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7. Abstract

This document provides the preferred alternatives for the replacement of the Safeguards and Security systems located at the Hanford Plutonium Finishing Plant.

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PLUTONIUM FINISHING PLANT
SAFEGUARDS AND SECURITY SYSTEMS
REPLACEMENT STUDY

Prepared By

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PFP TRANSITION ENGINEERING
December 1994

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ACRONYMS AND ABBREVIATIONS

ADDS	Alarm Detection and Display System
ADM	alarm display map
ALARA	as low as reasonably achievable
AMOSS	Alarm Monitoring Operational Support System
AMS	alarm monitoring system
CAS	Central Alarm Station
CCTV	closed-circuit televideo
CDAC	communication data acquisition controller
CRT	cathode ray tube
DOE	U.S. Department of Energy
FEP	front-end processor
FTE	full-time equivalent
HVAC	heating, ventilation and air-conditioning
IAEA	International Atomic Energy Agency
ICF KH	Kaiser Engineers Hanford
I/O	input/output
IRTU	Intelligent Remote Terminal Unit
LLNL	Lawrence Livermore National Laboratories
MCC	Multiplexer Communication Center
MUX	multiplexer
NPT	Non-Proliferation Treaty
NMSS	Nuclear Material Safeguards System
PFP	Plutonium Finishing Plant
PNLS	Programmable Lonworks Network Server
POC	Patrol Operations Center

RARS	Redundant Alarm Recording System
RL	U.S. Department of Energy, Richland Operations Office
SA	Secondary Annunciation
SAS	Safeguards and Security
SDM	security door module (remote MUX)
SNM	special nuclear material
SPO	Security Police Officer
STPO	Security Transition Program Office
VSIS	Vault Safety and Inventory System
WHC	Westinghouse Hanford Company

1.0 OBJECTIVE

1.1 Background

The initial engineering study entitled Replacement Analysis for Safeguards and Security Systems of Hanford Protected Areas (WHC-SD-CP-ES-161) was conducted by the U.S. Department of Energy, Richland Operations Office (RL) Security Transition Programs Office (STPO) to evaluate the Safeguards and Security (SAS) systems. The study was released in February 1994. The STPO study identified and extensively documented the current reliability and vendor support problems of six SAS systems located at the Plutonium Finishing Plant (PFP). These SAS systems are the Alarm Detection and Display System (ADDS), the Alarm Monitoring Operational Support System (AMOSS), the Secondary Annunciation System (SA), the Multiplexer (MUX) system, the Vault Safety and Inventory System (VSIS) and the Nuclear Material Safeguards System (NMSS). Other systems that were evaluated and determined not to need upgrading or replacing included the Alarm Display Map (ADM), the closed-circuit televideo (CCTV) Switcher/Controller/Camera System, the Redundant Alarm Recording System (RARS), and the Interior/Exterior Intrusion Sensor System. The six identified PFP SAS systems are degrading and are past their respective life expectancies. No long-term spare parts are available. The study concluded that catastrophic failures of these PFP SAS systems will occur in approximately 3 years.

These failures will result in major impacts to the PFP, causing significant increases in operating costs. The PFP is expected to store Category I and/or II special nuclear material (SNM) for another 20 to 50 years. Physical security and SNM control and accountability measures are required by DOE Orders for facilities storing SNM.

The study recommended the replacement of the following security systems:

- The Alarm Detection and Display System
- The Alarm Monitoring Operational Support System
- The Secondary Annunciation System
- The alarm Multiplexer System

The study recommended the replacement of the following safeguards systems:

- The Nuclear Material Safeguards System, Material Accountability
- The Vault Safety and Inventory System

1.2 Scope

This study addresses the major topics described as follows:

- (1) Analyze the DOE Orders that drive requirements for the SAS systems. Evaluate the potential of submitting deviation requests to the minimal benefit requirements. This would help to ensure a cost-effective implementation of the selected system.
- (2) Document the risks and impacts to the facility for system failure scenarios to include the following:
 - (a) Cost of contingency measures (additional patrol force)
 - (b) As low as reasonably achievable (ALARA) Impacts
 - (c) Operational impacts
- (3) Develop alternative options with rationale for the replacement of the SAS systems (ADDS, MUX, VSIS, NMSS).
- (4) Develop evaluation criteria that will allow the selection of a preferred alternative for the ADDS, MUX, VSIS, and NMSS.
- (5) Provide a cost estimate for each of the preferred alternatives.

