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Nevada procurement laws for computer related items for public agencies

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NEVADA PROCUREMENT LAWS FOR
COMPUTER RELATED ITEMS
FOR PUBLIC AGENCIES

by

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The Nevada procurement laws for public agencies generally require open, competitive bidding for any item that exceeds $10,000. Public agencies are also required to accept the lowest “responsive” and “responsible” bid. A “responsive bid is one which has addressed all the requirements of the bid documents. All forms must be properly completed and signed. A “responsible” bid is one in which the bidder proves the ability to perform the contract and has the resources to fulfill all the requirements of the contract. If a bidder fails to comply with all of the requirements in the contract documents, then the agency can disallow the bid.

This procedure is generally quite adequate for many routine and common commodities such as roads, buildings, pipelines, etc. The products and the raw materials used to construct these objects are very common, readily available and many businesses
can provide the services to implement the desired result in a consistent manner. However, as more specialized products and/or services are required by public agencies, the task to procure and implement the intended results becomes more difficult. The materials and/or the labor expertise required for such products may be very scarce or quite unique.

Fewer businesses are able to provide these unique products and services, and also compete in a highly specialized or technical market. Businesses may have different means and methods to reach the same end goal. Thus, the final solution could vary greatly depending on the business involved.

This can be particularly true with highly technical items, such as computer hardware and software used in very specialized and technical applications such as computer based process control systems.

How do public agencies procure control systems today? Is the current procurement method adequate in providing these specialized products and services through an open competitive market. Is there a better way? Are there alternatives to competitive bidding? This case study will examine three Nevada public agencies that used an alternative approach and found success in its application. It will explain computer systems in general and control systems specifically. It will finally offer a rationale for seeking alternatives to open competitive bidding.

Although a general conclusion can not be reached, public agencies could benefit from the use of the software exemption clause in the Nevada bidding laws.
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This paper is the culmination of several years of effort towards the Master of Public Administration program. While employed at the Clark County Sanitation District, I was encouraged to obtain an advanced degree by my supervisor, Carol Reynolds, who had been in the program a year already. He was instrumental in my decision to obtain a Masters degree in Public Administration. I initially considered an advanced degree in engineering. After several conversations with other engineers, I was convinced that an advanced administrative degree would offer more employment growth potential than an advanced technical degree. Thus, I began the program with interest and dedication.

The course has not been easy. The constant pressure of studies was laboring. The time away from family was discouraging. The costs were significant. There were frequent times when I felt like giving up. However, constant and kind persuasion from loved ones pushed me forward. I wish to thank my family for their enduring and faithful support throughout the long experience. I especially wish to express sincere appreciation to my wife, Kathy, for all the encouragement, patience and love which kept me going.

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CHAPTER 1

INTRODUCTION

The Nevada procurement laws for public agencies normally require open, competitive bidding for any item purchased over $10,000 (NRS 332.039). There are some exceptions (NRS 332.115). However, in a bidding situation, public agencies are obligated to accept the lowest responsive and responsible bid. This procedure is generally quite adequate for many routine and common commodities like roads, buildings, pipelines, office equipment, etc.

The products and the raw materials used to construct them are very common, are readily available and many business can provide the services to implement the result with equal consistency. Thus, public agencies are able to obtain these generic products from several businesses and expect nearly identical results at comparable prices.

However, as products become specialized and/or specialized services are required, the number of businesses that can provide these products or services in exactly the manner required by the agency is greatly reduced. This is especially true with very high technology items, such as specialized applications of computer hardware and software for control systems. The Nevada Revised Statues (NRS) has identified many exemptions to the bidding rules, one of which is software (NRS 332.115).
Purpose Statement

The purpose of this case study is to compare the procurement methods for high technology items, such as computer hardware and software for control systems, for three government agencies in the State of Nevada according to the state's bidding laws contained in the Nevada Revised Statutes, Chapter 332.

The procurement methods for high technology items will be generally defined as the purchasing process requirements or bidding constraints which public agencies must comply with in order to obtain these products. Computer hardware and software are not constrained under the same purchasing requirements. Software is exempt from competitive bidding (NRS 332.115.1.g). General computer hardware is not exempt, but certain specialized hardware can be categorized as exempt (NRS 332.115.1.a). The purchase of high technology items, such as computer hardware and software, especially in industrial control system applications, can present challenging procurement requirements to a public agency.

Content Summary

This paper is organized into several chapters. The Literature Review describes some background information of the Nevada bidding laws and briefly compares these laws to other states. The Case Study Presentation describes three specific agencies' experiences and approaches to procurement of high technology items. The Conclusion chapter offers a summary of the cases along with additional insight, including potential
advantages and disadvantages of procurement methods and finally suggests possible alternative procurement approaches are suggested.

**Comparative Examples**

For example, there are only a few personal computer operating system software products to choose from. By far, the most popular is Microsoft's Windows 95/98, which dominates the market. Two other popular operating systems are OS/2 and Macintosh. There are many software applications available from many vendors, which will run on these operating system software platforms, but not interchangeably.

For example, there are three very popular spreadsheet programs for personal computers (PC): Microsoft Excel, Lotus 1-2-3 and Corel QuattroPro. Each of these products performs many functions in a very similar manner to each other. However, each one also has its own uniqueness that the other product does not have. In some cases, each product will perform the same task, but using a different method. The most notable differences are in the highly specialized functions, formulas or data manipulation areas. This area of functionality is where these products differ from each other like concrete differs from steel. Concrete and steel are uniform and consistent within their own construction criteria and performance parameters. There are virtually no differences between manufacturers of the same product. But each material has its specific application depending on the unique requirements. Concrete is suitable for many applications, while steel may be more suitable for others.
However, computer software products are not always an apple to apple comparison, but rather an apple to orange comparison. They may both be fruits, but not the same flavor or content.

A spreadsheet application is different from a word processor application. Even one spreadsheet program is different from another spreadsheet program. For example, the method to copy a worksheet from one workbook to another workbook is quite different between QuatroPro and Excel. If a user requires a specific method for this type of operation, only one manufacturer could meet that requirement. But there are several possible resale vendors who could sell the Excel spreadsheet program. The buyer must also determine the specific options desired to be provided with Excel. For example, should the application be a stand-alone version to run on one PC or a networked version to run on multiple PCs? These differences make it difficult to competitively bid software items unless every option and aspect can be well defined and stated clearly to each bidder. If these features are not defined exactly, one cannot expect that any spreadsheet product will produce the same result, or meet a specific requirement.

This dilemma is even more exaggerated when a public agency wants to implement a highly complex technical and specialized computerized application such as a control system for a unique processing plant. Product manufacturing is an example of a highly specialized process.

Water treatment and distribution, and wastewater collection and treatment are also examples of these very specialized and unique processes. Many customized products and specialized equipment are required to treat and process water or wastewater. Even more
specialized products are needed to automate and computerize these facilities (Profile in Success, 1993).

Public agencies, which operate and maintain these types of process facilities, are obligated under law to protect the public safety. Both local and federal government agencies regulate and set clean water standards. Therefore, the operating agencies of these treatment plants are looking for ways to improve quality, efficiency and consistency to assure a safe drinking water supply. This uniqueness in a process environment makes open, competitive bidding for highly specialize computer hardware and software applications a very risky and uncertain prospect (McMullen interview, 1992).

Control system suppliers have each produced their own unique products without collaboration. Specialized software has been developed to provide the operating logic, which monitors and controls equipment, to start or stop a pump for example. A very specialized software subroutine had to be developed to interface the control logic software to the equipment hardware. This interface link provides the ability for a keyboard stroke to activate a pump, or a valve, or to measure process values such as a tank level, a flow rate or pressure. The combination of this interface link and the operating logic makes it possible for a tank level to automatically start and stop a pump in order to maintain the liquid level within a predefined range.

It becomes apparent that the products and performance of one control system, provided by one supplier, can be quite different from the products and performance of another control system, provided by another supplier. This difference and uncertainty leads one to consider alternative procurement approaches. There are better approaches which public agencies can use to purchase the computer hardware and software products
that best suits their unique application and meets all their specific requirements. However, most state laws force agencies to bid competitively for these high technology items (Hunsaker & Johnson, 1992).

**Background**

Before the case study is presented, it would perhaps be beneficial to establish a basic understanding about the difference between open systems and proprietary systems. It would also be useful to explain and describe a computer-based control system. This description is intended to assist the reader in understanding the complexity and nature of computer systems in general and, more specifically, computerized control systems. It is important also to understand that some computer components are generic and common between vendors while other products are very unique and uncommon. Control systems are typically configured with both types of components, generic and unique. These components can either be hardware or software related in application.

**Open vs. Proprietary**

The term “open” in the computer industry refers to a product’s ability to interface with other products from other vendors through the use of standard protocols, or hardware/software interfaces. The term “proprietary” refers to a product’s uniqueness and use of non-standard protocols, hardware and software; or its inability to interface to other products other than those made by the same manufacturer.

Open refers to a product’s relative use or implementation of industry standards. These standards are most often adopted voluntarily, and consequently, not universally applied by the various vendors throughout the industry. One basic dilemma faced by many
vendors is the question of which standard should be adopted? Will other vendors adopt the same standards or will they choose another? Thus, a vendor may desire to be open, but by selecting a so-called standard that no one else uses, becomes proprietary by default (Profile in Success, 1993).

For example, there are a variety of option cards (integrated circuit boards) available for the Windows-based IBM format Personal Computer (PC). There are serial interface cards, parallel interface cards, sound cards, compact disc interface cards, modem cards, game cards, video cards, television cards, input/output cards, and other specialty interface cards. These cards are produced in several hardware formats (including ISA, EISA and SCSI hardware format). Different PC vendors offer different types of interface format slots. There are other formats available, but most PC vendors have not adopted them as freely for their standard PC product offering. Thus, card manufacturers do not make their cards in any other format except the ones adopted by the most popular PC makers. The cards can certainly be made, but there would be no market for them, since no PCs would have the right interface slot available to accept the card.

Another example is the keyboard plug-in interface to a PC. The three most popular keyboard interface connectors are the PS-2, the 5-pin DIN and the RS-232C serial interface in either a 9-pin or 25-pin configuration. Most PC vendors have adopted one of these as their standard. Some vendors will even offer two of these keyboard interfaces on their PC. Consequently, vendors who manufacture keyboards will offer three styles, one in each of the formats listed above. Other formats are possible, but not manufactured. PC makers do not offer an interface connector unless other vendors have adopted it as a standard.
Now consider something more complex with computer systems — the network. PCs can be operated as stand alone unit or they can be connected together in a network to share data. This requires both a hardware interface and a software interface. Computers can be physically connected together, but that alone does not provide the ability to exchange data. Several typical network hardware standards include Ethernet, Token Ring, ATM, FDDI, ISDN and others.

