA, OMB, NBS and other government agencies will be screened for potential productivity enhancing management processes. Private sources such as universities, think tank corporations, computer manufacturing and organizations utilizing high tech ADP systems and management will be examined also.

Current management operations within NRC or CDN which could utilize improvement will be identified. After management strategy sessions are conducted, necessary or suggested redesign alternatives will be identified.

#### 2.6.2 Management Alternatives Analysis

Management alternatives derived from research and/or evaluation of current policies, standards, processes and procedures (see Section 2.8) will be analyzed and evaluated for appropriate action to be taken. A variety of management alternative analysis procedures may be undertaken. Some of these are:

- o Management alternatives and functional procedures could be simulated in operational models. Both financial saving and scheduling enhancements could be derived.
- o CPM/PERT management tools could be utilized to identify inherent problems in ADP operations. Again, both financial and scheduling of operations could be evaluated in periodic performance evaluations.
- o Cost Effectiveness Evaluations could be a most effective approach to management alternatives analysis. Measuring inherent costs and associated products is often an excellent way of making a final selec-



tion as well as providing justification for proposed changes in ADP management.

#### 2.6.3 Computerized Management Assistance Tools

Computerized management assistance tools will be recommended to carry out the Management Alternatives Analysis mentioned above. Part of the literature research will illuminate high tech tools that can create potential productivity improvements. These will be presented to CDN Management as appropriate. Some of the existing tools that MAXIMA will utilize are:

- o ARTEMIS - This is a METEIR HP-1000 computer based data management system that assists in financial and scheduling management for the monitoring of time phased projects.
- o IBM PC Software such as LOTUS 1-2-3 and Symphony are high tech, low cost solutions to management project tracking.
- o Large scale mainframe packages such as SIMULA and GPSS are also available for highly refined modeling if necessary.

#### 2.6.4 Implementation Procedures for Effective Management Evolution

All ADP management changes recommended will be changes by design that will insure implementation procedures for effective management evolution. Installing new ADP management procedures and/or planning methodologies can potentially upset organizations. Designed changes will be planned to minimize any disruption. Some implementation methods may include:

- o Point directed migration of one management process to a new one could be used. Often personnel must be led into a new management structure. Knowing only the final version management structure, the manager may elect to let the process evolve, in a guided manner, by changing con-

trols of the ADP personnel operating the functional system.

- o Transparent changeovers may be utilized in systems when only software and hardware changes are involved. This creates the least impact on the user.
- o Instructional changeovers may be required when a functional system is initially installing ADP equipment.
- o Training methods can often help develop new management improvements. When installing new equipment like the IBM PC, training often encourages new management technology to be used by the department using the system hardware.

Monitoring and updating newly installed management procedures, planning methodologies and/or operating processes is necessary. Sometimes the inclusion of a well intended procedural enhancement can develop into a useless time consuming process. Procedures which fall into this category should be identified and recommended for exclusion from general procedures (See Section 2.8).

## 2.7 Resource Allocation and Scheduling

If tasked, MAXIMA will assist the NRC in its planning for the Corporate Data Network at any or all phases in its life cycle. In particular, MAXIMA will provide assistance in terms of the preparation of schedules and resource estimates for proposed planning activities, new projects and systems, and contracted services in support of ADP plans.

MAXIMA has been providing similar assistance to a number of its clients, notably the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) at Edgewood, Maryland. USATHAMA is conducting a ten-year project for the destruction of nerve gas agents. This long-term project involves several phases, including:

- o Feasibility study
- o Concept design
- o Machine design
- o Construction of machines and site facilities
- o Demilitarization of the agents
- o Decontamination and closure of site

There are hundreds of tasks in this project and literally thousands of subtasks. The estimate cost at completion is in excess of 300 million dollars.

MAXIMA has been instrumental in developing the planning tools used routinely by USATHAMA. These tools include the ARTEMIS turnkey project management system, running on a Hewlett-Packard minicomputer. ARTEMIS provides a CPM network analyzer, a graphics capability and a relational database system.

MAXIMA has made full use of all of these components and honed its skills in project planning, tracking and monitoring concurrently.

Using these tools and others such as LOTUS 1-2-3 on the IBM PC, MAXIMA will assist NRC in developing comprehensive schedules, including resource loading. The same system will be used to provide cost and schedule status reports on a recurring basis if required by NRC. MAXIMA intends to use the system for its own internal management of this contract. MAXIMA is familiar with DOE and DOD Cost and Schedule Control Systems Criteria and uses this as guidance, if not fully implemented, in its automated project management systems.

Whether the application is proposed CDN planning activities, new projects or contracted services, MAXIMA will proceed in the following manner.