2.0 SUMMARY

The initial engineering study (WHC-SD-CP-ES-161) identifies the critical systems needed to support the Plutonium Finishing Plant in its mission to maintain a safe and secure storage facility for special nuclear material (SNM) for the U.S. Department of Energy (DOE). The following unanswered questions are addressed in this engineering study.

- Can DOE Orders that have "high cost / low benefit" requirements possibly be identified and waived?

An in-depth review of the DOE Orders that drive the need to maintain the Alarm Detection and Display System (ADDS), the Alarm Monitoring Operational Support System (AMOSS), the Secondary Annunciation (SA), the multiplexer (MUX) loops, the Nuclear Material Safeguards System (NMSS), and the Vault Safety and Inventory System (VSIS) is provided in this engineering study. The PFP requires these systems to comply with DOE Orders 5633.2A, 5633.3B, 5633.4 and DOE Manual 5632.1C-1. There were no requirements found to which waivers could be written.

- What are the impacts to the PFP if these systems fail and are not replaced for an extended period of time?

This study evaluated the cost to PFP of implementing manual measures to replace these systems once they fail. A risk modeling program was used to provide the minimum manpower required to implement a manual system. Patrol and Security Operations provided a more robust estimate base on empirical judgment. Considering that the SNM stored at PFP will remain for 20 to 50 years, the cost of hiring additional personnel, as much as \$7 million per year, for this length of time is not cost-effective.

The failure of the VSIS and or NMSS would result in a significant increase in manual inventories of the stored SNM items. The additional radiation exposure that would result from additional personnel performing the more frequent manual inventories would not demonstrate the "as low as reasonably achievable" (ALARA) principle. The quick inventory response required by DOE Orders could not be achieved without an automated inventory system.

The conclusion of this engineering study as to the replacement of the critical SAS systems are as follows:

Replace the ADDS, AMOSS, and SA with either the Hewlett Packard (HP) A-900 series minicomputer or a 486 personal computer (PC) system. Both the HP and PC systems are undergoing functional testing and the system that best meets the selection criteria will be chosen.

The MUX loops should be replaced with the Mason & Hanger Input/Output System.

The NMSS and the VSIS should be replaced with 486 PC systems.

The cost for this entire project has been estimated by Kaiser Engineers Hanford to be roughly \$7.2 million capital and \$6.10 million expense. Based on line item funding.

3.0 DEPARTMENT OF ENERGY (DOE) ORDERS EVALUATION

This section contains a cost/benefit analysis of the U.S. Department of Energy (DOE) Orders which dictate the requirements for the Safeguards and Security (SAS) systems. The potential of submitting deviation requests to the high cost/minimal benefit requirements was evaluated. This effort will help ensure the most cost-effective replacement alternative is developed to replace the Plutonium Finishing Plant (PFP) SAS systems.

3.1 Order Evaluation Methodology

The methodology used to evaluate the DOE orders first identified the appropriate DOE Orders that impact the SAS system. Secondly, the methodology provides a logical analysis that allows a consistent and thorough evaluation of each identified DOE Order. The descriptions of the Order selection and evaluation processes are described in this section.

3.2 Assumptions

- (1) Draft Orders shall not be evaluated.
- (2) The DOE, Richland Operations Office (RL) directives shall not be evaluated.
- (3) If unsure of an answer, choose the answer that leads to further analysis.
- (4) At a minimum, the 5630 series of DOE Order shall be evaluated.
- (5) The Vault Safety and Inventory System (VSIS), Nuclear Material Safeguards System (NMSS), and Alarm Detection and Display System (ADDs) functions are limited to the PFP. K-Basins are not included in the analysis.
- (6) A requirement that is considered too general shall not be included in the analysis.
- (7) Only the system components of the VSIS, NMSS, and ADDs that were identified in the original engineering study are considered.
- (8) Requirements that are not currently applicable to the VSIS, NMSS, and ADDs will not be evaluated further.
- (9) Category III and IV material shall not be evaluated because the affects on Category I and II special nuclear material (SNM) by elimination of VSIS, NMSS, and ADDs drives the evaluations.

