RESOLUTION NO. 68-92
APRIL 2, 1992

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE
VANDENBERG VILLAGE COMMUNITY SERVICES DISTRICT
APPROVING CONTRACT NO. SERV-1 FOR PROFESSIONAL
SERVICES FOR ADMINISTRATION AND MAINTENANCE OF
DISTRICT COMPUTER SYSTEM

WHEREAS, the Vandenberg Village Community Services District owns and operates a multi-person, multi-tasking, business computer system, based upon a Xenix operating system; and

WHEREAS, the District, by Resolution No. 67-92, has adopted its "Computer System Administration and Maintenance Guide" to serve as its basis for administering and maintaining its computer system, and

WHEREAS, it is necessary and desirable to retain the services of a properly trained and experienced computer system professional consultant to perform system administration and maintenance services contemplated and described in the "Computer System Administration and Maintenance Guide"; and

WHEREAS, Jerome A. Johnson, dba JAJ Consulting, is properly trained and experienced, and has been and is providing computer system troubleshooting, administration and maintenance on the District's computer system on an "on-call" basis, at an hourly rate; and

WHEREAS, it is desirable that such computer system professional services be conducted under terms of an authorized contract, and such a contract, designated as No. SERV-1, has been prepared, providing for such service at a fixed monthly rate, and within the scope and guidance of the District's "Computer System Administration and Maintenance Guide", which is made a part of Contract SERV-1; and

WHEREAS, said Contract No. SERV-1 is attached hereto as Exhibit "A"

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Vandenberg Village Community Services District as follows:

> 1. Contract for Professional Services for Administration and Maintenance of District Computer System (Contract No. SERV-1) between Vandenberg Village Community Services District and Jerome A. Johnson, dba JAJ consulting, for the provision of professional consulting services for the administration and maintenance of District compute system, is hereby approved and adopted.

> 2. The President is hereby authorized and directed to sign said Contract No. SERV-1.

On the motion of Director Nosler

Second Director Small

Roll call to vote, to wit:

AYES: Nosler, Small White
NOES: Nash, Picciuolo
ABSENT: None

<div align="center">Resolution No. 68-92 is hereby adopted.</div>

_____
Phyllis C. White
President, Board of Directors

ATTEST:

_____
Deanna M. Bruegl
Secretary, Board of Directors

SECRETARY'S CERTIFICATE

I, Deanna M. Bruegl, Secretary of the Board of Directors of the Vandenberg Village Community Services District, hereby certify that the foregoing is a true and correct copy of Resolution No. 68-92, passed and adopted by the Board of Directors of the Vandenberg Village Community Services District at an adjourned regular meeting held on the 2nd day of April, 1992.

_____
Deanna M. Bruegl
Secretary, Board of Directors
Vandenberg Village Community Services District

VANDENBERG VILLAGE COMMUNITY SERVICES DISTRICT

**CONTRACT FOR PROFESSIONAL SERVICES FOR
ADMINISTRATION AND MAINTENANCE OF DISTRICT COMPUTER SYSTEM**

CONTRACT NO. SERV-1

THIS AGREEMENT made and entered into this 2nd day of April 1992 by and between

> VANDENBERG VILLAGE COMMUNITY SERVICES

DISTRICT,

> a Public Agency,
> hereinafter referred to as "District",

and

> JEROME A. JOHNSON (dba JAJ Consulting),
> a Professional Computer Consultant,
> hereinafter referred to as "Consultant",

WITNESSETH

WHEREAS, District is authorized to contract with and employ person(s) to provide professional services needed; and

WHEREAS, the District needs the specialized professional services of a computer system consultant to administer and maintain the District's multi-user, multi tasking business computer system; and

WHEREAS, the District Board of Directors has adopted The "Vandenberg Village Community Services District Computer System Administration and Maintenance Guide" as the basis of providing such professional service, and which is attached hereto as Exhibit "A" and made a part hereof by reference

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth below, District and Consultant agree as follows:

1.   Appointment as Consultant System Administrator of District Computer System

     District hereby employs Consultant as Consultant System Administrator of the District's business computer system. Consultant shall provide the services required hereunder pursuant to the terms and conditions set forth herein. Consultant is an independent contractor hereunder.

2.   Compensation: General System Administration and Maintenance

     a.   Consultant shall be compensated for his professional services as Consultant System Administrator of the District's computer system at a fixed price of Seven

Hundred Dollars ($700.00) per calendar month, for up to 20 hours of such service per month, pursuant to the provisions of Section 7, below. District shall provide consultant with income verification statements, such as 1099 forms, or others required by law.

b.   Payment of the monthly fixed price shall be made by District to Consultant by the tenth (10th) day of each calendar month as compensation for Consultant's services under this Section 2 and Section 7 for the prior calendar month. Consultant is not required to submit a monthly statement for said fixed price payments. However, pursuant to provisions of Section 9, below, Consultant shall log work time and submit this monthly to District's General Manager.

3.   Compensation: Special On-Call Services

a.   Consultant shall be compensated for his Special, On-Call Services at a rate of $40.00 per hour, or for a negotiated lump sum price for a specific service.

b.   Payment for Special On-Call Services shall be made by District to Consultant by the tenth (10th) day of each calendar month as compensation for authorized Special On-Call Service actually performed by Consultant pursuant to this Section 3 and Section 8 during the preceding calendar month. For payment for such Special On-Call Service consultant must submit to District, by the 5th calendar day of the month, a detailed statement of charges, with break-out and description of hours worked and associated costs accumulated for each authorized Special On-Call Service in the prior month. time reporting for such Special On-Call Service shall be in one-quarter hour increments. A minimum charge for one hour will be allowed for each separate Special On-Call Service.

4.   Consultant Not Entitled to Other Compensation or Benefits

Notwithstanding any other District policy, rule, regulation or ordinance to the contrary, Consultant shall not qualify for or become entitled to any compensation, benefit or incident of employment other than those set forth herein.