There must also be a software connection for the computers to be able to “talk” to each other and exchange information. Several typical network software protocols include TCP/IP, IPX, NetBEUI, Novel, DECnet and others. This is the basic data transport software that carries the actual data package. Information exchange also requires compatible software applications such that the document contents can be interpreted. Both the transport protocol and the application software must reside on both computers in order to communicate with each other — a language that both computers understand.

A computer network is defined as two or more computers connected together physically so that they are electrically compatible and through software to exchange data (see Figure 1). Each computer must also have some form of networking software installed, the transport protocol, which allows the PCs to communicate and exchange data. Again, there are several products and vendors, which can provide this computer networking functionality. In the business world of desktop PCs, this is most commonly implemented with Ethernet as the physical hardware connectivity and TCP/IP as the networking software connectivity.

The Ethernet products are made by several manufacturers and are available from several vendors. This opens the market and helps keep prices competitive. This also
means that any PC can be purchased and networked to any other PC. Thus, the "open" system terminology is born. An "open" system is one in which several different brands of products, including PCs can be interfaced together and yet functions in an integrated manner as if the PCs were a single system.

A proprietary system is just the opposite. This is a system in which the components (whether hardware or software) must be made by the same manufacturer in order to function together in an integrated manner. The same manufacturer must make all components, such as the computers, the network, and the software. The vendor does not make use of the industry standards, but implements its own protocols instead. Thus, no other vendor's product will connect electrically, let alone communicate at the software level.

This prevents a buyer from shopping around for the best prices for hardware or software. Specifically, the buyer is locked into a single vendor to buy all components from. This situation may give the vendor an unfair advantage in setting prices for those products. This scenario also prevents products from being competitively bid in the open market – there is no open market. There is only one place from which to buy the products.

Control Systems

The special combination of hardware and software that forms a control system is not typically found at the local neighborhood computer store. In fact, there are relatively few suppliers for this type of specialized computer hardware/software application. Thus,
the market may not be suitable for the normal open competitive bidding process because this product and/or service is not generally available (Profile in Success, 1992).

A control system is composed of several individual products or components, which are combined together in an integrated manner to function as if it were a single unit. There are field devices, input/output devices, distributed computer based controllers, supervisory computer based controllers, computer based graphic display devices, printers, and interconnecting network devices (Profile in Success, 1992). A typical control system configuration is shown in Figure 1.

A field device (Item 6 Figure 1) is typically an electrical device, such as a switch, relay, motor starter, valve or process-measuring instrument. These field devices are designed to receive data from a computer, send data to a computer, or both.

A distributed computer-based controller (Item 5 Figure 1) provides the intelligence, or control logic, to identify and quantify the input/output data. It converts the field device information into a process information database. It also provides the logical decision algorithms to use this data and perform logical process control based on this data or operator entered data. This form of process control can be either continuous operation or batch sequence control.

An input/output device (Item 4 Figure 1) provides the hardware/software interconnecting means between a field device and the computer-based controller. An input device receives data from a field device and transmits the data to the computer-based controller. These input devices can be relay contacts, switch contacts or process instrument signals such as motor speed, valve position, temperature, pressure, flow or level. An output device sends data from the computer-based controller to the field device.
These output devices could be relay coils, electro-magnetic contactors or process instrument controllers such as motor speed controllers, valve actuators or flow controllers.

Figure 1 Control System Block Diagram
For example, a batch control sequence might include the following scenario, a tank level is measured and becomes input data to the computer-based controller. The controller’s software is configured to read the appropriate tank level from a specific input field instrument. The logic software then compares the measured tank level value to a predefined high and low set-point value. If the tank level reaches a low level, a pump is needed to refill the tank. The computer-based controller then generates an output signal to a field device called a motor starter. The motor starter connects a power source to the motor, which rotates the pump and moves water. Once the tank reaches a high level, the pump must be shut down.

The computer-based controller’s software logic makes this comparison and decision and then generates a signal which goes through the appropriate output device to a specific field device. The process control logic is implemented by software and is a significant element of any control system. It is this software that is very unique between vendors.

The software is also closely coupled or integrated with the hardware, especially the input/output interface system. The software must be able to address specific hardware data channels in the input/output device in order to read the correct tank level. There could be many tank levels connected to the input device and thus available to the computer-based controller. In order to maintain proper control, the right tank must be examined and the right pump must be controlled.

For example, a continuous control operation might include the following, a basin of water acts as a mixing tank to maintain a given range of pH. PH is a parameter that describes or quantifies the level of acid or alkaline in a given solution. The pH is thus
continuously measured and compared to an acceptable range. If the pH value exceeds that range, metering pump’s speed is adjusted up or down to add a compensation chemical that will adjust the basin pH level. As the pH increases, the metering pump speed increases proportionally. As the pH decreases, the metering pump decreases in speed proportionally.

In a typical process treatment facility, such as water or wastewater, there could be thousands of input/output devices or data channels. All must be uniquely addressable and identifiable. The input/output hardware is often very unique and proprietary to the control software.

The supervisory computer-based controller (Item 1 Figure 1) provides the overall coordination and management of the individual distributed computer-based controllers. It performs data management between computers. It also performs higher level types of decisions, such as total treatment plant operating parameters or product quality parameters. It also performs consolidated data reporting and/or alarming functions.

The computer-based graphics display device (Item 2 Figure 1) provides the visual display for an operator (person) to “see” every parameter of the treatment facility through the control system, all from a single location - a graphic computer screen. The display device is an extension of the person’s eyes, ears and hands allowing him/her to assimilate and interpret more data than otherwise possible. A treatment plant operator can manage more data in less time through this display device than to physically walk around the facility with a clipboard taking notes (Success Story, Spring 1992).

The computer-based control system can even be configured to respond to “upset” conditions, and do it more rapidly and accurately than a human could. The computer can
perform repeated actions more precisely and consistently than a human. The computer also eliminates the person’s mis-interpretation of data, thus reducing operator errors in judgment. There are, however some functions or decisions best left to a human, these should remain his/hers to execute (Clark County Sanitation District Hits the Jackpot with Automation, 1993).

As computer hardware and software become more sophisticated, neural networks, artificial intelligence and other special rule-based algorithms can perform near human-like thought processes and decision making. The future will bring exciting new applications for computer control systems. A few applications involving optimization processing are beginning to see limited use in water distribution systems (Harp, et al. 1997).

Printers (Item 3 Figure 1) provide a written or hardcopy output version of the display information or database and other facility performance parameters. It produces a permanent copy of reports and records describing events and alarms.

The final component that is mentioned in this example is the interconnecting network devices, both hardware and software (Item 7 Figure 1). This element provides the means to allow all of the other devices to connect and communicate with each other. Some vendors implement this network base over a proprietary protocol, both in hardware and software. Others have chosen to implement standard network protocols, such as Ethernet or Token Ring but using proprietary software. Still others have implemented standard networking protocols using both hardware and software standards. Again, this uniqueness is often the crux to the ability to openly bid for a computer control system or not.
The combination of all of these individual devices creates a complex control system. Some of the individual elements are standard (graphic display computers or PCs, printers, network components) and can be purchased from many vendors, therefore they could be bid competitively. Others are quite unique and specialized or customized products (computer-based input/output devices, computer-based controllers, control logic software) and therefore only available from a few vendors or just one vendor.

These custom products are very difficult to competitively bid in the open market because of their uniqueness and limited supply. Yet, some public agencies are still obligated by purchasing laws to request bids for these products. Nevada's purchasing laws have exempted software from bidding, given the highly technical nature of these products (NRS 332.115). This exemption applies to all types of software without limitation.

Personal computers are considered standard products and therefore must be competitively bid. However, the specialized products using computers are not recognized as unique in the bidding laws, and thus are still required to be competitively bid. This presents a major dilemma for most public agencies that are trying to procure highly specialized computer hardware and software applications. They are constrained under the bidding laws that are designed for standard products. Herein lies the basis for this case study.

A few venturesome Nevada agencies have recognized this dilemma and attempted to apply the intent of the law rather than the letter of the law. Here too is where differing attorney's interpretation of the Nevada Revised Statutes either help or constrain public
agencies in their procurement of high technology computer related items, especially items such as a custom computerized control system.
CHAPTER 2

REVIEW OF RELATED LITERATURE

The major issues surrounding this research subject include the interpretation of the NRS 332 bidding laws. The laws are written to protect both the public agencies and the potential sellers, contractors or manufacturers. However, there seems to be as many interpretations of the law and its application as there are attorneys reading them.

Much of the current purchasing law was established in the early 1960s. Revisions have been implemented periodically, including most recently in 1997. However, many areas are still in need of refinement and adjustment.

Normally, public agencies are required to procure their products through a competitive bidding process. This process attempts to obtain products or services at fair and reasonable prices, by requiring price competition for like products. This process also attempts to provide the agency with a consistent and predictable product or service. Likewise, this process attempts to provide an equal opportunity and method for all sellers and contractors to be able to conduct business with public agencies (Hunsaker, 1991).

Potential sellers and contractors are intended to have an equal opportunity to sell or provide products and services through the competitive bidding process. Public agencies cannot arbitrarily award, or not award, large dollar contracts at their own discretion or whim.
The issue here is whether specialized computer control systems are similar enough to be competitive and equal in function, performance and compatible with standard products. The author contends that these types of high technology items are different and unique in more ways than they are common or standard. Therefore, these systems should not be treated under the same procurement laws intended for competitive bidding (Hunsaker, 1991).

Industry Trends

The control system industry trend is evolving. Historically, many vendors have been very proprietary in nature. However, vendors of control systems today are migrating towards more “open” standard products. Those vendors who remain in the traditional mode of proprietary hardware and software will be left out of the future market place. Agencies are becoming more and more sophisticated with high technology. They are expecting, even demanding that their computer systems be “open” and compatible with many different products. These same agencies are extending this philosophy into the highly specialized technology applications of computer based control system for the process industry.