MAXIMA will develop a list of all tasks (and subtasks) appropriate to the function to be performed, develop a network on paper, assign resources and scheduling constraints, enter the data into ARTEMIS and the PC as appropriate and

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execute the programs which will produce the analyzed network (showing the critical path), Gantt charts and appropriate reports.

This is not to minimize the expert human judgement that needs to be applied. In an iterative process, the output of ARTEMIS will be evaluated and adjusted until a satisfactory schedule and resource estimate have been produced for submission to the NRC.

## 2.8 Policies, Procedures and Standards Recommendations and Implementation

Upon receipt of a task order, MAXIMA will assist NRC in the selection and implementation or deletion of policies, procedures and standards for the ADP functions of the agency. Recommendations will be provided for proposed policies, procedures and standards which may be of benefit to NRC for improvement to the management of the ADP functions of the agency. After NRC has selected specific policies, procedures and standards for implementation or eliminated those which are not desired, MAXIMA will provide implementation support to NRC in the preparation, documentation, distribution and changes required. NRC functional areas to be addressed include: management and administration, procurement, property management and ADP management.

### 2.8.1 Recommendations Support

This effort will result in recommended deletions, additions and changes to current NRC policies, procedures and standards for ADP functions of the agency. Current NRC ADP policies, procedures and standards will be described along with those imposed on NRC from other government agencies. Comparisons will be made to determine NRC policies, procedures and standards that do not meet higher-level requirements. The impact of selected recommendations to NRC on NRC operations will be examined by stepping through hypothetical operations.

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The result of these efforts will be recommendations for the deletion, addition or change of NRC policies, procedures and standards for ADP management.

#### 2.8.1.1 Analysis of Current NRC Policies, Procedures and Standards

The documentation of the agency will be canvassed to compile the current ADP policies, procedures and standards. Recognizing that not all ADP policies, procedures and standards are documented in any organization, this support effort will also require access to agency personnel associated with ADP functions. The following efforts will be performed:

- o All agency documentation related to ADP policies, procedures and standards of the agency will be obtained and analyzed.
- o This material will be listed and the list submitted to the ADP manager to assure that all documentation has been made available.
- o A written description of this material and the results from inputs from NRC personnel will be compiled.

#### 2.8.1.2 Obtaining and Examining of Other Government Agencies Policies, Procedures and Standards

Other Government agencies will be canvassed to describe the current policies, procedures and standards for ADP management within the Federal Government. The government agencies will include, but not be limited to, the General Services Administration, National Bureau of Standards and the Office of Management and Budget. These agencies all have responsibilities for issuance of directives for the management of ADP functions within the Federal Government.



#### 2.8.1.3 Comparison of NRC Policies, Procedures and Standards with Those of Other Government Agencies

The NRC policies, procedures and standards will be compared to those promulgated by other Government agencies. The comparison will be made on a point-by-point basis using current NRC policies, procedures and standards in outline form. The objectives will be to show (a) Federal policies, procedures and standards that are not documented or implemented at NRC and (b) NRC policies, procedures and standards which have not been promulgated by agencies having this responsibility.

#### 2.8.1.4 Determining the Impact of Selected Recommendations

In order to understand the impact of recommendations, selected recommendations will be stepped through hypothetical operational functions within NRC. A list of recommendations, deletions, additions or changes will be formulated based on these and previous efforts. From this list selected recommendations will be chosen for this effort to understand their impact on NRC operations. Changes in ADP operations which will occur as a result of the selected recommendation will be described. The description will be made in terms of a model of NRC ADP operations describing the functions, the organizations and the hardware/software which carry out the functions.

#### 2.8.1.5 Recommendations to the NRC

As the result of the above efforts, deletions, additions and changes to current NRC policies, procedures and standards for the ADP management functions of the agency will be recommended. The recommendations will be broad in scope and will take into consideration the current and future configurations of the CDN. A report on all the recommendations support effort will be provided.

## 2.8.2 Policy, Procedure and Standard Implementation Support

After the recommendations support is complete and NRC has selected initially the deletions, additions and changes required for implementation, MAXIMA will provide support to NRC in the implementation process. This support will include (a) the production of an implementation plan, (b) the documentation of the selected deletions, additions and changes, (c) their distribution within the agency under the direction of NRC personnel, and (d) any changes required.

### 2.8.2.1 Implementation Plan

An implementation plan will be produced to describe what policies, procedures and standards will be implemented, the documentation required, the schedule for implementation, the distribution and the management arrangements to be made to ensure that the necessary changes are distributed. The plan will not be considered final until NRC has selected the initial deletions, additions and changes to be made.

The implementation plan will be broad in scope and serve the agency as an informative source of management desires for implementation. The plan will not only provide the details of what will be implemented and how management proposes to carry out its objectives, but also provide the necessary background on the proposed CDN.