5.   Term, Adjustment, Termination

The term of this contract SERV-1 shall commence April 1, 1992. This agreement is for a term of six months, at the end of which time it shall be subject to mutual consideration of adjustment and/or extension. Either District or Consultant may unilaterally determine at that time to terminate this Contract SERV-1. Consideration of adjustment, extension or termination of this Contract SERV-1 shall commence on the first day of the sixth month of its term (September 1, 1992).

6.   Duties

Consultant's duties are as follows:

a.   Perform the duties of System Administrator for the District's business computer system, bearing the responsibility for administering and maintaining the District's

multi-user, multi-tasking computer system, which is based upon a Xenix operating system.

b.   Perform said duties in conformance with the provisions of the District's "Computer System Administration and Maintenance Guide", as adopted by District Resolution No. 67-92, and the provisions of Sections 7 and 8 of this Contract SERV-1. The "Computer System Administration and Maintenance Guide" is attached hereto as Exhibit "A".

c.   In performing the duties specified above, Consultant will include on-site visits, telephone discussions, dial-in by modem computer connections, written analyses, reports and recommendations, and similar contact with District staff users of the computer system, District management, computer hardware and program vendors and the computer system itself.

d.   In the performance of the aforementioned duties, Consultant will provide the District all necessary professional and technical services to perform the assigned duties and responsibilities to the satisfaction of the District's General Manager and Board of Directors.

e.   These duties apply to Consultant in performance of either General System Administration and Maintenance tasks or Special On-Call Service tasks.

7.   <u>Scope of Services to be Provided, General System Administration and Maintenance</u>

As indicated in Section 6.b above, the District has adopted its "Computer System Administration and Maintenance Guide", which is attached hereto and is a part of this Contract SERV-1. The scope of services to be provided by the Consultant pursuant to this Section 7 shall primarily be defined by said Guide. The size and makeup of the District's existing computer system is indicated in said Guide. Any excessive changes and/or additions are not the responsibility of Consultant under this Section 7, and will be separately defined and authorized as Special On-Call Service when determined by District to be necessary.

Excessive changes and/or additions to the computer system which shall not be a part of this Section 7 shall include the following items:

a.   Expansion in the number of system users beyond an existing total of six (6) persons.

b.   Expansion in the number of Xenix work stations, including the main computer work station, beyond an existing total of six (6) stations.

c.   Adding or re-configuring any work station and/or peripherals at remote sites (away from District's
business office, such as at District's operations yard at Station 1).

d.   Expansion in the number of complex application software packages beyond an existing three (3) such packages. Minor applications software items, which take up little memory and are simple to install, shall not be included in this limitation.

e.   Migrating or porting the system software to a non-Xenix environment or to a drastically different hardware platform.

Also, any changes, additions, or corrections to the computer system, including procedural changes, which require excessive effort shall not be the responsibility of the Consultant under this Section 7. Excessive effort in such circumstances is defined as work time more than twenty (20) hours in any calendar month.

8.   <u>Scope of Services to be Provided, Special On-Call Services</u>

All services provided to the District by Consultant which are not included within the Scope of Services delineated in Section 7, above, shall be considered Special On-Call Services. This includes any significant changes, additions or corrections to the system, or any time to be expended by Consultant which would cause the Consultant's work time to exceed twenty (20) hours per month on the system.

9.   <u>Authorization and Control of Special On-Call Services</u>

Special On-Call Service shall only be performed by Consultant when authorized by written Work Order, signed by the General Manager, and concurred in by the Board's Financial Committee. The scope of work to be authorized and the estimated hours and cost for the service to be provided shall be determined by consultation between the General Manager and the Consultant, with clear documentation provided.

It shall be the responsibility of the Consultant to notify the General Manger as soon as he becomes aware that a Special on-Call Service may become necessary within the current or the next calendar month. This includes providing such notification as soon as it appears to the Consultant that his service time pursuant to Section 7 might exceed twenty (20) hours in the current month.

10.   <u>Time Logging Required for Services Pursuant to Section 7</u>

In order to maintain accurate records of the effort needed to administer and maintain the District's computer system pursuant to the provisions of Section 7, Consultant shall log all time expended each calendar month on such services provided and shall submit such time log to the District's General Manger within one week following each calendar month. The time log shall include a simple and brief description of the basis for each work time item.

This time log is not a basis of billing, as the service provided by Consultant under terms of Section 7 shall be compensated as a fixed monthly price, pursuant to provisions of Section 2.

11.   <u>Work Product</u>

All work product of consultant, created pursuant to this Agreement, through the date of termination, whether complete or incomplete, shall be the property of District, free of any and all claims, liens and/or encumbrances, and such documents may be used by District for any purpose. Consultant may retain for his files a photocopy of each such work product document.

12.   <u>Assignment or Subcontract</u>

Except as may be required by law, neither this Agreement nor the performance of the duties required herein may be delegated, transferred, assigned or subcontracted without the express prior written approval of District's Board of Directors.

13.   <u>No Modification</u>

No modification or variation of the terms of this Agreement shall be valid unless made in writing and signed by the parties hereto, and no oral understanding or agreement not incorporated herein shall be binding on any of the parties hereto.

14.   <u>Notice</u>

Any notice required pursuant to this Contract SERV-1 shall be given to Consultant at 537 North "U" Street, Lompoc, CA 93436, and to District General Manager at District's business office, 3757 Constellation road, Vandenberg Village, CA 93436.

"District"   "Consultant"

VANDENBERG VILLAGE
COMMUNITY SERVICES DISTRICT,
a Public Agency

by: _____   _____
            Phyllis C. White   JEROME A. JOHNSON,
            President, Board of Directors   dba JAJ Consulting

ATTEST:

            _____
            Deanna M. Bruegl
            Secretary, Board of Directors

EXHIBIT A

VANDENBERG VILLAGE COMMUNITY SERVICES DISTRICT

COMPUTER SYSTEM ADMINISTRATION AND MAINTENANCE GUIDE

I.   OVERVIEW

The purpose of an ongoing computer system administration and maintenance program is to ensure the stability and availability of the District's computer system. Prior to the recent hardware upgrading (February 1992), the overall system had been plagued with hardware and software problems which required a great deal of time and money to resolve. Historically, much of the troubleshooting effort was spent trying to determine just where the malfunctions were occurring. The weakness and compatibility issues regarding the former system server (the HP RS-16), as well as the concerns over the constantly-evolving business application software (Corbin-Willits System - CWS) led to a great deal of finger pointing when problems arose. Furthermore, since the problems were not always well defined, the "fixes" themselves became suspect, since such "fixes" soon became the possible causes of new or recurring problems.