Business managers of public agencies have long ignored, or at least left alone, the process industry, especially relating to specialized computer control systems. This area of expertise has long been left to the hard core “techies” of the world. However, times are changing. As agencies embrace the technology world, the managers are being forced to assure total integration of all computer systems, whether for business or technical applications (Success Story, Spring 1992).
This trend is forcing vendors to extend business computer standards into the process industry standards. This is slow and painful for some control system vendors. Many companies have a substantial investment in hardware and software development for their proprietary systems. It is a difficult business decision to abandon those sunk costs and invest in a different approach, the "open" standard approach. The good news may be that the next investment could be less expensive. The use of standard products means that many of the needed control system components are standard and already exist or are made by several vendors.

Other States

By comparison, other states are recognizing the complex issues surrounding procurement of high technology items. There is some information available on PC based hardware and software applications. However, very little information could be found regarding the specialized high technology applications of computer control systems.

More than one hundred state and local government officials were interviewed regarding their information technology purchasing practices. These new practices include the use of such special purchasing vehicles as term contracts, schedules, multiple awards or catalogs. The majority (60%) indicated they plan to increase their purchasing of information technology using these vehicles in the future (Davies, 1997).

The State of California is attempting to pass Senate Bill 937. The California Acquisition Reform Act (CARA) is intended to replace the current patchwork of procurement rules with a framework which focuses on results rather than process. According to Peter Stamison, California's director of General Services Department, the
rest of the country will follow California's lead in procurement reform. One of the biggest problems for both purchasers and sellers alike is the lack of a uniform set of purchasing rules. There is confusion over duplication of rules and conflicting rules, which causes wasted time and money.

The CARA legislation includes expanded rules for the purchase of information technology based on best value rather than lowest bid. This new approach is a departure from the norm, the old pattern – specifying the solution and looking for the lowest possible cost. At this time this article was published the CARA legislation had not been presented for a vote (Towns, 1997).

The city and county of San Francisco have bypassed the traditional, lengthy procurement process and now purchase technology through their own computer store. In 1992, it took six weeks to add a PC to an existing legacy system. Today, it takes two weeks. Still, this method does not put them on the leading edge of technology. But it will keep them from getting stuck implementing outdated technologies that are two and three generations old (Speed, 1995).

Freshman Representative Thomas Davis from Virginia is a former vice president of a high technology and professional firm. He is using that experience to help shape federal procurement reform in Congress. It is a difficult and slow task. Most congressmen lack the interest or general knowledge about information technology to become involved in reform. There seems to be a general lack of personal experience with information technology on the part of these members. Reform laws can only be passed if these members can be educated and convinced of the benefit to the federal government (Miller, 1996).
Challenge

The challenge today is one of timing. Currently, control system vendors are in a state of transition from the old traditional proprietary systems to the “open” standard systems. It will take time to bring these control systems into the next generation with an “open” architecture. In addition, states have begun to recognize that their purchasing laws regarding high technology items are out-dated and in need of revisions. It will take time to bring these procurement laws into the next generation with an acknowledgment of high technology challenges.

However, those agencies requiring control systems today must deal with the products of today and the purchasing laws of today. For some, this is not a favorable prospect. Those agencies who can afford to wait may profit from a delay. For those who can not wait, it will be a difficult challenge to procure the right technical computer solution to meet all their needs and yet satisfy purchasing laws.
CHAPTER 3

METHODOLOGY

This qualitative type case study will focus on the experiences of the following three public agencies: the Clark County Sanitation District, the Colorado River Commission and the Southern Nevada Water Authority. A fourth agency, the City of Henderson, will be briefly described but not to the same detail. It is included only as an additional example and reference for further research.

The research was conducted by reviewing several special reports and seminars presented on or by these public agencies. A careful review of the bidding laws in the Nevada Revised Statues was also an important basis for the research. A few interviews with public employees involved in this purchasing process were also conducted. A brief evaluation of other state’s bidding laws is provided as a comparison for alternative purchasing processes. The author is a former public agency employee and has also presented some additional insights on this subject based on personal experiences (Hunsaker, 1991).

This professional paper has attempted to compare and contrast the different issues and events associated with each agency. Although the same law was reviewed, each applied it according to its own interpretation and understanding.
CHAPTER 4

CASE STUDY PRESENTATION

Public agencies are defined in the Nevada Revised Statuses, Chapter 332. They include city, county and state governments and their political subdivisions. Each must comply with the bidding procedures outlined in NRS 332. Competitive bidding can be beneficial to the public agency, but it can also be detrimental. This is especially critical in computer applications that are very technical in application, such as control processes and functions in water treatment and distribution facilities or wastewater collection and treatment facilities.

Thus, in today's world of high technology, computer control systems are being implemented to achieve the quality and consistency of the treated water. These control systems can even improve operating efficiency while reducing operating costs.

Three such public agencies have discovered an exemption clause in the Nevada procurement laws (NRS 332.115) which avoids the normal open, competitive bidding procedure for computer software and some hardware. The Clark County Sanitation District (District), the Colorado River Commission (CRC) and the Southern Nevada Water Authority (SNWA) successfully applied the software exemption to procure their control systems.
The District used this exemption clause to obtain a wastewater treatment computer control system upgrade to the Advanced Wastewater Treatment (AWT) facility in 1991.

The CRC used this exemption clause to purchase a water treatment computer control system upgrade to the Alfred Merritt Smith Water Treatment Facility (Lake Mead Plant) at Lake Mead in early 1996. The new system went online in mid 1997.

The SNWA subsequently received operating responsibility of the Lake Mead Plant in early 1997 and expanded the recently completed control system.

The City of Henderson (City) also obtained a new distributed control system which monitors and controls both their water treatment and distribution plant and their wastewater treatment facility. The City's case is yet another example of innovative procurement of high technology items similar to the previous three cases, but the details of this case will not be presented in this paper. A brief summary, however, is included for additional comparison and reference.

Clark County Sanitation District

The District's AWT plant was completed in early 1982 and included a 1972 vintage computerized control system. The computer system was designed and specified with the treatment facility which was included as part of the general plant construction. The entire facility design took two years. Construction time was four years. This caused a delay in computer technology because the system selection was made at least six years prior to actual implementation and startup. In reality, the system that was finally purchased and installed was ten year-old technology the day the system was placed into service (Success Story, Spring 1992).
After five years of operation, hardware became obsolete and the manufacturer no longer supported the software. This situation seriously hampered maintenance and repair. The system was configured with two each one-megabyte disk drives, one to backup the other. Both of the units eventually experienced a fatal head crash. Since there was no replacement unit available to purchase, the units were rebuilt by the manufacturer at a cost of $8,000.00 each (Clark County Sanitation District Hits Jackpot with Automation, 1993). Today, a one-megabyte disk drive costs less than $50.00.

The District was also considering a major plant expansion and the existing system could not be expanded. A replacement computer control system was the only viable solution (Clark County Sanitation Hits Jackpot with Automation, 1993).

The Control Systems Engineer (Engineer) for the District was assigned to lead the effort to replace the old computer control system with a newer technology system. The first step involved the selection of an engineering consultant to begin designing the new system. The next step involved interviewing other public agencies, which had recently completed similar projects. This step also included evaluating various products and suppliers to find a specific solution, which matched the District's unique criteria and requirements (Profile in Success, 1993).

The initial approach utilized an evaluated bid procedure, where competitive bids would be evaluated based on performance as well as cost (Success Story, Spring 1992). The Nevada purchasing laws described in the Revised Statutes allows several exemptions to competitive bidding, including software (NRS 332.115.1.g).

Victor Priebe, the District's attorney at that time, reviewed the procurement Statutes regarding the software exemptions. Mr. Priebe, who had a conservative attitude,
had never applied this exemption to purchase a computer control system before. Thus, he opposed the use of this exemption and suggested an evaluated competitive bidding approach (V. Priebe, personal communication, Spring 1989). Before the design of the new control system was completed, Ralph Peterson replaced Mr. Priebe as the District's attorney.

The Engineer and Mr. Peterson reviewed the NRS 332 again to determine its applicability to purchase the new control system software and hardware under the software exemption clause. Mr. Peterson concluded that the software could be purchased under the exemption clause. The hardware, however, could only be purchased without bidding if it could be shown that the hardware was unique and the software required a specific hardware to function properly (R. Peterson, personal communication, Fall 1989).

The control system was defined as a single operating unit. Therefore, that particular control software could only function with specific control system hardware. One could not function without the other. This was clearly the case with this specialized computer control system project.

Perhaps an analogy might help to explain this concept. The control system hardware and software could be compared to a personal computer and a modem. A Voice/FAX/Modem comes packaged with the hardware (modem card) including its own specific software application to match.

The software provides the operating logic to tell the modem to go off-hook, detect a dial tone, dial a number, exchange initialization signals to synchronize one modem to the other modem, and then transfer the user’s data. After the transfer, the software again communicates with the modem to stop the data transfer, disconnect the synchronizing
signals, and hang up the modem. The software (program) must operate together with the hardware, as a single system, in order to function completely and properly. Neither will work separately without the other.

After many discussions between the Engineer and Mr. Peterson, it was mutually agreed to allow use of the exemption clause to purchase the control system software and hardware as a single system under a single purchase contract. Mr. Peterson was still concerned about awarding a multi-million dollar contract without a competitive bid. This was a venture into new territory, an approach never before attempted in Clark County (Hunsaker & Johnson, 1992).

Several control systems were evaluated until one was selected which met all of the District’s unique and specific requirements. A contract was then awarded. The new control system was purchased, installed and placed into service on time, on budget and with complete success. This procurement method resulted in a control system that was less than one-year old technology at the time it went into service. Recall that the original system was ten years old at the time of initial startup. The original system was purchased under the traditional design, bid and construction method. More importantly, the new control system, implemented under the bidding exception clause, was exactly the right solution for all of the District’s needs and requirements (Hunsaker & Johnson, 1992).

Other public agencies, including the CRC, the SNWA, the City and the Las Vegas Valley Water District (Water District) were also planning future control systems or upgrades to their existing control systems. They watched with great anticipation and interest as the District completed its project. The District’s novel and venturesome
approach became the model procurement method for several other control systems purchases in Nevada.

Colorado River Commission / Southern Nevada Water Authority

The SNWA is currently embarking on a two billion-dollar plus capital improvement program to upgrade, expand and increase water treatment and transmission facilities within Clark County. The planned improvements included a computer control system upgrade at the Lake Mead Plant (Harp, et. al. 1997). At the time this control system upgrade project began, the CRC governed the Lake Mead Plant upgrades, including the control system project (Colorado River Commission, Spring 1994).