### 2.8.2.2 Documentation of Policies, Procedures and Standards

As part of the implementation plan it will be necessary to update current ADP policies, procedures and standards of the agency. This effort will require rewrite and/or generation of policies, procedures and standards in a format specified by NRC. If required, a reorganization of all ADP documentation on

policies, procedures and standards will be introduced in order to make them more accessible to NRC personnel. Additions and changes will be indicated by editorial notations easily discernible to the reader.

#### 2.8.2.3 Original Distribution

MAXIMA will publish and distribute to agency personnel the resulting update of current ADP policies, procedures and standards. A distribution list will be compiled for NRC review. After approval MAXIMA will carry out the distribution using the internal mail system of NRC wherever possible or the U.S. government mail service.

#### 2.8.2.4 Change Documentation and Distribution

Changes in policies, procedures and standards for ADP management will be carried out by the distribution of change documentation. Change documentation and its distribution will be a part of the implementation plan, describing the nature of the changes, the distribution plan for the changes and the frequency of change distribution. A central point of contact at MAXIMA will be maintained to manage this function.

### 2.9 Development of Benchmarks and Evaluation of Benchmark Results

In order for the NRC to determine whether proposed computer equipment, assorted computer equipment configurations, software, database management systems or time sharing services can fulfill the requirements laid down for the CDN or whether new approaches represent an improvement over current approaches, the NRC must establish the criteria for and evaluate the results of live test demonstrations (LTD), benchmark mix demonstrations, or benchmarks.

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In some circles the term benchmark encompasses capability or functional demonstrations. Depending on the instructions received from the NRC, MAXIMA will include or exclude functional demonstrations from its approach in assisting the NRC in developing and evaluating benchmarks.

#### 2.9.1 Research Required for the Benchmark Process

When tasked to provide this form of assistance, MAXIMA proposes that, as a preliminary step, it will embark on a research effort to identify which computer equipment, configurations, software, DBMS, or timesharing services ought to be judged according to a benchmark. Results of this identification process will be reported to the NRC.

Having identified the equipment, software or timesharing services that are candidates for benchmarking, MAXIMA will identify the specific requirements for designing, constructing and documenting the benchmark packages required, taking general guidance from FIPS PUB 42-1 and more specific guidance from applicable DoD standards.

Part of this effort will be identify the job mixes, both batch and interactive, which are representative of the projected workload, whether that be the number of concurrent tasks running, the number of concurrent tasks running in a DBMS, or the amount and mix of data that needs to be processed. The level of complexity will vary depending on the scope of the benchmark, single software packages generally being less complex than fully loaded mainframes. MAXIMA will also identify the criteria for evaluation.

Following all of the identification process, the information developed will be entabled via suitable software on a personal computer so that data captured in the actual live test demonstrations can be automatically evaluated and the evaluation results delivered as easily as possible.

### 2.9.2 Development of Benchmark Packages

MAXIMA, in its design will apply, at a minimum, the following guidelines. Additional guidance will have been developed in the research process. These guidelines can be applied to any of the components: hardware, software or time sharing service.

1. To the extent possible, avoid mandatory requirements for hardware not manufactured by a vendor being benchmarked.
2. Avoid use of vendor specific hardware/software features.
3. Code the benchmark programs in compliance with Federal Information Processing Standards (FIPS) for languages.
4. Do not use programs and data bases tailored to a specific vendor's system features.
5. Use standard character sets as defined in applicable FIPS publications for distribution of program code and input or output data.
6. The degree of complexity of benchmark programs should be representative of the projected workload.
7. Realistic consideration should be given to the workload planned for the future. A realistic workload is one that reflects the projected requirements of the agency during the required system life.
8. Test all programs in the benchmark mix with the data to be furnished to the vendors (including any program modifications and alternate data) to be used at the live test demonstration.
9. Adequately consider precision requirements. Use floating point data in ways that yield predictable and definable results.
10. Clearly define all timing constraints associated with the benchmark mix demonstration. Do not state a series of time constraints on vari-



ous interrelated pieces of the benchmark in such a way as to permit various interpretations.

11. Be consistent in conventions for naming of programs and associated data files.
12. Clearly define requirements for the pre-timed, timed and post-timed portions of the benchmark demonstration.
13. Rely on benchmark performance rather than specific statements of desired hardware or software characteristics.