- (10) Cost includes material, life cycle, maintenance, testing, installation and operation.
- (11) Backup or compensatory provisions are not factors for determining "any dependency." The purpose is to determine if a requirement has any relation to the VSIS, NMSS, or ADDS. Backup and compensating provisions are factors in Step III of the methodology for determining system impact.
- (12) Requirements for maintenance, record of maintenance, testing, and record of testing apply equally to all SAS system options.

3.3 DOE Order Identification Process (Step I)

Step I allows the development of a list of DOE Orders to evaluate and identifies the Orders that may contain requirements associated with the VSIS, NMSS, or ADDS.

Question 1 Does compliance with the DOE Order have any dependency on the VSIS (Yes/No)?

Question 2 Does compliance with the DOE Order have any dependency on the NMSS (Yes/No)?

Question 3 Does compliance with the DOE Order have any dependency on the ADDS (Yes/No)?

Result: If Questions 1, 2, and 3 are all no, then the DOE Order is not applicable and no further analysis is required.

If any of the questions are answered yes, then the DOE Order is applicable and the analysis continues to Step II of the process.

3.4 DOE Order Requirement Breakdown Process (Step II)

Step II breaks down identified DOE Orders into smaller parts or requirements that are a more reasonable size for analysis. This step also identifies specific requirements associated with the VSIS, NMSS, or ADDS.

Question 1 Can the requirement (e.g., DOE Order, chapter, section, paragraph) be analyzed more effectively if broken into parts or at a lower indenture level (Yes/No)?

If yes, break down requirement into smaller parts and analyze at the lower level, beginning at Question 1.

If no, continue to Question 2.

Question 2 Does compliance with the requirement have any dependency on the VSIS (Yes/No)?

Question 3 Does compliance with the requirement have any dependency on the NMSS (Yes/No)?

Question 4 Does compliance with the requirement have any dependency on the ADDS (Yes/No)?

Result: If Questions 2, 3, and 4 are all no, then the requirement is not applicable and no further analysis is required.

If any of the questions are answered yes, then the DOE Order is applicable and the analysis continues to Step III of the process.

3.5 Requirement Evaluation Process (Step III)

Step III Evaluates a requirement for the following:

- amount of impact or reliance of the VSIS, NMSS, or ADDS
- importance of its contribution to achieving the SAS goal
- minimum cost to comply with this requirement if the VSIS, NMSS, and ADDS were no longer operational.

Question 1 What impact does the NMSS, VSIS, and ADDS have on compliance with the requirement?

0 1 2 3 4 5 (0-least, 5-most)

Question 2 What contribution does the requirement have on achieving the SAS goal?

0 1 2 3 4 5 (0-least, 5-most)

Question 3 What is the minimum cost to be compliant with the requirement if the VSIS, NMSS, and ADDS were not operational?

Low (< \$500K capital and < \$200K annual expense)
 Medium (Between Low and High)
 High (> \$1000K capital or > \$1000K annual expense)

Question 4 Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal (Yes/No)?

3.6 DOE Order Analysis Results

The analysis logic identified 44 DOE Orders that relate to the SAS functions. Step I of the analysis logic reduced the number to eight Orders that directly impact the SAS Systems.

The cost/benefit analysis did not identify any DOE Order against which submitting a deviation request could be entertained.

Appendix A provides a list of DOE Orders reviewed. Appendix B, C, and D provide a matrix for each system showing the evaluation ratings developed by the analysis logic.

4.0 RISK IMPACT ANALYSIS

This section documents the risks and impacts to the facility for Safeguards and Security (SAS) system failure scenarios.

4.1 Alarm Detection and Display System Failure

The U.S. Department of Energy (DOE) Manual 5632.1C-1, Manual For Protection And Control Of Safeguards And Security Interests, requires that a facility storing Category I and/or II special nuclear material (SNM) have a system capable of providing timely detection and annunciation of unauthorized access to SNM storage areas.

The current system provides protection-in-depth by using perimeter intrusion detection sensors, interior/exterior door monitoring sensors and interior motion detection sensors. In addition to the sensors, closed-circuit televideo (CCTV) cameras provide the system operators with area surveillance.