Mary Bochanis, attorney for the CRC, reviewed the District example and the NRS software bidding exemption clause, and determined that the same procurement approach could be applied to this computer control system upgrade project. As with the District, a similar approach was used to evaluate and select a software product, including any required hardware to make the system completely functional. The CRC then awarded a contract for a control system upgrade (M. Bochanis, personal communication, Spring 1996).

However, before the project was installed and completed, the control system procurement contract was transferred from the CRC to the SNWA. Mary Bochanis also transferred from the CRC to become the attorney for the SNWA. The control system contract was honored by the SNWA and completed as written and awarded. However, the SNWA would not use future implementations of this approach to acquire additional control system components.
The SNWA is a political subdivision of the State of Nevada that is operated by contract staff from the Water District. Charles Hauser, the supervising attorney for the Water District, and consequently for the SNWA, interpreted the bidding exemption clause differently than Ms. Bochanis. His opinion was that the control system hardware is generic computer equipment available from several sources and therefore must be open, competitively bid. Staff engineers and other technical consultants tried in vain to explain to Mr. Hauser that only a small portion of the hardware was generic, and that most of the control system hardware was specialized and unique. They attempted to convince Mr. Hauser that the hardware should be purchased with the control system software. But Mr. Hauser did not change his opinion or interpretation of the Statute (C. Hauser, personal communication, Fall 1997).

The software was purchased by exemption, but the hardware was competitively bid as pieces and delivered to the control system software vendor to assemble. The software vendor then installed the software on the assembled hardware to complete the system. The software vendor also provided integration services to complete the project. Technical services are also exempt from competitively bidding (NRS 332, AGO, 1973).

**City of Henderson**

The City of Henderson was also in the process of developing plans to expand its water and wastewater treatment facilities when it decided to include a new distributed control system. A City project engineer was assigned the task to review the District example. He met with the District staff on several occasions to discuss the procurement method used by the District. The City engineer also met with the City’s attorney to
review the NRS 332-software exemption. They, too, concluded that the software exemption could be applied to their new control system project. They would procure the software under exemption and include the hardware as unique and specifically required by the software to complete the control system.

The City evaluated several control system software products. After an evaluation process and scoring procedure, a software supplier was selected and awarded a contract. The new control system consisted of a computer control system for the water plant, a computer control system for the wastewater plant, a radio telemetry communications system, a local area network, a wide area network and several programmable logic controllers (PLCs). The control system was implemented on time, on budget and successfully. (M. Morine, personal communication, 1993).

**Control System Example**

For example, the control software receives input data to request a pump to start. The software must then transfer this request to a hardware output device, such as a relay, which in turn activates a motor starter contactor, which then starts the pump. The software must communicate in an exact manner with a specific piece of hardware. In other words, the hardware must be able to understand the software, and vice versa. The pump could also have been requested to start automatically from a low tank level. Here, the software must receive a hardware-input signal indicating a low tank level, which is interpreted as a request to start the pump.
Summary

Sometimes the right combination of attorney and technical staff comes together with an understanding and trust for each other. This, apparently rare situation, is the ideal arrangement in order to take advantage of the current procurement requirements for Nevada public agencies. Some agencies are able to work the procurement system, work around the procurement system, or work within the procurement system to achieve their desired goals. While others may only be trapped, restrained or frustrated by the same procurement system.

Only three example cases have been presented in this paper. Even though all three agencies are governed by the same NRS 332, there appears to remain several differing interpretations on its proper application. These differences make it impossible to suggest that this approach would work with any other public agency within the state. However, given the right circumstances and combination of people involved, this approach may yet find another application – an application, which would result in the successful implement of a highly technical and complex computer control system.

Many of the references in the Bibliography are unique and not readily accessible. Therefore, the author has copies available should the reader request additional information. Three references, which can be copied, are included in Appendix 2 - Supplemental References.
CHAPTER 5

SUMMARY. CONCLUSIONS AND RECOMMENDATIONS

The assertion from this research is that a generalized conclusion cannot be drawn. The case study presents scenarios of how three Nevada public agencies worked within the NRS to procure high technology computer control systems. The research cannot draw a general conclusion based on only three examples. What worked for one (or two or three) agencies may, or may not, work for any other Nevada public agency.

One key element that seems to have an influence on the application of the NRS 332-software exemption clause is the interpretation by the governing agency, especially the attorney. One attorney's opinion varies from another, just as perhaps, one doctor's opinion may vary from another, or just as one scholar's opinion may vary from another on a given literary work. Since the United States Supreme Court is constantly rendering opinions regarding the interpretation of the existing laws and the constitution, one can probably expect to continue to have varying interpretations of the local purchasing laws.

Historically, questions or decisions, which may seem to be controversial or risky in nature, tend to be made on the conservative side. When something has never been done before, or only done on a limited basis, people tend to minimize their risk by following the majority. This means they are not likely to try something new. It is always safer to let someone else go first in an unknown or uncertain situation. The greater the risk, the less
likely will one attempt to be the first. Similarly, when many people have done something before, others tend to join the crowd and readily follow along. Public agencies also tend to purchase items based on sound proven methods and procedures approved by their attorney.

It would seem that the procurement laws should be revised in consideration of the procurement dilemma of high technology items, such as computer control systems. Most procurement laws have not been updated since the technology revolution started in the early 1980s. There has been a tremendous advancement of technology since then and especially in the last ten years. Computer performance has increased significantly while prices have decreased. Computers are being used more and more in both business and everyday personal life. Personal computers are becoming as common to the home as a television set or VCR. Millions of individuals own one or more. Businesses of all sizes find it difficult to function without a computer. Even the very small, one-owner shop is likely to have a PC in the back office to keep track of business activities. New computer applications are developing daily. Some of these applications are unique and very specialized. Some are even one-of-a-kind applications.

Questions

How will a public agency be able to acquire these specialized types of product if it must open competitively bid in a very limited market? Is this method truly in the public’s best interest? Is the public agency prohibited from purchasing these items simply because the procurement laws do not acknowledge their existence (Success Story, Spring 1992)?
Procurement law overhaul is desperately needed and long overdue. But who will lead the charge down an uncertain and perhaps politically unpopular road?

The industry trend in high technology computer applications is leaning more and more towards specialized procurement methods (Speed, 1995). Agencies are finding it very difficult or nearly impossible to obtain exactly the right highly technical solution when restrained by conventional open bidding requirements.

The future success of business, both private and public, lies in the successful application of high technology solutions. The competitive nature of private business dictates the maximum use of resources. High technology computer applications and process automation provide a great deal of that efficiency and effectiveness. The recent threat of privatization in public agencies also dictates that maximum use of resources in order to provide the most public service for the least public cost (McMullen interview, 1992).

Public agencies are under going a closer public scrutiny to prove their efficiency and effectiveness (Roemhildt, 1992). As the local southern Nevada population increases, so does the demand for public provided services. Many local public agencies are faced with this increased demand. However, agencies are also being expected to provide these additional services without an increase in cost, especially labor (Manning, 1994). This is a daunting task at best. Consequently, the use of high technology offers an attractive solution.

However, procurement laws may prevent agencies from acquiring the right technical solution unique for them. In fact, the current bidding laws may be the most inefficient and ineffective aspects facing public agencies today.
The author has many personal experiences with flaws in the current bidding procedure (Hunsaker, 1991). For example, a product is specified and openly bid. The contractor is awarded the project. The contractor attempts to save money by providing an "equal" substitute product. The substitute may appear to be equal, but when integrated into a complete processing plant, it fails to perform satisfactorily. The agency or owner is then forced to accept the substitute product. Within the first year of operation, the product is replaced with one that does perform as an integrated part of the complete processing plant. In effect, the item is purchased twice. Once, incorrectly, through bidding, and once, correctly, through preference and based on experience (P. Johnson, personal communication, 1995). Public dollars are wasted. It would have bee cheaper in the long run to purchase a more expensive brand of unit, which is known to function properly.

The current bidding laws do not properly acknowledge the existence of highly technical, specialized products. Computer based control systems are very complex systems and incorporate many highly technical components. These components must not only function individually, but also as an integrated part of the entire system.

Computer hardware and software procurement presents an interesting challenge for public agencies. Many state and local governments have established yearly or multi-year contracts to purchase personal computers and applications under a competitively bid process. This procedure helps the public agencies meet the purchasing laws, but it should not be generally applied to all computer related purchases, especially highly technical computer control systems.
A small business telephone system today is computerized. It is comprised of a computer, specialized hardware and software. The computer may also be specialized or it may be a standard PC. Standard PCs can be bid and one can generally expect a predictable performance outcome. A specialized computer cannot be bid or obtained from one vendor and expected to operate with another vendor’s software or telephone desk sets. The specialized hardware which interfaces the computer to the telephones is likely not standard. It is unique and special to the complete system, including the software.

In order to assure that a complete, functional telephone system is obtained, it should be purchased from a single vendor. This vendor has developed the software and hardware to work together as a single integrated system. One cannot expect that a Sprint digital telephone will plug into an NEC brand private business exchange (PBX) system. The two are unique, proprietary and incompatible. These two vendors have not collaborated on the development of their products, so one cannot expect them to perform the same or be compatible. Isn’t that the nature of competition? Vendors strive to offer a product that is both unique and desirable in order to capture consumer dollars. Why then, should we expect to be able to competitively bid for unique complex control systems?

Public agencies, today, should consider the use of the software bidding exception for their future control system purchases. Public agencies, and other lobbyists, might also consider changing the current bidding laws. Neither of these two tasks will be easy, but the reform move should be started soon before more public money is wasted through inappropriate purchasing statutes.
APPENDIX 1

PERSONAL COMMUNICATIONS

The following persons were cited in the text of the paper. They are not included in the reference list, but are included here for review and as additional information.

Bochanis, Mary, Attorney, Colorado River Commission (CRC), Las Vegas, Nevada, Personal Interviews and Discussions between 1996-1997. I worked as a consultant to the CRC, met with this attorney regarding the procurement of computer software, and related hardware for a control system upgrade at the Southern Nevada Water System (SNWS).

Bochanis, Mary, Attorney, Southern Nevada Water Authority (AUTHORITY), Las Vegas, Nevada, Personal Interviews and Discussions during 1997. I worked as a consultant to the AUTHORITY, met with this attorney regarding the procurement of computer software, and related hardware for a control system upgrade project at the SNWS. The CRC control system upgrade project was transferred in 1997 to the AUTHORITY for completion.