MAXIMA's goal for the NRC is to specify a benchmark package that:

1. Provides complete program documentation including source code listings, compilation listings, job control information and all output generated.
2. Provides complete documentation for all files, including intermediate files and program/file cross references.
3. Utilizes system block and flow diagrams to indicate system flow, including program order dependencies.
4. Provides estimates of computer system resource requirements for all programs.
5. Carefully defines system conditions at the start of the benchmark timed runs.
6. Specifies the use of multiple copies of inputs for multiple executions of the same benchmark program.
7. Provides clear instructions for vendor preparation of programs and data required to process the benchmark.
8. Includes a glossary of terms to reduce probability for misunderstanding.
9. Minimizes use of punched cards. When cards are necessary, utilize a mechanism for assuring their proper sequence.

10. Carefully controls the environment in which cards, tapes and disks are stored and handled.
11. Ensures accuracy of files through comparison with copies of the original file.

### 2.9.3 Conducting the Benchmarks

MAXIMA will assist the NRC in seeing that properly planned and conducted benchmarks occur once the criteria have been established and the benchmark packages have been assembled. MAXIMA recommends implementation of the guidance provided in FIPS 42-1 for conducting a benchmark and will assist NRC in performing all of the tasks enumerated below.

1. Establish a user benchmark coordinator who is accessible to the coordinator for each vendor for providing answers to technical questions, providing replacement of missing material, and coordinating the dissemination of all other information pertinent to the benchmark demonstrations.
2. Develop an overall schedule of on-site vendor visits. Once a schedule is established, maintain its integrity to the extent possible.
3. Organize the benchmark team and dry-run the benchmark prior to arrival at the vendor's location.
4. Determine and adhere to a scheduled agenda for each on-site benchmark demonstration.
5. Develop and document expedient methods for making changes to data files at the benchmark test demonstration.
6. Plan and state procedures for validating the hardware configuration and the specific systems software to be used in the benchmark mix demonstration.

#### 2.9.4 Evaluating Benchmark Results

The results of a benchmarking need to be evaluated. The output results of computer test runs will be compared and ranked. Since the various vendors whose products are under examination may use different terminology or interpret the same terms differently, MAXIMA will provide assistance in assuring that the benchmark output data are getting a consistent interpretation, that is, all results are converted to some standard notation suitable for comparison.

MAXIMA will also make certain the previously defined evaluation criteria are available at evaluation time by having them resident in personal computers which will be used to capture the results, make data conversions if appropriate, perform the evaluation and produce a report of the results.

#### 2.9.5 Recommendations Based on Benchmarks

MAXIMA will assist the NRC by providing recommendations for the use of specific equipment, configurations of equipment, software, database management systems and techniques based upon its evaluation of benchmark derived data.

### 3.0 Uncertainties and Problems with the RFP

MAXIMA has read the entire RFP and has not identified any uncertainties or problems which would preclude MAXIMA from performing any of the required functions or complying with any specifications that are likely to be required in future task orders issued under the contract embraced by this RFP.

### 4.0 Interpretations, Requirements and Assumptions

MAXIMA has read the entire RFP and has not identified a need to stipulate any particular interpretations, requirements or assumptions that would limit

MAXIMA's willingness to perform any of the functions specified in the RFP. MAXIMA and the NRC will negotiate each task when it is issued and questions regarding interpretations, requirements and assumptions as they pertain to each task will be resolved at the time of negotiation.

## 5.0 Management Organization

### Management Approach

The MAXIMA Corporation has a sound and proven approach to successful management of Technical Assistance and ADP Evaluative contracts. Our business is project-oriented; our organization, designed for quality. MAXIMA reflects the importance of project management's relationship to corporate success and is organized to provide control, oversight, exception reporting and a total integration of resource allocation to functional requirements.

The basic management structure and management tools established by MAXIMA—coordination of resources, integration of related area, grouping of projects within similar client and substantive programs, adoption of clear lines of authority and responsibility, coordination of client liaison activities, coordination of marketing and technical work, regular financial reporting and oversight at all levels, and centralized financial, contractual and administrative support—are key to the successful management of projects of any size or scope and to planned growth. MAXIMA currently manages 80 projects. Our corporate structure—based on effective project-level management and review and coordination of related projects—is capable of sustaining extensive growth, both in terms of the number and the scale of future projects.

### Organizational Structure

MAXIMA recognizes that effective managers and sound management practices are two of the most important requisites to achieving quality project perform-

ance. Inasmuch as sound management philosophy is only valuable to the extent that it is put into effect, MAXIMA has established company-wide management objectives and structures that are designed to assist our project managers in responding to the demands of each project. These management objectives, which form the foundation of our management plan, encompass the following:

- o A high level of corporate support and attention throughout the duration of the project's activities.
- o A project management structure that is highly visible within the company and that provides direct access to company personnel, resources and facilities.
- o Assignment of a highly qualified and experienced Project Manager.
- o A direct working relationship and continuing close contact among the Project Officer, Contracting Officer and other key project staff as required to assure continued responsive support to task requirements and to avert potential problems.
- o Assignment of experienced and dedicated personnel to accomplish task activities.
- o Performance of high quality work that is delivered on time and within budget.
- o Strict adherence to planned work schedules.