The failure of the Alarm Detection and Display System (ADDS) would require that a manual means of intrusion detection be put into place. Two methods were used to try to determine the number of additional patrol posts required to make up a manual intrusion detection system for The Plutonium Finishing Plant (PFP). A computer modeling program was employed by personnel from the Security Applications Engineering, and an evaluation was made by personnel from Hanford Patrol and Security Operations.

The Hanford Patrol and Security Operations estimated the number of additional posts to be 13 if the perimeter detection and protection-in-depth were retained. The results of the computer modeling were published in the report Risk Impacts To The Plutonium Finishing Plants Safeguards And Security Systems (U), dated September 16, 1994. This report states that a minimum of 3 posts must be added to maintain minimum protection, and that the optimum number of location of additional posts would have to be determined by a series of force-on-force exercises. It also states that the effectiveness of a manual system would degrade due to fatigue and boredom.

Since each additional post would be manned 24 hours a day, each one would require the addition of 5.3 full-time equivalent (FTE) personnel. The current cost for a FTE Security Police Officer is \$100K per year. Therefore, to add 3 to 13 patrol posts for a manual intrusion detection system, it would cost PFP \$1.59M to \$6.89M per year.

4.2 Nuclear Material Safeguards System Failure

DOE Order 5633.3B Control and Accountability of Nuclear Materials, section 2.2.C.(3), requires a complete book inventory on a 3-hour notice. The PFP has 6,830 stabilized items in long-term storage. This complete inventory is therefore several hundred pages long. In addition to this report, there are two additional 30-page reports issued on a monthly basis. These reports are currently compiled on the Nuclear Material Safeguards System (NMSS) classified computer. The data for these reports are entered daily by Safeguards and the computer stores this information formatted for quick retrieval. This data is also transferred to the Oak Ridge national data base via classified communications.

Performing these inventory tasks manually would require hiring several additional full-time, Q-cleared clerks. The manual system could not comply with the DOE 3-hour turn-around requirement for the complete book inventory report. Quick response to the many ad-hoc report requests that are currently received from DOE would not be possible with a manual system.

4.3 Vault Safety and Inventory System Failure

The Vault Safety and Inventory System Failure (VSIS) performs real-time inventory and monitoring of SNM for vaults 1, 3, and 4 of the 2736-Z building. The system monitors the bulge, heat and un-authorized removal of the canisters containing the SNM material. Because these three vaults are monitored by VSIS, the bi-monthly inventory of the 5,042 items in these vaults has been waived. In addition, the VSIS provides backup capabilities for the NMSS.

To perform the inventory manually would require a minimum of two vault custodians and three Special Police Officers (SPO) about 4 hours per vault. A Health Physics Technician is also required to do the initial radiation survey before the inventory can begin.

Currently the vault custodians are above their 500 mr dose limit without doing the bi-monthly inventory in these vaults. Before the VSIS was in place, the average dose rate required to inventory each vault was about 2,500 mr.

5.0 SYSTEM DEFINITIONS

This section provides a description of each of the systems that are to be replaced.

5.1 Alarm Detection and Display System

The Alarm Detection and Display System (ADDS) records and displays critical alarm information to the system operator for assessment and disposition. This information includes the date and time the alarm was generated; the sensor identification, location, type, and class; the event number; and the associated cameras. The system also allows the operator to display information from the alarm display map (ADM), and request camera views on the closed-circuit televideo. The major components of the ADDS are as follows:

Host computers, HP 1000	System consoles
Disk and tape drives	Operator consoles
Printers	Vendor and Hanford developed software
Network communications	
Touch screens	

The Hewlett Packard components are no longer manufactured and on-site spare parts are expected to be exhausted early in the 3 to 12 year period. The limited support that is currently available from the vendor will end in 1997. The host computers, disk drives, and software are interdependent and based on the Hewlett Packard proprietary architecture, thus requiring replacement as a group.