Hauser, Charles K., Attorney, Las Vegas Valley Water District (LVVWD), Las Vegas, Nevada. Meetings and Discussions during 1997. Mr. Hauser was the supervising attorney over Ms. Bochanis at the AUTHORITY. His views and opinions differed from Ms. Bochanis.

Johnson, Paul, Assistant District Attorney, Clark County Sanitation District (DISTRICT), Las Vegas, Nevada, Personal Interviews and Discussions between 1991-1995. I worked for DISTRICT from 1981 to 1996 as the Control Systems Engineer. Mr. Johnson was the third attorney assigned to DISTRICT while I was there. He and I discussed many procurement and bidding issues during that time.

Morine, Michael, Project Engineer III, City of Henderson (City), Henderson, Nevada, Personal Interviews and Discussions between 1991-1995. I worked for DISTRICT from 1981 to 1996 as the Control Systems Engineer. Mr. Morine was the project engineer assigned to implement the City's new computer control system. He and I discussed many procurement and bidding issues during that time.
Peterson, Ralph M., deceased, Assistant District Attorney, Clark County Sanitation District, Personal Interviews and Discussions between 1989-1990. I worked for DISTRICT from 1981 to 1996 as the Control Systems Engineer. Mr. Peterson was the second attorney assigned to DISTRICT while I was there. He and I discussed many procurement and bidding issues during that time. He was the resident attorney during the time I was responsible for a project to upgrade an old control system, to a new system for the wastewater treatment plants in Las Vegas and Laughlin. The system was procured under the software exemption.

Priebe, Victor, Assistant District Attorney, Clark County Sanitation District, Las Vegas, Nevada, Personal Interviews and Discussions between 1985-1989. I worked for DISTRICT from 1981 to 1996 as the Control Systems Engineer. Mr. Priebe was the first attorney assigned to DISTRICT while I was there. He and I discussed many procurement and bidding issues during that time.
APPENDIX 2

SUPPLEMENTAL REFERENCES

THE FOLLOWING ARTICLES ARE INCLUDED IN THE NEXT PAGES AS SUPPLEMENTAL INFORMATION AND READING:


Consulting-Specifying Engineer

- IBM Automates Facilities Energy Management
- Wastewater System Provides Remote Control
- Protect Motors with Type 2 Coordination
Clark County Sanitation Hits Jackpot with Automation

Sanitation District Takes Control of Remote Stations with Square D's Control and Monitoring System

Metropolitan Las Vegas is one of the fastest growing communities in the United States. In addition to being the entertainment capital of North America, where new 4,000-room hotel/casino complexes materialize virtually ever year, approximately 50,000 new residents move to the area annually.

This kind of spectacular growth places a tremendous strain on the area's infrastructure and environment. Keeping up with the needs of this rapidly growing population has had a profound impact on the community's wastewater treatment capacity.

The Clark County Sanitation District (CCSD) in southern Nevada is responsible for wastewater collection and treatment for unincorporated areas of the county, which include residential and industrial areas as well as a significant portion of the Las Vegas "Strip." CCSD also collects and treats sewage from distant communities, such as Laughlin, Overton and Searchlight, Nevada.

According to Rick Hunsaker, CCSD control systems engineer, in 1982 the agency constructed a 90-million-gallon-per-day advanced wastewater treatment (AWT) plant to meet area growth and higher discharge standards enacted by the Environmental Protection Agency.

CCSD management realized, in addition to increased capacity, physical expansion would require a more efficient and timely method of managing the entire wastewater collection and treatment process.

**Outdated Control System**

Hunsaker says that when the AWT plant opened in 1982, it was fairly sophisticated. The need for service expansion, however, caused a related need to upgrade and automate the CCSD control system.

"The first problem was that our control system couldn't be upgraded to expand with our needs," Hunsaker says. "The minicomputer disk drives crashed about every 18 months at a cost of $8,000 each time. Since the architecture was outdated, it became difficult to get parts and expensive to repair."

The second problem was due to the geographic size of the Clark County service area. CCSD found it was becoming increasingly difficult to effectively monitor the lift (pumping) stations, some of which are 55 miles away from the main facility.

"When we had a few stations, we had a crew visit each site two or three times a week to check for pump failures, sound and vibration inspections, temperature checks, pump operation level checks, control problems or power failures," says Gary Workman, CCSD lift station supervisor. "As our service area expanded, we had to reduce visits to once a week and problems could go undetected for days. We really needed to automate the lift stations with on-line, real-time monitoring so if something went wrong, we would know about it immediately," he adds.

Realizing the need for outside expertise, Hunsaker petitioned CCSD management to hire EMA services of Tucson, Ariz. as the contract administrator and design engineering firm. EMA is also assisting CCSD with its plant expansion, maintenance program and long-term planning.

"We decided to replace our outdated system," Hunsaker says. "At the same time, we decided to incorporate the 27 remote lift stations into a new system, since they were not automated at all. We were looking for an expandable control..."
System A Winner
CCSD chose Square D to provide a new distributed process plant control system and the supervisory control system for the remote lift stations. The system incorporates a wide array of Square D products, including SY/MAX® Model 400 programmable logic controllers (PLCs) and Square D's CRISP® software. Square D also provides CCSD with relays, electromechanical limit switches and a Model 6 motor control center. Additionally, Square D's electrical distribution equipment is used in circuit breaker panels and for lighting control; the plant's central computer is protected by Square D's Topaz uninterruptible power system (UPS).

At the heart of the system is the CRISP® software, operating in a DEC® VAX/VMS environment, which allows CCSD to use standard PC-based workstations and a fiber optic Ethernet communications network. This provides the ability to add process applications on an as-needed basis. The software enables control of both the wastewater treatment process and the remote lift stations. This commonality of software reduces training and maintenance costs while increasing overall plant operation efficiency.

PLCs key to monitoring
Critical lift station monitoring system design parameters, included operating procedures, input/output points to be monitored, data update rates and field panel operation. The system now monitors 27 remote CCSD lift stations from the supervisory control computer and provides a complete station update every five seconds. Each lift station is equipped with a Square D Model 400 SY/MAX PLC, which monitors all station operations and communicates to the supervisory computer via leased telephone lines.

A key feature of the alarm system is DECtalk®, which automatically and immediately informs control personnel of a lift station alarm due to equipment malfunction. When an alarm comes in, the software detects it and sends a message to dial someone at home if the situation is critical. The system requires the receiver to key in an operator I.D. before delivering the message. Non-critical alarms are displayed on a PC screen and can be handled during normal business hours.

Winning Results
The original idea of this system was to collect data from the plant and have an extensive lift station alarm system, explains Mark Binney, CCSD senior instrumentation technician. "I wasn't satisfied with that and started looking at control. We have a hundred-fold change from the original plan. We can now fix a lot of process problems from the control room. In fact, we've cleared up some problems we didn't even know we had," he says.

Workman agrees that CCSD had no idea of the many advantages it would realize with the new system. "We really didn't know how good this system was going to be," he says. "Our operators can see trends, how the plant is operating, and how we can fine tune chemical dosages to refine the treatment process. And now with the PLCs monitoring everything, we're figuratively in each lift station 24 hours a day."

"We know more sitting at a computer screen in the control room than a man does standing in the plant or at a lift station," explains Binney. "I can operate the station faster than a person on site and I'm doing it from 75 miles away. I can see all 27 sites in five minutes, whereas that would take two to three days with four guys out driving around in trucks."

"Other treatment facilities don't know how to maintain their systems once the control system vendor leaves," Hunsaker says. "The beauty of this system is that we were involved up front in the planning, installation and programming, so that when Square D left we were fully trained and could operate on our own."

Hunsaker says CCSD will add five more VAX computers, nine workstations and seven Square D SY/MAX Model 650 PLCs when a new advanced secondary treatment plant goes online in 1995.

Square D

DEC, VAX/VMS and DECtalk are registered trademarks of Digital Equipment Corporation
The Clark County Sanitation District (CCSD) provides wastewater collection and treatment services for the Las Vegas metropolitan area and outlying rural areas. The Las Vegas area wastewater is conveyed to a wastewater treatment plant for discharge into Las Vegas Wash and, ultimately, into Lake Mead. The treatment plant includes primary treatment, trickling filters, lime treatment, and mixed media filtration for up to 90 MGD. A plant expansion project to add secondary treatment with nitrification and increase capacity to 100 MGD is in the construction phase.

The Las Vegas area is one of the fastest growing urban areas in the U.S. It is also located in an arid climate, making growth dependent on reliable, clean water sources. The CCSD collection system and treatment processes must respond to these demands. The needs for system responsiveness drove the decision to computerize the Lift Station Telemetry System (LSTS) and the Process Control System (PCS).

Define Real Needs

Most lift stations were pre-engineered with a drywell/wetwell and two pumps. Controls could be characterized as stand-alone with no communications abilities. Controls at the lift stations before computerization were generally hard-wired to provide pump starting/stoppping based on wetwell level. Remote monitoring was available on some lift stations, but limited to four or eight alarm signals on Automatic Dialer Units (ADU). The ADU dialed one or more pre-programmed telephone numbers and reported the alarm condition and site identification.

All lift stations required regular site visits to check on operations and performance. Often, equipment failures and other alarm conditions were not known until someone at the site observed the failure. Since some sites are located more than 60 miles away, site visits required considerable time resources. The new LSTS would provide centralized monitoring and control capabilities for all lift stations, while still providing automatic dialing capabilities for after-hours alarms.

The primary treatment and trickling filter facilities (secondary and regional plants) used only hard-wired controls with no remote monitoring. Equipment status could only be determined by operator observation, requiring substantial time resources to visually inspect the facilities.

The lime treatment and filtration facilities at the Advanced Wastewater Treatment (AWT) plant included a Fischer & Porter Series 3000 control system. This control system was originally designed in 1974, and parts were increasingly difficult to find. Also, all automatic process control was dependent on a single computer.

Use of the Fischer & Porter control system was also difficult. Operators used a monochromatic terminal with very little graphic representation of the process. Accessing data often involved cryptic commands with a heavy reliance on memorization of various codes. Programming the control system was time-consuming and difficult. Very few staff were comfortable with changing programs to meet changing operational needs. More often than not, the plant was operated manually due to one or more of these constraints.
Communication Was Key

A good example of the benefit that came from good communication is in the area of operator training. One of the operators had interest and energy for the project and assumed the role of systems champion. In this role, he solicited operator input and kept operators informed. He trained many of the other 49 operators.