Continued commitment to our management objectives has provided our clients with the assurance that technical services are performed according to standards that are as professional and demanding as their own.

The corporate organization is structured to foster the following:

- o Direct lines of authority, responsibility and control for each member of the project team.



- o Immediate access to corporate resources (people, equipment and facilities) through the direct involvement of a Vice President and the Chief Operating Officer.
- o Open lines of communication via regular meetings of the management operations committee (includes all corporate officers) corporate group meetings and project review meetings to address contract, technical and fiscal issues.
- o Intra-company cooperation using matrix management concepts in the sharing of resources and responsibility across the corporation.
- o Consistent, high-quality project performance through regular management reviews at each level of organization in conjunction with standardized project management and special quality assurance/control procedures.

The structure of The MAXIMA Corporation is designed to facilitate managing projects of varying sizes. This structure has proven to be effective in monitoring and controlling work performance and budgeting. MAXIMA has completed over 140 separate contracts on time, within budget and with 100 percent client satisfaction.

MAXIMA's management structure is also designed to provide project managers with the timely information they require to maintain proper project control. On a monthly basis they are furnished with complete labor effort and cost data on projects under their cognizance. These data are generated using MAXIMA's in-house, automated project tracking system, which employs ARTEMIS software running on a Hewlett Packard 1000 minicomputer and by the Business/3000 Financial Management System.

#### Corporate Authority and Responsibility

Once assigned to a project, the designated Project Manager is the principal client contact point. He has overall responsibility for control of project

activities and for ensuring that resources and expenditures are controlled and used in the most efficient manner at all times. He reports directly to the Program Manager.

The Program Manager under which the project falls is responsible for ensuring that all requirements within the scope of the project are performed in a technically excellent manner and that they receive whatever resources are required to ensure optimal performance. He reports directly to the Division Manager.

The Division Manager has the authority and responsibility within MAXIMA to allocate and direct division resources to ensure timely and effective completion of all division projects. He also monitors cost performance on an ongoing basis. He reports directly to the Group Manager.

Whenever any problems or potential problems are encountered, they are reported to the Group Manager, a MAXIMA Corporate Officer. The Group Manager is responsible for reporting any such problems or potential problems to the firm's Chief Operating Officer and for ensuring prompt resolution thereof. This approach ensures the visibility of project performance and requirements at the highest corporate levels. Exhibits 5-1, 5-2 and 5-3 clearly define the structure and are included for your perusal.

#### Cost Management

The use of monthly labor allocation plans at the project and group levels helps ensure the most efficient possible use of staff. MAXIMA uses the Uniform Contractor Reporting System (UCRS) on all task orders and other contracts. For each task, the UCRS provides an initial monthly projection about labor requirements (hours and dollars). These estimates are compared to the actual hours and dollars, as well as to milestones for the project. The Program Manager and the Project Managers are provided with all cost and hours data from MAXIMA's

Finance and Administration Group. Program Managers are required to supervise the preparation of and sign off on monthly UCRS reports.

The UCRS includes all the basic reporting data generally required by a procurement of this type. In addition, we will provide a narrative report, "exception" reports documenting problems or potential problems, and supplemental descriptions of travel and any unusual charges. The UCRS and supplemental reports shall include the following:

- o NRC contract number
- o Reporting period
- o Task order number
- o Milestone number and name (for each interim milestone deliverable)
  - work completed during reporting period
  - work scheduled for next reporting period
  - problems and delays
- o Resources expended by
  - labor/skill category
  - hours per periods
  - cumulative hours
- o Amounts invoiced by
  - milestone
  - estimated versus actual
  - invoiced per period
  - cumulative invoiced
- o Percent task completed versus percent resource expended
- o Travel and unique expense documentation
- o Exception/problem reports (made when problem is identified, in addition to routine monthly reports)

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The UCRS is useful for planning and managing both ceiling-price tasks and fixed-price tasks. Upon receipt of the task request from NRC, the MAXIMA Program Manager and Project Manager will meet with appropriate MAXIMA technical staff to review the technical and practical requirements of the request. Task schedule, place of performance, clearance requirements, logistics and other practical considerations will be reviewed by the team. Technical requirements, performance standards, deliverables, determination of computer and any other costs, acceptance criteria and benchmarks will also be reviewed in order to determine required skills and labor/skill categories, manhours per category, period of performance, manpower loading by month, milestones and completion dates, Work Breakdown Structure (WBS) and total price (ceiling or fixed). Milestones are tracked by the UCRS and payment is keyed to achievement of these milestones and/or delivery of the end product at task completion.