This Computer system Administration and Maintenance Guide seeks to drastically reduce problems by tightening the policies and procedures governing the recently upgraded system. The process begins by taking stock of all system configurations, and continues as changes or additions to each component are regulated and tracked over the life of the central system.

II.   GENERAL AND ADMINISTRATIVE

Xenix, and multi-user systems in general, typically require a significant amount of system administration. Because all of the system resources are accessed from many different places (terminals, modems, I/O ports), the opportunity for inadvertent changes to the central resource is increased. Furthermore, a single change in the central system affects many users -- sometimes in different ways. The key to the administration of the overall system is to reduce and control the number and types of hardware, software and maintenance activities across the entire system.

The effort and number of people needed to exercise this control depends on the size and use of the computer's resources. As a practical matter, the organization's ability to train and commit people to the effort is an overriding factor. In an organization the size of Vandenberg Village Community Services District, it is difficult to meet all of the system administration and technical demands solely with in-house personnel. Nonetheless, the required maintenance tasks remain the same even though the responsibilities may be called by different names.

In order to account for these demands, the District will commission both a System Administrator (S/A) and Operations Manager (O/M). Because of the technical knowledge and overall system familiarity required of the S/A, the District must out-

source this responsibility. No one currently on staff can immediately fill the position, and creating a part-time position would be inappropriate for the District. The O/M's daily activities, however, are less technical, and can be assigned to an in-house user who has been given proper training and guidelines. The specific duties of each position are described in detail in the next section. However, everyone involved should be aware from the beginning that the S/A and the O/M are the life's blood of the District's computer resources. Their responsibility and authority should extend beyond mere titles and tasks. These positions should be appropriately recognized and compensated by the District if they are to be executed faithfully.

III.   SYSTEM ADMINISTRATOR RESPONSIBILITIES

A.   System Administrator Qualifications

The commissioned S/A is responsible for the computer system's overall functionality, integrity and availability. The S/A must have sufficient knowledge of the hardware and software involved to direct all activities that affect the system. Pertaining to this District, this knowledge must include a thorough understanding of the SCO Xenix operating system and its implementation requirements; functional knowledge of 386 micro-computers and such peripherals as hard disk drives, floppy disk drives, tape back-up drives, multi-port boards and industry standard work station terminals. It must also include sufficient knowledge of each application software package's environmental requirements so that each application coexists reasonably with all of the system resources.

B.   System Administrator, Execution of Duties

Execution of the System Administrator's duties can be summarized into the following categories:

1.   Asserting a stable hardware, software and file environment

2.   Performing the more technical of the regular system maintenance tasks

3.   Overseeing all Xenix, application and hardware changes

4.   Responding to system problems and user questions

5.   Coordinating system needs and user needs with the O/M

6.   Documenting, logging maintenance problems, and system modifications

Specific details and explanations of these categories are contained in the sections which follow.

IV.   ASSERTING HARDWARE, SOFTWARE AND FILE SECURITY

This activity begins with the S/A ensuring that all components of the system have been set up properly for everyday use. Without the reasonable assurance of a solid installation, smooth and efficient trouble shooting is almost impossible. Additionally, upgrading and expanding a poor installation, no matter how much the organization is growing, is frivolous if the existing platform is unsure.

A.   Hardware

The S/A must ensure that the computer hardware, as well as all terminals and other peripherals, is configured and connected properly. This configuration includes software accessibility as well as the actual hardware-to-hardware interaction. Configuration and use of the hardware components should conform to manufacturers' guidelines.

The S/A must also take into consideration the physical user environment and how the equipment will be used. Power consumption, heat, humidity and similar concerns must be expressed to the O/M or to the General Manager as they arise. This awareness is needed not only to keep the equipment running, but also to ensure that the relevant manufacturer warranties are not jeopardized.

B.   Operating System

As with any operating system, the Xenix installation at this District must be implemented properly before the rest of the software can be expected to run smoothly. It is the S/A's responsibility to see that all of the components of the operating system have been loaded with regard to the anticipated hardware and software involved. The S/A must also ensure that extensions of the operating system, such as device drivers and other utilities, are loaded properly.

In addition to the core operating system, the S/A must implement a workable user account structure. All necessary users must be provided with access rights only to those areas of the system required by their activities. Passwords should be used and a provision for frequent password changes should be set up and maintained.

The user account structure invoked by the S/A should follow in form the S/A-created directory structure. The directory and file structure must support all of the applications to be run on the system. This support must take into account directory naming conventions, file access rights, user accessibility, system backups, and overall maintainability.

B.   Application Software

Although most software manufacturers dictate their installation needs, the S/A must oversee certain aspects of each package's installation. The S/A must see that the software has access to any system resources it requires, while restricting its ability to affect unneeded resources. In cases where this is

mutually exclusive, the S/A must implement procedures that will minimize the risk of one package adversely affecting other software or system files.

The S/A is also responsible for ensuring proper user accessibility and interaction with the application software. This includes passwords, access rights, as well as connectivity and emulation requirements. It does not include proper use of the software but, rather, proper access. The S/A must make sure that all features and controls implemented for the users' environment can be readily accessed and used. This includes such items as keyboard mapping, display control, and printing features.

C.   File Security

Although an ongoing task, user and file security rely on a proper structure originated by the S/A. The S/A engenders this security in several ways. First and foremost, the S/A is responsible for grouping application and user files appropriately. This extends beyond the S/A's general concern over the operating system. The S/A must avoid instances where excessive user or application access is granted in an attempt to get something to work. Users must be prevented from accessing files beyond their venue, applications must not have excessive operating system access, and there must be sufficient auditability in place to inform the S/A when these boundaries are overstepped.