Conclusion

CCSD is using and benefiting from successful PCS and LSTS. The way they accomplished this both on time and within budget was through:

- defining real needs
- trying new concepts
- avoiding pitfalls
- defining roles
- adapting to change
- communicating thoroughly

Benefits of the PCS and LSTS installations have developed beyond initial expectations. Plant operators and lift station technicians alike have realized opportunities for labor savings, improved operations, increased reliability, preventive maintenance, and remote diagnostics. Jobs are changing from the performance of many routine repetitive tasks, to the improving of operational and maintenance procedures, to testing newer treatment processes.

The management vision of integration and expansion was incorporated into system design before negotiations began. The system was designed with expansion capability to handle a major Central Plant expansion of treatment capacity and nitrification, and the integration capacity to accept a Maintenance Management System (MMS) and Office Automation (OA). All of these packages are accessible on the same fiber optic communications network as the process control system. In addition, the same CRT used for the operator interface for process control can be used for work order entry, electronic mail, and operating reports. Eventually, even the business system and accounting data will be available to all authorized users.
System Flexibility Helps
Clark County Sanitation District
Serve Rapidly Growing Population

In the arid Southwest, water is a precious commodity. Add the relative
scarcity of this natural resource to the realities of a rapidly growing popula-
tion, and a picture emerges of the Clark County Sanitation District.

Las Vegas, the well-known entertainment resort, is actually one of the
country's fastest growing residential areas with an estimated influx of
4,000 new residents per month. The industry base is also expanding to include
new manufacturing and warehouse facilities, many of which are relocating
from the West Coast.

The Clark County Sanitation District (CCSD) is responsible for treating
wastewater produced from the unincorporated areas of Clark County,
which include residential areas, industrial areas, and a significant portion of the
famous Las Vegas Strip. Although CCSD serves approximately 60,000 custom-
ers, the numbers are deceivingly small. For example, an individual customer,
such as one of the resort hotels on the Strip, may include 4,000 rooms.

The Goal
To meet the needs of a rapidly
growing population for the next
10 years.

The Automation Solution
Square D/CRISP distributed
process control system for
wastewater treatment control

Square D/CRISP supervisory
control system for telemetry
control of remote pump stations

Rick Hunsaker - Control Systems Engineer and Project Manager

Photo courtesy of EMA Services, Inc.
The Selection Process

After a thorough pre-qualification of eight control system vendors, the CRISP System was selected based on a negotiated procurement. EMA services, the engineering consultant CCSD asked to design the system, assisted them in the prequalification process and final bid evaluations.

Evaluations were based on functionality, flexibility and future expansion capability.

Rick Hunsaker, Control Systems Engineer:

“During this process we visited several other utilities who had put in control systems recently. Those conversations convinced me that we were on the right track and that low bid was not the way to go.

“They had gone with low bids and were unhappy with the end product. Even though specs were met, the system did not meet their expectations.

“Before choosing the CRISP System, we looked at a variety of control products on the market. Some offered easy to use, fill-in-the-blank software. But, it was apparent that once the blanks were filled in, these systems couldn’t offer the flexibility to make changes or to expand.”

The Benefits of An Open Systems Approach

The CRISP software operates in a DEC® VAX/VMS® operating environment. The CRISP solution allowed CCSD to use standard PC-based workstations and a fiber optic ethernet communications network, as well as providing the ability to add process applications on an as-needed basis.

Designed with expansion capability, the CRISP system will handle a major central plant expansion of treatment capacity and nitrification. It will also provide the integration capacity to accept a Maintenance Management System, Office Automation and Laboratory Information Management System. All of these packages are accessible on the same fiber optic communications network as the process control system.

In addition, the same CRT used for operator interface for process control can be used for work order entry, electronic mail, and operating reports. In the future, business system and accounting data will also be available.

The same CRISP software which is used for direct control of the wastewater treatment process is used for supervisory control of all remote pump stations. This commonality of software, for both the telemetry and process control systems, reduces training and maintenance costs while increasing the efficiency of overall plant operations.

Hunsaker: “Now that most problems can be fixed from a workstation in our control room, we only visit each station once a month. We’re spending significantly less time on the road and more time managing the system.”
PHASE II

CRISP System Shortens Start-Up Time for New Plant Expansion

At the present time, CCSD treats approximately 56 million gallons of water daily. A new nitrification/denitri-fication plant is scheduled to go online in 1994 to enhance treatment and increase capacity to 100 million gallons per day.

Hunsaker: “Our CRISP System is playing an important role in this expansion. We are building a model system and simulating its operation prior to bringing the new plant on line.

We’re trying to identify various future integration needs to be able to include the additional hardware and software needed to make total integration happen. For example, with total integration, at my workstation,

I can connect into the office environment, look at the schedule, and send a message to the secretary.

I can call up the plant software, look at it, change it, and code the program out in the plant.

Or, I can look at lift stations.

I could also get into the maintenance routine and update it.

I can do virtually anything from this workstation.

And that’s what I think we need — to be able to have a single workstation, not two or three computers on a desk. We’ll get the information we need and exchange that information with others who use it.”

Environmental Impact and Validation

In addition to keeping up with the increased volume of water used by a burgeoning community, CCSD needed a flexible system that could also help keep pace with changing environmental regulations.

Hunsaker: “With our increasing population and water usage, the Environmental Protection Agency is asking us to reduce the amount of chemicals we use in our treatment process. Our new nitrification plant will help us achieve this goal and the CRISP System will help us to monitor and validate the process through enhanced data collection and reporting.”
The Advanced Wastewater Treatment Computerization Project was a win-win situation. Clark County wanted an open systems architecture that offered flexibility and 100% expansion capacity to accommodate the projected population growth of the county through the year 2000. By choosing CRISP, Clark County was able to select the most cost effective system that met all of their requirements.

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From contract award through completion of the 90-day field acceptance test, the spirit of cooperation and teamwork that existed between the District, EMA and Square D/CRISP proved to be a winning combination.

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COLLECTION SYSTEM AUTOMATION: 
HOW TO SAVE LABOR COSTS WITH TOTAL STAFF INVOLVEMENT

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INTRODUCTION

The Clark County Sanitation District (CCSD) in southern Nevada is responsible for wastewater collection and treatment for parts of Clark County outside Las Vegas city limits. This includes the greater Las Vegas metropolitan area which contains most of the famous hotels and entertainment centers of the Las Vegas Strip. In addition, the District collects and treats sewage in population centers outside the metropolitan area such as Searchlight, Overton, and Laughlin, Nevada.

Clark County recently installed a computerized Lift Station Telemetry System (LSTS) to monitor the 28 sewage lift stations in its collection system. From the beginning of the telemetry system design, the District determined that the key to effective utilization of the LSTS was active involvement by maintenance staff. The maintenance supervisor and a senior technician with a special interest in the project were assigned roles on the project during design, procurement, installation, and startup. Application software was developed as a combined effort between the senior technician and the consulting engineer. Once the LSTS came on-line, everyone on the maintenance staff easily learned the system because it had the features that were important to them. As a co-worker, the senior technician could explain the system to other staff and modify it to incorporate new ideas. This effort built a feeling of ownership within the staff that keeps the system effective and continually expanding its capabilities even two years after startup.

HISTORY OF THE COLLECTION SYSTEM

The Collection System has grown slowly over the years and now has a variety of different pumping and control panel configurations. Previously, physical checks of each lift station were made on scheduled maintenance calls. If a problem developed at a site between scheduled visits, someone in the neighborhood would call to report it. This evolved over the years into an alarm light mounted on a pole nearby that alerted neighbors to call in. Eventually, a limited phone system was installed for 11 of 28
sites that called in alarms but still gave little indication of the cause or severity of the problem. As the collection system grew, the District appeared to be less responsive.

Regular station checks at each site included checking run and lapse times by stopwatch, motor and pump sound and vibration inspections, motor temperature checks, and pump operation level checks. This was very time consuming to say the least. General conditions, such as loose bolts, pins, screws, etc., were also inspected. Run and lapse times were recorded to be checked against previous run times. These visits were also used for equipment maintenance and station cleanup. Stations in the Las Vegas valley and Overton were checked twice a month. The station at Searchlight, 55 miles away, was checked weekly at a cost of one man-day each trip. Overall, basic maintenance checks were costing 1264 man-hours per month, requiring seven full time staff.

During the late 1980's, the Las Vegas metro area grew at a rate of approximately 1000 people per week. A new major hotel (3000 to 4000 rooms) was built each year. This growth pattern indicated that the number of lift stations would increase significantly over the next few years. CCSD realized they could not continue these labor intensive station checks. They recognized the need to change their approach to maintain all of the lift stations. Also, the local public and new major customers were now demanding better responsiveness to collection system problems.

A systems consultant (EMA) was contracted to provide engineering services to install an LSTS that met these needs. Preliminary studies for the LSTS design commenced in October 1988, followed by design and procurement in March 1990. Implementation and startup of the new system was completed in September 1991. Final acceptance of the LSTS occurred in December 1991.

PEOPLE INVOLVEMENT

Maintenance staff involvement was stressed from the beginning. Bob Evans, the Manager of Buildings and Grounds, was not initially a strong supporter of automation systems. His original concern was that the system would not be used nor be of value to his staff. Gary Workman, Lift Station Maintenance Supervisor and Mark Binney, Senior Maintenance Technician were assigned roles on the project ranging from reviewing study and design drafts, to communicating the maintenance staff's requirements. Gary and Mark also provided design input on system requirements such as site locations, station operating procedures, I/O points to be monitored, data update rates, and field panel operation. One key issue was the type of remote terminal unit to use in the station. Both Mark and Gary were committed to PLC type RTUs because spare PLCs would be available locally from electrical distributors' stock and could be purchased competitively.

The LSTS procurement procedure was the evaluated bid process, and not the usual low bid process. This procedure helped the District buy a system based on their best interests in the long-term, rather than being locked in with the lowest initial price. Mark Binney was part of the team that evaluated proposals and visited vendor installations. He was able to discuss advantages and disadvantages of each vendor with other users and influence the selection of the LSTS supplier. When a vendor was selected, he was more willing to work on application difficulties because he was involved in the selection decision.
Gary and Mark also went to factory training on PLC programming and the Operator Interface software. Along with EMA, they developed the application software design guide, planning the implementation of the application software for the lift stations and central monitoring computer equipment. The design guide included PLC programming, graphic display, station polling, and report formatting guidelines.