Performance on a task will begin only after negotiations and receipt of a final task order executed by the Contracting Officer. Any change orders will also be executed by the Contracting Officer.

#### Managing Task Orders

Task order contracts present a particular challenge in management and performance. Unlike a multi-year contract with concrete milestones and a single deliverable as the end product, task order contracts demand a quick response to assignments that vary in size, scope, timing and number. A large task order contract with an unpredictable flow of work may present the additional danger of requiring overlapping resources for multiple tasks. A successfully managed task order contract requires rigorous planning for allocation of staff and other resources in order to produce high quality products within a stringent time frame.

MAXIMA has significant experience in managing task-order type contracts. Exhibit 5-4 presents a schedule of representative efforts of this type. One hundred fifteen (115) tasks have been issued under these agreements, with individual values ranging from \$2,000 to \$800,000.

#### 5.1 Key Personnel Qualifications

Successful performance of the proposed work depends heavily on the qualifications of the individuals committed to this effort. Accordingly, MAXIMA has placed emphasis in offering exceptional, professional expertise in the selection of the principal members of the Technical Assistance in Support of the NCR Planning Function Team. The resumes of MAXIMA's primary project staff reflect MAXIMA's philosophy of forming a well-balanced team consisting of both experienced project management and technical professionals.

MAXIMA has proposed a project team that provides comprehensive coverage of the technical, analytical, programming and data entry support requirements specified. The staff members proposed include the following categories of personnel.

##### o Key personnel

- Project Manager
- Senior Configuration/Quality Assurance Analyst
- Senior Planning and Telecommunications Analyst
- Senior ADF Administrative Specialist

##### o Advisory Staff

- Director, Data Systems Group
- Senior Information Management/DP Development Specialist
- Senior Data Base Scientist



Exhibit 5-4

The MAXIMA Corporation  
Schedule of Task Order Type Contracts

Client	Project Title	Contract Value	Period of Performance	Contract Number	Number of Tasks	Type of Contract
Naval Air Systems Command Naval Weapons Engineering Support Activity Washington, DC	Engineering Configuration/ Data Management and Pro- duction Support Services - Weapon Systems Acquisitions	\$2,626,876	9/01/80 - 5/31/83	W00019-80-D-9450	45	Time & Materials
Union Carbide Corporation Oak Ridge, Tennessee	Research, Development, and Related Analytic Services	2,096,395	8/27/79 - indefinite	62B-13833C	14	CPFF
U.S. Department of Energy Technical Information Center Oak Ridge, Tennessee	Technical Information Center Support	2,681,189	6/01/80 - 9/30/83	DE-A105-800R11232	6	CPFF
Applied Management Sciences (Prime Contractor) U.S. Department of Energy Energy Information Admin- istration Washington, DC	Field Data Collection	996,440	10/01/80 - 9/30/83	DE-AC01-80E1-10231	21	CPFF
U.S. Department of Treasury Bureau of Government Financial Operations Washington, DC	Development of BGFO Reference	197,397	10/01/82 - 9/30/83	T-gfo-82-25	6	CPFF
U.S. Department of Energy Energy Information Admin- istration Washington, DC	Reference Response System	960,656	3/26/81 - 3/25/84	DE-AC01-81E1-11088	14	CPFF
U.S. Department of Energy Office of Security and Safeguards Germantown, Maryland	Safeguards and Security	399,680	10/01/82 - 9/29/85	DE-AC01-82DP30307	7	CPFF
U.S. Department of Energy Energy Research Germantown, Maryland	Technology Base Assessment Support	49,953	9/17/81 - 3/16/83	DE-AC01-81ER30019	4	CPFF
Air Force Human Resources Laboratory U.S. Department of the Air Force Brooks Air Force Base, Texas	Contributive Research in Manpower and Personnel Technologies	4,450,000	4/18/83 - 10/17/87	F33615-83-C-0030	4	CPFF

Exhibit 5-4 (continued)

The MAXIMA Corporation  
Schedule of Task Order Type Contracts

Client	Project Title	Contract Value	Period of Performance	Contract Number	Number of Tasks	Type of Contract
Naval Surface Weapons Center U.S. Department of the Navy Dahlgren, VA	Product Assurance Technical Support	4,529,425	7/15/83 - 7/14/86	N60921-83-D-A006	3	CPFF
Naval Electronic Systems Command U.S. Department of the Navy Washington, DC	Technical Data Verification and Review	150,000	5/15/83 - 11/14/85	N00039-83-G-0404	3	CPFF

## 6.0 Milestone Charts

MAXIMA has been making extensive and successful use of a CPM network and milestone graphics capability in support of several contracts and in-house efforts and plans to get further use from it in respect to managing task orders occurring in this contract. One use anticipated will be in coordination of efforts with NRC's Project Officer. As tasked, MAXIMA will produce additional management graphics as deliverable items in the course of the contract.