V.   PERFORMING REGULAR SYSTEM MAINTENANCE TASKS

As the strongest member of the technical support team, the S/A is responsible for performing many routing integrity checks and maintenance items. In a smoothly running system, these items should take up the majority of the S/A's time. In general, the majority of *this* time is spent overseeing the day-to-day health of the Xenix operating system. The responsibilities specific to the Xenix environment are covered in detail in the "Xenix System Administrator's Guide" provided with the operating system. They are divided into groups according to how often they are carried out: i.e., as needed, daily tasks, weekly tasks, monthly tasks, and occasional tasks.

The S/A is responsible for ensuring that the routine tasks are performed regularly. It may be more effective, however, for the S/A to delegate some of these tasks to the O/M or other qualified user. The decision as to who handles what should be left up to the S/A, but should be based on technical knowledge, reliability and overall participant comfort. The S/A is stili responsible for the proper execution of these tasks. A likely split between S/A and O/M tasks is summarized below.

A.   Daily Tasks

        1.   Operations Manager

                a.   Perform backups
                b.   Check disk space
                c.   Check printer status
                d.   Remove core and *.OUT files

2.   Systems Administrator

      a.   Check usage levels
      b.   Check for runaway processes

3.   Operations Manager or Systems Administrator

      Check for unattended log-in sessions

B.   <u>Weekly Tasks</u>

      Systems Administrator

      a.   Run fsck (ADM) on all file systems
      b.   Check printer spooler status report
      c.   Check/maintain log files
      d.   Use vmstat (ADM) to report activity
      e.   Prepare weekly detailed report of disk utilization
      f.   Remove temporary files and lost+found files

C.   <u>Monthly Tasks</u>

1.   Operations Manager

      Perform full system backup

2.   Systems Administrator

      a.   Archive critical files, if changed
      b.   Re-tune system and reallocate resources
      c.   Perform hardware maintenance

D.   <u>Occasional Tasks</u>

      Systems Administrator

      a.   Upgrade operating system and application software
      b.   Fix permissions on software
      c.   Redistribute space in file systems
      d.   Locate huge files and verify purpose
      e.   Find "orphan" files
      f.   Locate sparse directories and compress

Regardless of who performs the above tasks, the S/A is responsible for dictating the policies and procedures from a technical as well as operational perspective. How these maintenance items are completed and tracked requires a substantial amount of familiarity with the entire system. The S/A is expected to be capable of performing

all of the tasks necessary for healthy operation of the overall computer system. Although tasks may be delegated, understanding them may not.

VI.   OVERSEEING ALL XENIX APPLICATION AND HARDWARE CHANGES

A.   Supervision of Other Support Personnel

Because of the many components found in the District's computer system, there are many people who support different areas of the system's hardware and software. These include hardware vendors, maintenance technicians, Xenix support personnel, application support personnel and maybe a systems consultant or two. With all of these people involved and proposing changes, it is crucial that all modifications to the computer system be funnelled through a single person. This is, perhaps, the most important role of the S/A -- administering change control.

B.   Software System Changes

Changes to the computer system are inevitable on several fronts. In addition to regular operating system updates, the user accounts and related file structure can change as well. Since the S/A is already managing these areas, there is little chance for them to get out of control. More crucial are the areas where the S/A may not be the sole source of support. The S/A must be especially aware of these areas of change; they are, specifically, the application software and the system hardware.

C.   Application Software Changes

Application software changes come about most often through regular version upgrades. The S/A should be aware of when these updates become available and what changes they will bring with them. Installing the updates is also the responsibility of the S/A, as the software developers may not know exactly how the update will affect the system. In any case, the S/A should follow standard updating procedures when installing new or modifying application software. These procedures should include the following activities:

1.   System backup prior to updating

2.   Impact assessment of the changes that are expected

3.   The actual update procedure

4.   Evaluation of the system and application testing (users)

D.   Software Configuration Changes/Code Patches

These procedures should also be followed for configuration changes or code patches that cannot be easily rolled back should they need to be removed. If the S/A is actually performing the update, this level of control should be easily maintained. If the software vendor is performing the update, the S/A

must take extra steps to ensure that proper updating procedures are followed. The actual steps necessary are up to the S/A to document and enforce, but there are several measures available:

1.   Require an updated summary of changes from the vendor

2.   Restrict log-in access to only the areas needing change

3.   Produce a system listing of changed files after the update

4.   Be prepared to test the changes as soon as they are completed

E.   Control of Vendor Access

The S/A must be aware of all of the proposed changes prior to implementing them. Real-time vendor "programming" should be allowed only in the most extreme of emergencies. The S/A is to ensure that all vendor updates have been tested prior to installing them on the District's system and that the system can be brought back to its condition prior to anything being modified.

F.   Control of Hardware System Changes

Changes to the system hardware are usually less common and more manageable than software changes. Nonetheless, similar change control guidelines must be enforced by the S/A. As with the software, any configuration or connectivity changes to the hardware must be assessed by the S/A prior to implementing them. This includes even the most innocent of changes, such as terminal moves, keyboard swapping, or wiring changes. If there are some areas in which the S/A will allow user changes, clear and detailed boundaries and procedures must first be documented by the S/A.

G.   System Hardware Problems -- Coordination of Troubleshooting

Problems with the system hardware always require the S/A's attention -- even if the component is supported under its own maintenance contract. The S/A must first rule out other possible causes for the failure, and assist the hardware technicians in further diagnosis of the problem. The S/A should oversee the entire repair operation and coordinate the repair or replacement with the hardware support vendor. In cases where a temporary or alternative part must be used, the S/A must determine its impact on the system. In cases where multiple repair options are available, the S/A should provide the District's management with guidance as to issues of functionality, reliability and cost.

VII.   RESPONDING TO SYSTEM PROBLEMS AND USER QUESTIONS

A.   Availability for Problem Consultation

The S/A must be available to the system users during normal operation hours in order to respond to system problems and users' questions. The most important

component of this availability is the S/A's ability to direct users in the initial stages of a problem or unknown situation. For other issues, such as general questions or non-problem requests, the S/A's availability is important even if only to maintain communication between the S/A and the day-to-day users of the system. If the S/A is only informed when there is a problem, there will be a lot more problems requiring the S/A' attention! The S/A should, therefore, maintain a wide-open-door policy with the users, working through and with the O/M.