Once the application software design guide was established, EMA provided technical leadership in programming the overview displays and application software programs as templates for five types of similar lift stations. Gary and Mark reviewed and modified the design guide by incorporating their knowledge of the collection system with the software expertise provided by the consultant. They went on to program the remaining lift stations with the template programs developed by the consultant. Mark enhanced the graphics and control functions. He also worked on the startup of each station as the PLCs were installed.

Gary and Mark's system knowledge has now been transferred to others on the maintenance staff and they are all comfortable working with the system. Even Bob Evans has become a believer. Since the initial startup, everyone has contributed ideas and enhancements to the system. Because the District has trained staff in place, they can continuously improve the system without outside assistance.

RESULTS

There have been two types of results from implementation of the Collection System Automation system. First, there are the results anticipated by EMA and the District prior to the design.

1. Service responsiveness to the public has been improved. The alarm handling capabilities of the new system allow a technician to see more alarm details and a history of station operations before departing for the site. Alarms monitored have increased from less than four alarms on some sites and one alarm on all others, all critical. Alarms monitored now average six critical alarms and four non-critical alarms, variable due to site complexity. Equipment status and other events are also monitored to provide a more complete picture. Trends show the technician a sequence of events leading to the alarm condition. This allows the technician to be better prepared by bringing the right equipment on the first trip to the site. As the technicians became more familiar with the new system's monitoring capabilities, they learned to recognize developing problems and perform preventive maintenance before actual failure. New alarm additions are only limited by staff imagination and budget.

![Increased awareness provides improved service](chart)
2. Maintenance costs have been reduced. The new system provides 24-hour monitoring for every station. These monitoring capabilities have significantly reduced driving time. Regular station checks at sites have been reduced from twice per month to once per month. Basic maintenance activities have been reduced by 600 man-hours per month. The new system can differentiate between critical and non-critical alarms. Response to non-critical alarms may sometimes be delayed to normal working hours to minimize overtime costs.

![Man-hour reduction lowers maintenance costs](image)

3. Dial-out and dial-in capabilities have been enhanced with voice annunciation. The old system would dial in alarms to the plant operator who would then call the technician. The technician would go to the site without knowing what the alarm was and whether or not the alarm had cleared itself. The new system will generate calls based on critical alarms directly to the technician on call and announce the station name, alarm condition, and other information. Depending on the alarm, the technician could make a site visit or call in to the system and check on other alarms. This saves on unnecessary field trips, and also allows for remote checking on other sites.

Second, there are unexpected benefits that have resulted from staff involvement.

1. System reliability has increased substantially due to staff familiarity. Manual timing of pump starts has been replaced by system trending. This capability provided new understanding to lift station operations and added the ability to calculate actual lift station flows.

![Wet Well Level Trends](image)
APPENDIX 3

NEVADA REVISED STATUTES (NRS 332) - EXCERPT

[NOTE to reader: bolded text in this excerpt has been added by the author to highlight specific references mentioned in the body of this professional paper.]

CHAPTER 332

PURCHASING: LOCAL GOVERNMENTS

NRS 332.005 Short title.

NRS 332.015 "Local government" defined.

NRS 332.025 Other terms defined.

NRS 332.035 Contracts in county whose population is less than 100,000: Advertising required if estimated amount exceeds $10,000; requests for bids required if estimated amount exceeds $5,000.

NRS 332.039 Contracts in county whose population is 100,000 or more: Advertising required if estimated amount exceeds $25,000; requests for bids required if estimated amount exceeds $10,000.

NRS 332.045 Publication of notice to bid.

NRS 332.055 Emergency contracts: Competitive bidding not required; "emergency" defined.

NRS 332.061 Proprietary information regarding trade secret: Confidentiality; disclosure.

NRS 332.065 Award of contract; preference given to recycled products; reawarding contract by hospital.

NRS 332.075 Rejection of bids.

NRS 332.085 Determination of bidder's responsibility.

NRS 332.095 Assignment of contracts.

NRS 332.105 Bidders' bonds.

NRS 332.115 Exceptions to requirements for competitive bidding: Contracts not adapted to award by competitive bidding; purchase of equipment for use by local law enforcement agency; purchase of goods commonly used by hospital.
NRS 332.146 Exceptions to requirements for competitive bidding: Auction, closeout and bankruptcy sales; sale of merchandise left after exhibition.

NRS 332.148 Exceptions to requirements for competitive bidding: Failure to receive responsible bids.

NRS 332.155 Interest of member or representative of governing body in contract prohibited; exception; penalty.

NRS 332.161 Prohibited acts by bidders before award of contract; penalty.

NRS 332.165 Effect of collusion among bidders or advance disclosures.

NRS 332.175 Trade-in allowances for personal property.

NRS 332.185 Sale or lease of personal property of public entity; public auctions; chapter inapplicable to transactions regarding real property.

NRS 332.195 Joinder or use of contracts by other local governments.

NRS 332.215 Commission to study governmental purchasing: Members; meetings; duties.

NRS 332.221 Provision of maintenance services and purchase of motor vehicle fuel for sale to public agencies or nonprofit corporations; regulations.

NRS 332.223 Use of facilities of local government by nonprofit corporation that provides ambulance services pursuant to franchise agreement.

NRS 332.225 Requirements of chapter unaffected by approval by governing body of application for federal grant.

NOTE: The section added to chapter 332 by section 1 of chapter 159, Statutes of Nevada 1995, has been codified as NRS 237.020.

CHAPTER 332
PURCHASING: LOCAL GOVERNMENTS
CROSS REFERENCES
Conservation of energy, lease of property for, NRS 344.070
County purchases, NRS 245.070, 247.080
Population defined, NRS 0.050

Purchasing Act is to be broadly construed to include every type of local governmental unit, not
(a) A governing body or its authorized representative in a county whose population is less than 100,000 shall advertise all contracts for which the estimated amount required to perform the contract exceeds $10,000.

(b) Such a governing body or its authorized representative may enter into a contract of any nature without advertising if the estimated amount required to perform the contract is $10,000 or less.

(c) If the estimated amount required to perform the contract is more than $5,000 but not more than $10,000, requests for bids must be submitted to two or more persons capable of performing the contract, if available. The governing body or its authorized representative shall maintain a permanent record of all requests for bids and all bids received.

2. Nothing in this section prohibits a governing body or its authorized representative from advertising for or requesting bids regardless of the estimated amount to perform the contract.

(Added to NRS by 1975, 1536; A 1977, 151; 1979, 172; 1983, 1248, 1659; 1993, 2553; 1995, 709)

NRS CROSS REFERENCES.
"Population" defined, NRS 0.050

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Public Contracts ! 6.

WESTLAW Topic Nos. 268, 316A.


C.J.S. Public Contracts §§§ 8, 9.

NRS 332.039 Contracts in county whose population is 100,000 or more: Advertising required if estimated amount exceeds $25,000; requests for bids required if estimated amount exceeds $10,000.

1. Except as otherwise provided by specific statute:

(a) A governing body or its authorized representative in a county whose population is 100,000 or more shall advertise all contracts for which the estimated amount required to perform the contract exceeds $25,000.

(b) Such a governing body or its authorized representative may enter into a contract of any nature without advertising if the estimated amount required to perform the contract is $25,000 or less.

(c) If the estimated amount required to perform the contract is more than $10,000 but not more than $25,000, requests for bids must be submitted to two or more persons capable of performing the contract, if available. The governing body or its authorized representative shall maintain a permanent record of all requests for bids and all bids received.

2. Nothing in this section prohibits a governing body or its authorized representative from advertising for or requesting bids regardless of the estimated amount to perform the contract.

(Added to NRS by 1993, 2553)
NRS 332.085 Determination of bidder's responsibility. In determining the responsibility of any bidder, the governing body or its authorized representative shall consider the possession of and limit on any required license and may consider the financial responsibility, experience, adequacy of equipment and ability of the bidder to complete performance.

(Added to NRS by 1975, 1537; A 1983, 914)

NEVADA CASES.

Writ of mandamus. Where board of county commissioners issued invitations to bid for erection and operation of billboard which implied that bidder must hold contractor's license, petition by unsuccessful bidder for writ of mandamus was appropriate to contest acceptance of bid (see NRS 332.065) by person who lacked this license as variance from specifications despite discretion in determining responsibility of bidder (see NRS 332.085). Faust v. Donrey Media Group, 95 Nev. 235, 591 P.2d 1152 (1979)

NRS 332.095 Assignment of contracts.

1. No contract awarded may be assigned to any other person without the consent of the governing body.

2. No contract awarded or any portion thereof may be assigned to any person who was declared by the governing body not to be a responsible person to perform the particular contract.

(Added to NRS by 1975, 1537)

NRS 332.105 Bidders' bonds.

1. A bid bond, performance bond, payment bond or any combination thereof, with sufficient surety, in such amount as may be determined necessary by the governing body or its authorized representative, may be required of each bidder or contractor on a particular contract.

2. Any such bonds may be to insure proper performance of the contract and save, indemnify and keep harmless the local government against all loss, damages, claims, liabilities, judgments, costs and expenses which may accrue against the local government in consequence of the awarding of the contract.

3. If a local government requires such a bond, it shall not also require a detailed financial statement from each bidder on the contract.

(Added to NRS by 1975, 1537; A 1983, 914)
NEVADA CASES.

Section gives local governments broad latitude in drafting bid documents to define purpose and consequences of bid bond requirement. Provisions of NRS 332.105 give local governments broad latitude in drafting bid documents to define purpose and consequences of bid bond requirement. Therefore, where city's bid documents contained provision requiring forfeiture of bidder's bond if bidder did not enter into contract with city within certain time after city accepted his bid but did not state whether forfeiture of bid bond functioned as penalty or as provision for liquidated damages, supreme court, in applying established principles of contract interpretation, concluded that provision functioned as provision for liquidated damages thereby precluding city from receiving damages in excess of provision. American Fire & Safety, Inc. v. City of N. Las Vegas, 109 Nev. 357, 849 P.2d 352 (1993)

NRS 332.115 Exceptions to requirements for competitive bidding: Contracts not adapted to award by competitive bidding; purchase of equipment for use by local law enforcement agency; purchase of goods commonly used by hospital.