MAXIMA utilizes the ARTEMIS project management information system, a product of Meteor Management Systems, Inc., to produce network drawings, Gantt charts, X-Y charts, histograms and pie charts. ARTEMIS also comprises a relational database system which provides immense flexibility in data management and report writing capabilities.

Network drawings depend on the capture of at least the following information prior to analysis and drawing:

- o Predecessor and successor events for each activity
- o Planned duration for each activity
- o Description of each activity
- o Target start or completion dates for selected activities

Following data entry, ARTEMIS is used to analyze the data which results in the following additional information:

- o Early start and early finish dates for each activity
- o Late start and late finish dates for each activity
- o Total and free float for each activity

Activities with a total float of zero or less lie on the critical path of the project.

Network drawings and Gantt charts produced by MAXIMA are successfully being produced and used in long-term projects, such as the Johnston Atoll Chemical

Agent Disposal System of the US Army Toxic and Hazardous Materials Agency and short-term projects, such as Carbon Dioxide Research State-of-the-Art Reports Project of the Department of Energy's Carbon Dioxide Research Program.

#### 6.1 Hypothetical CIN Plan Network Drawing

MAXIMA has taken the liberty of interpreting the information contained in the Corporate Data Network plan provided in the RFP, entered it in the ARTEMIS system, analyzed the data and drawn the following network chart in order to demonstrate our capability to perform work of this nature. If tasked to do so, MAXIMA will brief NRC on the specific details of the methodology employed and also if tasked, will engage in similar efforts for the NRC.

#### 6.2 Hypothetical Task Plan

In addition to the CIN Plan Network, MAXIMA is providing a network drawing of a hypothetical task to perform a functional requirements analysis and produce a functional requirements specification.

Drawings such as this will be prepared routinely for tasks assigned to the MAXIMA Corporation. They will be part of MAXIMA's project management review procedures and copies will be made available to the NRC Project Officer when requested.

#### 7.0 Management Controls

Task order contracts present a particular challenge in management and performance. Unlike a multi-year contract with concrete milestones and a single deliverable as the end product, task order contracts demand a quick response to assignments that vary in size, scope, timing and number. A large task order contract with an unpredictable flow of work may present the additional danger

of requiring overlapping resources for multiple tasks. A successfully managed task order contract requires rigorous planning for allocation of staff and other resources in order to produce high quality products within a stringent time frame.

#### 7.1 Task Management Overview

Each task order issued to MAXIMA by the NRC Contracting Officer will be managed as an individual project and assigned an appropriate in-house project number consistent with our accounting system to allow for tracking of charges to the task. For example, if the master contract control number were 590, task numbers would be 590.001, 590.002, etc. A file will be maintained for each task by the Project Manager and will contain the task order/work assignment, statement of work, management plan, cost estimate, deliverable schedules, staff assignments, technical correspondence, report products and other deliverables, and quality assurance plan. The Project Manager will maintain a contract file for each task containing financial, administrative and contractual documents pertinent to the task. These files, combined with those maintained by our Accounting Department, will be the official records supporting the management of the contract.

#### 7.2 Task Planning Procedures

Task planning procedures encompass four chronological activities:

- o Receipt of a task request
- o Task planning initiation
- o Development of a task proposal
- o Task initiation

A discussion of these activities follows.



#### 7.2.1 Receipt of the Task

Upon notification that a Task Request has been prepared by the NRC, MAXIMA will pick up the Task Request within one day.

#### 7.2.3 Planning Initiation

The Program Manager and Project Manager will convene a small working group of specialists in the required disciplines to examine the Task Request in detail in order to gain a thorough understanding of the technical requirements, performance standards, acceptance criteria, project milestones and performance schedule involved and to identify any questions or difficulties. The Project Manager will meet with the NRC Project Officer within one working day to confirm the interpretation of the requirements and to resolve any questions of interpretation.

#### 7.2.3 Development of the Task Proposal

The purpose of this function is to develop a technical approach with an appropriate staffing plan to meet the requirements and specifications in the task order. In the development of the Task Proposals, the following steps are performed:

- o Detailed analysis of the task requirements
- o Analysis of the impact of the task on other related NRC systems/subsystems
- o Assessment of available personnel resources and requirements
- o Assignment of staff
- o Development of the best overall cost effective approach to task completion