B.   Problem Definition and Guidance to District Staff

When a problem (or possibility of one) does arise, the S/A is expected to instruct the users (or, better yet, the O/M) as to what actions to take from that point forward. The S/A should maintain contact with the O/M until the situation is resolved. In most cases, the S/A will need to perform, if not direct, much of the problem definition effort. Even if the problem lies outside the S/A's expertise, such as a hardware problem, the S/A is expected to assess all of the repair options available. This assessment requires the S/A to anticipate the impact of each proposed solution including recovery options, costs, and user /organization impact. The S/A should then be able to present these options to the General Manager and to make competent recommendations.

In many cases a problem will lie well within the S/A's venue, and the S/A will be able to make a rapid assessment of the problem and effect almost immediate repairs. This is as it should be for small problems and minor issues, provided the S/A follows normal change control procedures (backups, logging, etc.). As the problems become more complex, however, and the impact on the users increases, the S/A is expected to communicate these effects to the users and District management.

C.   System Administrator Interface with Operations Manager -- Accountability

One of the key benefits of appointing a S/A is that there is then a single person accountable for the health of the computer system. All system uses should flow to the S/A and be responded to in reverse fashion. Unfortunately, the individual S/A has several users to deal with, and the lines of communication can sometimes become confused or cluttered. The S/A should avoid this clutter by dealing closely with the O/M. Whenever possible, the O/M should be the single point of contact for the S/A. Significant problems or issues must be brought to the attention of the O/M. Best practice is that <u>all</u> system and user issues, even minor or routine matters, be dealt with through the O/M, who interprets to the S/A.

VIII.   COORDINATING SYSTEM AND USER NEEDS WITH OPERATIONS MANAGER

A.   Minimization of Down Time

As with any computer system, problems and issues will arise that affect user access to the system. The S/A must constantly try to minimize down time for the users. Routine system maintenance, as well as unforeseeable repairs, should be scheduled around user needs as much as possible. As this is not always possible,

the S/A must evaluate how best to intervene and maintain the system, yet not unduly impede the users.

B.   Mutual Efforts of Systems Administrator and Operations Manager

The key to making the balance work is effective coordination between the S/A and the O/M. The S/A should always have his/her hand on the pulse of the system. The O/M should be equally cognizant of the users' requirements and problems. In order for the frequently diverging user needs to be reconciled, the S/A and the O/M must get together as early as possible on system issues. Together, they should be able to provide the following items, as needed:

1.   A regular schedule of system maintenance

2.   Advanced notification of down time required by the S/A

3.   Unusual access time needed by the users

4.   Known problems and their known symptoms/effects

5.   Known restrictions or temporary procedural changes

6.   Estimates for repair completion and enhancement requests

C.   Prompt Advice to District Management

While this is not a comprehensive list, it should be an indication of the kinds of things on which the S/A and O/M must interrelate. These items should also be brought to the attention of management, usually by the S/A, as they become known. Frequently the S/A must seek direction from the General Manager as to how the General Manager may choose to resolve a given situation. Waiting until impasse is reached to provide the General Manager with needed background information may waste valuable time or, even worse, prevent the manager from making a fully informed and competent decision. A successful S/A keeps management informed.

IX.   DOCUMENTING MAINTENANCE PROBLEMS AND SYSTEM MODIFICATIONS

A.   Documentation is Critical

It should be clear at this point that the S/A is absolutely essential to the health of a multi-user system such as the District's Xenix environment. The S/A, however, should not allow him/herself to become the sole source of system information. In this vein, full and effective documentation by the S/A can be infinitely more valuable to the District than the S/A's technical expertise.

B.   Responsibility for Documentation

The S/A must be free to manage the overall system and should avoid having to work on every part of the system simply because no one else knows where things

are. Many aspects of the computer system can be worked on by other competent technicians, if the proper documentation is available. In addition to maintaining unique aspects of the system, the S/A is expected to organize and document standard aspects of the system. These should include:

1.   System hardware configuration map

2.   Complete equipment and software manuals

3.   File system structure documentation

4.   Problem/resolution log

5.   Regular maintenance checklists/notes

It is beyond the scope of this guide to indicate all of the information needed to be covered under the above. Documentation can depreciate in value rather quickly if it is not maintained. What is most important about the S/A's documentation is that it will be available when the S/A cannot be. By telephone, S/A should be able to guide the O/M or other competent person through many telephone if the required documentation is available on site. Furthermore, the S/A should be able to transfer duties to another S/A when necessary.

X.   **EXISTING HARDWARE AND SOFTWARE (APRIL 1992)**

A.   Hardware

1.   New System Hardware

New system hardware provided and installed in January/February 1992 by South Coast Phoenix Computers, Inc. of Lompoc, is shown on Attachment "E", pages 1 and 2, and Attachment "F", pages 1, 2, 3 and 4 from the Bid/Contract with South Coast Phoenix. It is attached hereto.

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> Lompoc, CA 93436
>
> Telephone: (805) 736-5589
> FAX: (805) 736-9768

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    (2)   CPU: 16 Mhz 386
    (3)   Power supply:
    (4)   Memory Type: 256K RAM SIPPS; 4 MB total
    (5)   Expansion Slots: 11
    (6)   Parallel Ports: 2
    (7)   Serial Ports: 2
    (8)   Floppy Disk Drives: 1
    (9)   Keyboard: Hewlett Packard

    (10)   Hard Drive/Controller
            Make: Hewlett Packard
            Capacity: 105 MB/150 MB
    (11)   Tape Drive
            Make: Irwin
            Capacity: 40 MB
            Std/Size: DC2000
    (12)   VGA Monitor
            Make: Hewlett Packard D1182A
            Serial No.: 8840J21937
            Size: 14"

        b.   Laser Printer
            Make: Hewlett Packard LaserJet III

        c.   Dot Matrix Printer
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        d.   Dot Matrix Printer
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        e.   Modem
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            Quantity: 4
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            Note: The Intermac meter reading devices and applications software for in-putting to central computer was provided by Corbin Willits Systems, Inc., Fremont, California.