1. Contracts which by their nature are not adapted to award by competitive bidding, including contracts for:
   (a) Items which may only be contracted from a sole source;
   (b) Professional services;
   (c) Additions to and repairs and maintenance of equipment which may be more efficiently added to, repaired or maintained by a certain person;
   (d) Equipment which, by reason of the training of the personnel or of an inventory of replacement parts maintained by the local government is compatible with existing equipment;
   (e) Purchases of perishable goods by a county or district hospital;
   (f) Insurance;
   (g) Software for computers;
   (h) Books, library materials and subscriptions;
   (i) Motor vehicle fuel purchased by a local law enforcement agency for use in an undercover investigation;
   (j) Motor vehicle fuel for use in a vehicle operated by a local law enforcement agency or local fire department if such fuel is not available within the vehicle's assigned service area from a fueling station owned by the State of Nevada or a local government;
   (k) Purchases made with money in a store fund for prisoners in a jail or local detention facility for the provision and maintenance of a canteen for the prisoners; and
Contracts requiring high degree of professional and technical skill are not required to be submitted to competitive bidding. Under provisions of former NRS 332.140 (cf. NRS 332.115), local governments are not required to submit contracts for professional services of architects or engineers to competitive bidding because such services are personal services requiring high degree of professional and technical skills which are not adaptable to competitive bidding. AGO 142 (9-6-1973)

Management services contract for consulting or coordinating purposes is exempt from competitive bidding unless manager is responsible for cost and construction of project. County hospitals and other local government entities otherwise authorized by law to engage in public works projects may utilize construction management services for such projects and under NRS 332.115, which exempts contracts for professional services from competitive bidding requirements, contract for construction management services need not be let by competitive bidding if construction manager is used solely for consulting or coordinating purposes, but must be so let if manager is made responsible for guaranteeing cost and construction of project. AGO 209 (1-3-1977)

City contract not requiring specialized management or promotional skills subject to competitive bidding requirements. City contract for management and operation of facility for conventions and trade shows was subject to requirements for competitive bidding contained in NRS ch. 332, and was not exempt under NRS 332.115 as being contract for professional services, because contract did not require person with specialized management or promotional skills. AGO 86-15 (8-1-1986)

NRS 332.135 Contracts with carriers; solicitation of informal rate quotations; contracts with purchasing division of department of administration.

1. Nothing in this chapter prohibits a governing body or its authorized representative from contracting for interstate or intrastate carriage of persons or property with a certificated common or contract carrier at the rates set forth in the officially approved tariff of such carrier.

2. Nothing in this section prohibits a governing body or its authorized representative from soliciting informal rate quotations.

3. Nothing in this chapter prohibits a governing body or its authorized representative from obtaining supplies, materials, equipment or services on a voluntary basis from the purchasing division of the department of administration pursuant to NRS 333.470.

(Added to NRS by 1975, 1538; A 1991, 618; 1993, 1564)

NRS 332.146 Exceptions to requirements for competitive bidding: Auction, closeout and bankruptcy sales; sale of merchandise left after exhibition.

1. Except as otherwise provided by law, if the chief administrative officer of the local government concurs with the authorized representative that the supplies, materials or equipment can be purchased at any public auction, closeout sale, bankruptcy sale, sale of merchandise left after an exhibition, or other similar sale at a reasonable savings over the cost of like merchandise and below the market cost in the community, a contract or contracts may be let or the purchase made without complying with the requirements of this chapter for competitive bidding.

2. The documentation for the purchase or acquisition must be summarized for the next regularly scheduled meeting of the governing body, together with written justification showing the savings involved.

(Added to NRS by 1975, 1538; A 1983, 845)

NRS 332.148 Exceptions to requirements for competitive bidding: Failure to receive responsible bids.
1. Except as provided in subsection 2, when a governing body or its authorized representative has advertised for or requested bids in letting a contract and no responsible bids are received, the governing body may let the contract without competitive bidding not less than 7 days after it publishes a notice stating that no bids were received on the contract and that the contract may be let without further bidding.

2. A governing body or its authorized representative shall entertain any bid which is submitted after it publishes notice and before the expiration of the waiting period.

(Added to NRS by 1977, 463)

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Public Contracts 10.

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C.J.S. Public Contracts §§§§ 15, 17.

NRS 332.155 Interest of member or representative of governing body in contract prohibited; exception; penalty.

1. No member of the governing body may be interested, directly or indirectly, in any contract entered into by the governing body; but the governing body may purchase supplies, not to exceed $300 in the aggregate in any 1 calendar month from a member of such governing body, when not to do so would be of great inconvenience due to a lack of any other local source.

2. An authorized representative of a governing body may not be interested, directly or indirectly, in any contract by such governing body.

3. A member of a governing body who furnishes supplies in the manner permitted by subsection 1, may not vote on the allowance of the claim for such supplies.

4. A violation of this section is a misdemeanor and, in the case of a member of a governing body, cause for removal from office.

(Added to NRS by 1975, 1539)

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Municipal Corporations 231(1) to 231(4).

Public Contracts 4.

WESTLAW Topic Nos. 268, 316A.

C.J.S. Municipal Corporations §§§§ 988 et seq., 991.

C.J.S. Public Contracts §§ 5.

NRS 332.161 Prohibited acts by bidders before award of contract; penalty.

1. Before a contract is awarded, a person who has bid on the contract or an officer, employee, representative, agent or consultant of such a person shall not:
(a) Make an offer or promise of future employment or business opportunity to, or engage in a
discussion of future employment or business opportunity with, a purchasing officer or member of
the governing body offering the contract;

(b) Offer, give or promise to offer or give money, a gratuity or any other thing of value to a
purchasing officer or member of the governing body offering the contract; or

(c) Solicit or obtain from an officer, employee or member of the governing body offering the
contract, any proprietary information regarding the contract.

2. A person who violates any of the provisions of subsection 1 is guilty of a gross misdemeanor
and shall be punished by imprisonment in the county jail for not more than 1 year, or by a fine of
not less than $2,000 nor more than $50,000, or by both fine and imprisonment.

(Added to NRS by 1995, 1731)

NRS 332.165 Effect of collusion among bidders or advance disclosures.

1. Any agreement or collusion among bidders or prospective bidders in restraint of freedom of
competition by agreement to bid a fixed price, or otherwise, shall render the bids of such bidders
void.

2. Advance disclosures of any information to any particular bidder which would give that
particular bidder any advantage over any other interested bidder in advance of the opening of
bids, whether in response to advertising or an informal request for bids, made or permitted by a
member of the governing body or an employee or representative thereof, shall operate to void all
proposals of that particular bid solicitation or request.

(Added to NRS by 1975, 1539)

NRS 332.175 Trade-in allowances for personal property. When purchasing personal property,
the governing body or its authorized representative may solicit and accept advantageous trade-in
allowances for personal property of the public entity which has been determined by the
governing body to be no longer required for public use, and may award any bid to the bidder
submitting the lowest net bid after deduction of such trade-in allowance.

(Added to NRS by 1975, 1539)

NRS 332.185 Sale or lease of personal property of public entity; public auctions; chapter
inapplicable to transactions regarding real property.

1. Except as otherwise provided in NRS 334.070, all sales or leases of personal property of the
local government must be made, as nearly as possible, under the same conditions and
limitations as required by this chapter in the purchase of personal property; but the governing
body or its authorized representative may sell any such personal property at public auction if it
deems such a sale desirable and in the best interests of the local government.

2. The provisions of this chapter do not apply to the purchase, sale, lease or transfer of real
property by the governing body.

(Added to NRS by 1975, 1539; A 1983, 1248)

NRS CROSS REFERENCES.

Collusion among bidders or advanced disclosures regarding purchase or lease, effect, NRS
237.020

ATTORNEY GENERAL'S OPINIONS.
School district may dispose of textbooks with no marketable value without following public auction procedures. School district may dispose of obsolete, unserviceable textbooks which have no marketable value by distributing them without charge to pupils and nonprofit organizations within district without following public auction procedures specified in former NRS 332.190 (cf. NRS 332.185). AGO 106 (12-7-1972)

NRS 332.195 Joinder or use of contracts by other local governments. Local governments and the State of Nevada may join or use the contracts of other local governments within this state with the authorization of the contracting vendor. The originally contracting local government is not liable for the obligations of the local government which joins or uses the contract.

(Added to NRS by 1975, 1539; A 1985, 357)

NRS 332.215 Commission to study governmental purchasing: Members; meetings; duties.

1. Each county of this state whose population is 100,000 or more, must be a member of the commission to study governmental purchasing which is composed of all purchasing agents of the local governments within those counties. Each county whose population is less than 100,000 may participate as a voting member of the commission. The members shall select a chairman from among their number.

2. The commission shall meet no less than quarterly or at the call of the chairman to study practices in governmental purchasing and laws relating thereto and shall make recommendations with respect to those laws to the next regular session of the legislature.

(Added to NRS by 1975, 1540; A 1979, 537; 1985, 358)

NRS CROSS REFERENCES.

"Population" defined, NRS 0.050

NRS 332.221 Provision of maintenance services and purchase of motor vehicle fuel for sale to public agencies or nonprofit corporations; regulations.

1. A governing body may provide maintenance services for vehicles which belong to, and may purchase motor vehicle fuel to sell to:

(a) Any public agency or organization which is supported by tax money; and

(b) Any private agency or organization which is incorporated as a nonprofit corporation pursuant to chapter 81 or 82 of NRS,

and which uses the vehicles and fuel in specially providing transportation to the elderly or handicapped.

2. The governing body shall establish regulations for determining the eligibility of applicants for maintenance services and fuel pursuant to this section.

3. The costs of all maintenance services and fuel provided pursuant to this section must be paid for by the agency or organization which receives the service or fuel.

(Added to NRS by 1979, 88; A 1981, 239; 1991, 1313)

NRS 332.223 Use of facilities of local government by nonprofit corporation that provides ambulance services pursuant to franchise agreement. A nonprofit corporation that provides ambulance services pursuant to a franchise agreement with a local government may obtain supplies, materials and equipment on a voluntary basis through the facilities of the local government.
NRS 332.225 Requirements of chapter unaffected by approval by governing body of application for federal grant. Approval by a governing body of an application for a federal categorical grant does not dispense with the requirements of this chapter for approval by the governing body of the letting of any contract.

(Added to NRS by 1975, 1540)
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Seminar Presentations:
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Professional Paper Title: Nevada Procurement Laws For Computer Related Items For
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