The analysis of the task requirements concentrates on the detailed elements that constitute the actual work. For each task, MAXIMA develops a Staffing and Resource Schedule and a Work Breakdown Structure (WBS). This work plan disaggregates the tasks into subtasks which may be further subdivided into individual work elements, each having identifiable end products or milestones. Task requirements and end products are the basis from which the work structure is defined. The number of work element levels depends on the size and complexity of each task order. The WBS is disaggregated with respect to the requirements and deliverables of each task order and the level of detail necessary to determine specific accountability for each work element. Once the work structure has been established, individuals are assigned responsibility for each component of the task. The Project Manager estimates the time required to complete each work element. These time constraints are then aggregated to form a master schedule for the entire task. The master schedule demonstrates the overlap of independent task components and the implications for staffing and resource allocation. Staffing estimates are derived for each work element. These estimates are converted into cost estimates by applying the appropriate skill levels, labor mix and other direct costs. The cost estimates serve as budgets for each element in the WBS. They are then aggregated to establish the task price. Once completed, the WBS establishes schedules and budgets from the task order level through the intermediary levels to the finest level (work element and deliverable). This analysis of the WBS provides the input to the ARTEMIS project management information system and additional spread sheet packages available to the Project Manager.

Incorporating the Work Breakdown Structure, Staffing and Resource Plans, and a detailed technical approach, the Program Manager and the Project Manager develop the Task Proposal. The Task Proposal includes a breakdown of the number

of manhours by skill category; resumes of proposed personnel; the amount of computer time and other resources required to complete the task; beginning, milestone and completion dates; interim milestone deliverable costs; network drawings and Gantt charts; the total task order price and a full explanation of the technical approach.

Receipt of Multiple Task - When multiple tasks are received, particular effort will be made to ensure that staffing and resource plans reflect the most beneficial mix of available resources without interfering in the smooth and timely operation of ongoing concurrent tasks. This will be accomplished by assigning staff to the new task, to the extent possible based on available time and skills, who are not currently working on other tasks or are working on other tasks less than full time. The depth of resources available at MAXIMA helps to ensure that staff will be available without taking staff from other ongoing tasks.

### 7.3 Project Manager Responsibilities

The duties of the Project Manager include primary interaction with the NRC Contract Officer and Project Officer and control of all work performed under the contract. He will be responsible for ensuring that all contractual and technical requirements are met. In addition, he will have the following specific responsibilities:

- o Reviewing Task Requests
- o Assisting in preparation and reviewing technical parts of Task Proposals
- o Approving task staffing
- o Negotiating task orders
- o Reviewing task performance and providing technical direction

- o Taking action to resolve any schedule and/or resource difficulties arising
- o Reviewing and approving invoices prior to submission to the client
- o Reviewing deliverables
- o Maintaining contract files and task files
- o Controlling task costs
- o Maintaining liaison with MAXIMA's Finance and Administration Group
- o Preparing progress reports
- o Recruiting and hiring new staff as needed

#### 7.4 Task Initiation and Conduct of Work Under Task Assignment

Within one day after the Task Proposal is approved by NRC and completed task order is negotiated, the Project Manager will assign personnel to carry out specific activities according to the Task Proposal. A task kickoff meeting will be held with all task performers to discuss fully the work to be performed.

The Project Manager will conduct weekly project reviews, adjusting project staffing as warranted to ensure efficient utilization of personnel resources on a continuous basis. In addition, overall project status will be reported to the Program Manager on a weekly basis.

**Progress Reports** - Progress reports for each individual task will be submitted to the NRC Officer and the NRC Contract Officer according to the delivery schedule defined in the task order. Progress reports will include the NRC contract number, the reporting period, the task order number and other relevant data. Additionally, any problems encountered will be brought to the immediate attention of the NRC Project Officer through a verbal report, followed immediately by a written summary to the NRC Project Officer and Contract Officer.

Invoices - Invoices will be submitted to the NRC Project Officer and the NRC Contract Officer for interim milestone deliverables and deliverable products that have been accepted. They will include the NRC contract number, the task order number, the milestone or deliverable number and name, and other relevant data. Invoices will be furnished in quadruplicate and will be accompanied by a written statement from the NRC Project Officer noting acceptance of the interim milestone deliverable or deliverable product. Acceptance criteria will be specified in each task order.

Deliverables - Deliverables shall be provided in accordance with applicable federal and NRC standards. They will be subject to acceptance criteria designated in the originating task order.

All deliverables will be subject to a MAXIMA management review prior to submission to the NRC. The management review team will consist of the Program Manager, the Project Manager and at least two other senior staff members who possess technical expertise relevant to the scope of the deliverable and who were not involved in deliverable preparation. Products will be examined for functional completeness, adherence to required format and standards and compatibility with acceptance criteria. The review will be conducted sufficiently in advance of the scheduled delivery date to allow for necessary adjustments to the product, if warranted. If deficiencies in deliverables are noted by the NRC when delivered or subsequently, corrections will be made at no additional charge.