B. Software

1. Operating System

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VANDENBERG VILLAGE COMMUNITY SERVICES DISTRICT

COMPUTER SYSTEM ADMINISTRATION AND MAINTENANCE GUIDE

XI.   OVERVIEW

The purpose of an ongoing computer system administration and maintenance program is to ensure the stability and availability of the District's computer system. Prior to the recent hardware upgrading (February 1992), the overall system had been plagued with hardware and software problems which required a great deal of time and money to resolve. Historically, much of the troubleshooting effort was spent trying to determine just where the malfunctions were occurring. The weakness and compatibility issues regarding the former system server (the HP RS-16), as well as the concerns over the constantly-evolving business application software (Corbin-Willits System - CWS) led to a great deal of finger pointing when problems arose. Furthermore, since the problems were not always well defined, the "fixes" themselves became suspect, since such "fixes" soon became the possible causes of new or recurring problems.

This Computer system Administration and Maintenance Guide seeks to drastically reduce problems by tightening the policies and procedures governing the recently upgraded system. The process begins by taking stock of all system configurations, and continues as changes or additions to each component are regulated and tracked over the life of the central system.

XII.   GENERAL AND ADMINISTRATIVE

Xenix, and multi-user systems in general, typically require a significant amount of system administration. Because all of the system resources are accessed from many different places (terminals, modems, I/O ports), the opportunity for inadvertent changes to the central resource is increased. Furthermore, a single change in the central system affects many users -- sometimes in different ways. The key to the administration of the overall system is to reduce and control the number and types of hardware, software and maintenance activities across the entire system.

The effort and number of people needed to exercise this control depends on the size and use of the computer's resources. As a practical matter, the organization's ability to train and commit people to the effort is an overriding factor. In an organization the size of Vandenberg Village Community Services District, it is difficult to meet all of the system administration and technical demands solely with in-house personnel. Nonetheless, the required maintenance tasks remain the same even though the responsibilities may be called by different names.

In order to account for these demands, the District will commission both a System Administrator (S/A) and Operations Manager (O/M). Because of the technical knowledge and overall system familiarity required of the S/A, the District must out-source this responsibility. No one currently on staff can immediately fill the position, and creating a part-time position would be inappropriate for the District. The O/M's daily activities, however, are less technical, and can be assigned to an in-house user who has been given proper training and guidelines. The specific duties of each position are described in detail in the next section. However, everyone involved should be aware

from the beginning that the S/A and the O/M are the life's blood of the District's computer resources. Their responsibility and authority should extend beyond mere titles and tasks. These positions should be appropriately recognized and compensated by the District if they are to be executed faithfully.

XIII.   <u>SYSTEM ADMINISTRATOR RESPONSIBILITIES</u>

A.   <u>System Administrator Qualifications</u>

The commissioned S/A is responsible for the computer system's overall functionality, integrity and availability. The S/A must have sufficient knowledge of the hardware and software involved to direct all activities that affect the system. Pertaining to this District, this knowledge must include a thorough understanding of the SCO Xenix operating system and its implementation requirements; functional knowledge of 386 micro-computers and such peripherals as hard disk drives, floppy disk drives, tape back-up drives, multi-port boards and industry standard work station terminals. It must also include sufficient knowledge of each application software package's environmental requirements so that each application coexists reasonably with all of the system resources.

B.   <u>System Administrator, Execution of Duties</u>

Execution of the System Administrator's duties can be summarized into the following categories:

1.   Asserting a stable hardware, software and file environment

2.   Performing the more technical of the regular system maintenance tasks

3.   Overseeing all Xenix, application and hardware changes

4.   Responding to system problems and user questions

5.   Coordinating system needs and user needs with the O/M

6.   Documenting, logging maintenance problems, and system modifications

Specific details and explanations of these categories are contained in the sections which follow.

XIV.   <u>ASSERTING HARDWARE, SOFTWARE AND FILE SECURITY</u>

This activity begins with the S/A ensuring that all components of the system have been set up properly for everyday use. Without the reasonable assurance of a solid installation, smooth and efficient trouble shooting is almost impossible. Additionally, upgrading and expanding a poor installation, no matter how much the organization is growing, is frivolous if the existing platform is unsure.

A. <u>Hardware</u>

The S/A must ensure that the computer hardware, as well as all terminals and other peripherals, is configured and connected properly. This configuration includes software accessibility as well as the actual hardware-to-hardware interaction. Configuration and use of the hardware components should conform to manufacturers' guidelines.

The S/A must also take into consideration the physical user environment and how the equipment will be used. Power consumption, heat, humidity and similar concerns must be expressed to the O/M or to the General Manager as they arise. This awareness is needed not only to keep the equipment running, but also to ensure that the relevant manufacturer warranties are not jeopardized.

B. <u>Operating System</u>

As with any operating system, the Xenix installation at this District must be implemented properly before the rest of the software can be expected to run smoothly. It is the S/A's responsibility to see that all of the components of the operating system have been loaded with regard to the anticipated hardware and software involved. The S/A must also ensure that extensions of the operating system, such as device drivers and other utilities, are loaded properly.

In addition to the core operating system, the S/A must implement a workable user account structure. All necessary users must be provided with access rights only to those areas of the system required by their activities. Passwords should be used and a provision for frequent password changes should be set up and maintained.

The user account structure invoked by the S/A should follow in form the S/A-created directory structure. The directory and file structure must support all of the applications to be run on the system. This support must take into account directory naming conventions, file access rights, user accessibility, system backups, and overall maintainability.

C. <u>Application Software</u>

Although most software manufacturers dictate their installation needs, the S/A must oversee certain aspects of each package's installation. The S/A must see that the software has access to any system resources it requires, while restricting its ability to affect unneeded resources. In cases where this is mutually exclusive, the S/A must implement procedures that will minimize the risk of one package adversely affecting other software or system files.

The S/A is also responsible for ensuring proper user accessibility and interaction with the application software. This includes passwords, access rights, as well as connectivity and emulation requirements. It does not include proper use of the software but, rather, proper access. The S/A must make sure that all features and controls implemented for the users' environment can be readily accessed and used. This includes such items as keyboard mapping, display control, and printing features.

D.   <u>File Security</u>

Although an ongoing task, user and file security rely on a proper structure originated by the S/A. The S/A engenders this security in several ways. First and foremost, the S/A is responsible for grouping application and user files appropriately. This extends beyond the S/A's general concern over the operating system. The S/A must avoid instances where excessive user or application access is granted in an attempt to get something to work. Users must be prevented from accessing files beyond their venue, applications must not have excessive operating system access, and there must be sufficient auditability in place to inform the S/A when these boundaries are overstepped.

XV.   <u>PERFORMING REGULAR SYSTEM MAINTENANCE TASKS</u>

As the strongest member of the technical support team, the S/A is responsible for performing many routing integrity checks and maintenance items. In a smoothly running system, these items should take up the majority of the S/A's time. In general, the majority of *this* time is spent overseeing the day-to-day health of the Xenix operating system. The responsibilities specific to the Xenix environment are covered in detail in the "Xenix System Administrator's Guide" provided with the operating system. They are divided into groups according to how often they are carried out: i.e., as needed, daily tasks, weekly tasks, monthly tasks, and occasional tasks.

The S/A is responsible for ensuring that the routine tasks are performed regularly. It may be more effective, however, for the S/A to delegate some of these tasks to the O/M or other qualified user. The decision as to who handles what should be left up to the S/A, with the concurrence of the General Manager, but should be based on technical knowledge, reliability and overall participant comfort. It is the district's intent to maximize the use of the O/M. The S/A is still responsible for the proper execution of these tasks. A likely split between S/A and O/M tasks is summarized below.

A.   <u>Daily Tasks</u>

    1.   Operations Manager

        a.   Perform backups
        b.   Check disk space
        c.   Check printer status
        d.   Remove core and *.OUT files

    2.   Systems Administrator

        a.   Check usage levels
        b.   Check for runaway processes

    3.   Operations Manager or Systems Administrator

        Check for unattended log-in sessions

B.   <u>Weekly Tasks</u>

Systems Administrator

a.   Run fsck (ADM) on all file systems
b.   Check printer spooler status report
c.   Check/maintain log files
d.   Use vmstat (ADM) to report activity
e.   Prepare weekly detailed report of disk utilization
f.   Remove temporary files and lost+found files

C.   <u>Monthly Tasks</u>

1.   Operations Manager

Perform full system backup

2.   Systems Administrator

a.   Archive critical files, if changed
b.   Re-tune system and reallocate resources
c.   Perform hardware maintenance

D.   <u>Occasional Tasks</u>

Systems Administrator

a.   Upgrade operating system and application software
b.   Fix permissions on software
c.   Redistribute space in file systems
d.   Locate huge files and verify purpose
e.   Find "orphan" files
f.   Locate sparse directories and compress

Regardless of who performs the above tasks, the S/A is responsible for dictating the policies and procedures from a technical as well as operational perspective. How these maintenance items are completed and tracked requires a substantial amount of familiarity with the entire system. The S/A is expected to be capable of performing all of the tasks necessary for healthy operation of the overall computer system. Although tasks may be delegated, understanding them may not.

XVI.   <u>OVERSEEING ALL XENIX APPLICATION AND HARDWARE CHANGES</u>

A.   <u>Supervision of Other Support Personnel</u>

Because of the many components found in the District's computer system, there are many people who support different areas of the system's hardware and software. These include hardware vendors, maintenance technicians, Xenix support personnel, application support personnel and maybe a systems consultant or two. With all of these people involved and proposing changes, it is crucial that all modifications to the computer system be funnelled through a single

person. This is, perhaps, the most important role of the S/A -- administering change control.

B.   Software System Changes

Changes to the computer system are inevitable on several fronts. In addition to regular operating system updates, the user accounts and related file structure can change as well. Since the S/A is already managing these areas, there is little chance for them to get out of control. More crucial are the areas where the S/A may not be the sole source of support. The S/A must be especially aware of these areas of change; they are, specifically, the application software and the system hardware.

C.   Application Software Changes

Application software changes come about most often through regular version upgrades. The S/A should be aware of when these updates become available and what changes they will bring with them. Installing the updates is also the responsibility of the S/A, as the software developers may not know exactly how the update will affect the system. In any case, the S/A should follow standard updating procedures when installing new or modifying application software. These procedures should include the following activities:

1.   System backup prior to updating

2.   Impact assessment of the changes that are expected

3.   The actual update procedure

4.   Evaluation of the system and application testing (users)

D.   Software Configuration Changes/Code Patches

These procedures should also be followed for configuration changes or code patches that cannot be easily rolled back should they need to be removed. If the S/A is actually performing the update, this level of control should be easily maintained. If the software vendor is performing the update, the S/A must take extra steps to ensure that proper updating procedures are followed. The actual steps necessary are up to the S/A to document and enforce, but there are several measures available:

1.   Require an updated summary of changes from the vendor

2.   Restrict log-in access to only the areas needing change

3.   Produce a system listing of changed files after the update

4.   Be prepared to test the changes as soon as they are completed

E.   Control of Vendor Access

The S/A must be aware of all of the proposed changes prior to implementing them. Real-time vendor "programming" should be allowed only in the most extreme of emergencies. The S/A is to ensure that all vendor updates have been tested prior to installing them on the District's system and that the system can be brought back to its condition prior to anything being modified.

F.   Control of Hardware System Changes

Changes to the system hardware are usually less common and more manageable than software changes. Nonetheless, similar change control guidelines must be enforced by the S/A. As with the software, any configuration or connectivity changes to the hardware must be assessed by the S/A prior to implementing them. This includes even the most innocent of changes, such as terminal moves, keyboard swapping, or wiring changes. If there are some areas in which the S/A will allow user changes, clear and detailed boundaries and procedures must first be documented by the S/A.

G.   System Hardware Problems -- Coordination of Troubleshooting

Problems with the system hardware <u>always</u> require the S/A's attention -- even if the component is supported under its own maintenance contract. The S/A must first rule out other possible causes for the failure, and assist the hardware technicians in further diagnosis of the problem. The S/A should oversee the entire repair operation and coordinate the repair or replacement with the hardware support vendor. In cases where a temporary or alternative part must be used, the S/A must determine its impact on the system. In cases where multiple repair options are available, the S/A should provide the District's management with guidance as to issues of functionality, reliability and cost.

XVII.   RESPONDING TO SYSTEM PROBLEMS AND USER QUESTIONS

A.   Availability for Problem Consultation

The S/A must be available to the system users during normal operation hours in order to respond to system problems and users' questions. The most important component of this availability is the S/A's ability to direct users in the initial stages of a problem or unknown situation. For other issues, such as general questions or non-problem requests, the S/A's availability is important even if only to maintain communication between the S/A and the day-to-day users of the system. If the S/A is only informed when there is a problem, there will be a lot more problems requiring the S/A' attention! The S/A should, therefore, maintain a wide-open-door policy with the users, working through and with the O/M.

B.   Problem Definition and Guidance to District Staff

When a problem (or possibility of one) does arise, the S/A is expected to instruct the users (or, better yet, the O/M) as to what actions to take from that point forward. The S/A should maintain contact with the O/M until the situation is resolved. In most cases, the S/A will need to perform, if not direct, much of the

problem definition effort. Even if the problem lies outside the S/A's expertise, such as a hardware problem, the S/A is expected to assess all of the repair options available. This assessment requires the S/A to anticipate the impact of each proposed solution including recovery options, costs, and user /organization impact. The S/A should then be able to present these options to the General Manager and to make competent recommendations.

In many cases a problem will lie well within the S/A's venue, and the S/A will be able to make a rapid assessment of the problem and effect almost immediate repairs. This is as it should be for small problems and minor issues, provided the S/A follows normal change control procedures (backups, logging, etc.). As the problems become more complex, however, and the impact on the users increases, the S/A is expected to communicate these effects to the users and District management.

C.   System Administrator Interface with Operations Manager -- Accountability

One of the key benefits of appointing a S/A is that there is then a single person accountable for the health of the computer system. All system uses should flow to the S/A and be responded to in reverse fashion. Unfortunately, the individual S/A has several users to deal with, and the lines of communication can sometimes become confused or cluttered. The S/A should avoid this clutter by dealing closely with the O/M. Whenever possible, the O/M should be the single point of contact for the S/A. Significant problems or issues must be brought to the attention of the O/M. Best practice is that <u>all</u> system and user issues, even minor or routine matters, be dealt with through the O/M, who interprets to the S/A.

XVIII.   COORDINATING SYSTEM AND USER NEEDS WITH OPERATIONS MANAGER

A.   Minimization of Down Time

As with any computer system, problems and issues will arise that affect user access to the system. The S/A must constantly try to minimize down time for the users. Routine system maintenance, as well as unforeseeable repairs, should be scheduled around user needs as much as possible. As this is not always possible, the S/A must evaluate how best to intervene and maintain the system, yet not unduly impede the users.

B.   Mutual Efforts of Systems Administrator and Operations Manager

The key to making the balance work is effective coordination between the S/A and the O/M. The S/A should always have his/her hand on the pulse of the system. The O/M should be equally cognizant of the users' requirements and problems. In order for the frequently diverging user needs to be reconciled, the S/A and the O/M must get together as early as possible on system issues. Together, they should be able to provide the following items, as needed:

1.   A regular schedule of system maintenance

2.   Advanced notification of down time required by the S/A

3.   Unusual access time needed by the users

4.   Known problems and their known symptoms/effects

5.   Known restrictions or temporary procedural changes

6.   Estimates for repair completion and enhancement requests

C.   <u>Prompt Advice to District Management</u>

While this is not a comprehensive list, it should be an indication of the kinds of things on which the S/A and O/M must interrelate. These items should also be brought to the attention of management, usually by the S/A, as they become known. Frequently the S/A must seek direction from the General Manager as to how the General Manager may choose to resolve a given situation. Waiting until impasse is reached to provide the General Manager with needed background information may waste valuable time or, even worse, prevent the manager from making a fully informed and competent decision. A successful S/A keeps management informed.

XIX.   <u>DOCUMENTING MAINTENANCE PROBLEMS AND SYSTEM MODIFICATIONS</u>

A.   <u>Documentation is Critical</u>

It should be clear at this point that the S/A is absolutely essential to the health of a multi-user system such as the District's Xenix environment. The S/A, however, should not allow him/herself to become the sole source of system information. In this vein, full and effective documentation by the S/A can be infinitely more valuable to the District than the S/A's technical expertise.

B.   <u>Responsibility for Documentation</u>

The S/A must be free to manage the overall system and should avoid having to work on every part of the system simply because no one else knows where things are. Many aspects of the computer system can be worked on by other competent technicians, if the proper documentation is available. In addition to maintaining unique aspects of the system, the S/A is expected to organize and document standard aspects of the system. These should include:

1.   System hardware configuration map

2.   Complete equipment and software manuals

3.   File system structure documentation

4.   Problem/resolution log

5.   Regular maintenance checklists/notes

It is beyond the scope of this guide to indicate all of the information needed to be covered under the above. Documentation can depreciate in value rather quickly if it is not maintained. What is most important about the S/A's documentation is that it will be available when the S/A cannot be. By telephone, S/A should be able to guide the O/M or other competent person through many telephone if the required documentation is available on site. Furthermore, the S/A should be able to transfer duties to another S/A when necessary.

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       (9)   Keyboard: Hewlett Packard
       (10)   Hard Drive/Controller
                   Make: Hewlett Packard
                   Capacity: 105 MB/150 MB
       (11)   Tape Drive
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                   Make: Hewlett Packard D1182A
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