5.2 Alarm Monitoring Operational Support System

The Alarm Monitoring Operational Support System (AMOSS) is a stand-alone system that allows software and hardware upgrades to be developed and operators to be trained without impacting the operational security system. The software revision changes are first tested using the AMOSS before they are installed on the Plutonium Finishing Plant (PFP) ADDS and the secondary annunciation system at the Patrol Operations Center (POC). The major components of the AMOSS are as follows:

Host computers, HP1000	Firmware development system
Front End Processors (FEP)	Printers
Disk drives	ADM computers
Multiplexers	Hanford developed software
Security door module	Tape drive
Touch screens	

The Hewlett Packard components of the system have the same problems as the ADDS. The components are no longer manufactured and on-site spare parts are

expected to be exhausted early in the 3 to 12 year period. The limited support that is currently available from the vendor will end in 1997. The host computers, disk drives, and software are interdependent and based on the Hewlett Packard proprietary architecture, thus requiring replacement as a group.

5.3 Secondary Annunciation

The Secondary Annunciation (SA) system provides a second indication of a PFP alarm such that a response can be initiated in the event the PFP Primary Alarm Station is compromised. This function is a requirement of DOE Manual 5632.1C-1. The SA System is located at the POC. The major components of the SA are as follows:

Host computer, HP 1000	Operator consoles
Disk and tape drives	Network communications
Printers	Microwave network
System consoles	Hanford developed software
Touch Screens	

The Hewlett Packard components of this system have the same problems as the ADDS and AMOSS. The components are no longer manufactured and on-site spare parts are expected to be exhausted early in the 3 to 12 year period. The limited support that is currently available from the vendor will end in 1997. The host computers, disk drives, and software are interdependent and based on the Hewlett Packard proprietary architecture, thus requiring replacement as a group.

5.4 Multiplexer Loop

The multiplexer (MUX) loop consists of nine MUXs that monitor and process alarm information from security, safeguards, fire and criticality sensors. There are approximately 700 sensors currently monitored at the PFP facility and 50 sensors in the K-Basin areas. The MUXs communicate the alarm information to the ADDS based on commands it receives from the ADDS. Dual communication paths are provided as required by the DOE Manual 5632.1C-1 from the multiplexers to the dual FEPs. The FEPs and the communication data acquisition controller (CDAC) control the communications between the MUXs and the ADDS. The MUX provides the required level of sensor line supervision that allows for the detection of attempts to compromise or tamper with the sensor signal cables. Each MUX has an Uninterruptable Power Supply that provides about 8 hours of secondary power.

The major components of the MUX System are as follows:

FEPs	Security door modules
MUXs	Hanford developed software
CDAC	

The manufacturer of the MUX loop components, We Fix Things (WFT), no longer markets the MUX, CDAC, and FEP components. The spare parts on-site will be exhausted in the 3 to 12 year period, and key parts required to maintain the components will be unavailable. New components are manufactured on an as-needed basis and are long lead-time and high-cost items.

5.5 Vault Safety and Inventory System

The Vault Safety and Inventory System (VSIS) is a computer system designed to automate material surveillance and to monitor canisters containing nuclear material stored in Vaults 1, 3, and 4 of the 2736-Z building. The system has the capacity to monitor over 6,800 canisters for presence, identification, temperature, and bulge detection. The system also provides movement authorization and inventory reconciliation. The major components of the VSIS are as follows:

Host computer, PRIME 2350	System console
Micro computers, 6809 Motorola	Canister monitoring units
Communication devices	Vendor and Hanford developed software
Printers	
Disk drives	

The primary computer vendor for the VSIS is out of business. The successor company is experiencing financial difficulties and is actively marketing services away from the PRIME platform. Vendor application software maintenance (except PRIMOS) is no longer available. Parts and service are not expected to be available in the 3 to 12 year period. On-site personnel with the skills necessary to maintain the system are seeking employment elsewhere. Replacement personnel are difficult to find and require extensive training.

5.6 Nuclear Material Safeguards System

The Nuclear Material Safeguards System (NMSS) is a dual database system that maintains the official inventory and transaction records of Westinghouse Hanford Company nuclear materials. This system provides data to the Oak Ridge, Tennessee database and various reports to the U.S. Department of Energy, Richland Operations Office and Westinghouse. The major components of the NMSS are as follow:

Host computer, PRIME 9755	Printers
Micro Computers	System Console
Communication devices	Archival system worm drive

Disk and tape drives

Vendor and Hanford developed software

The problems with the NMSS are identical to the VSIS. The primary computer vendor is out of business. The successor company is experiencing financial difficulties and is actively marketing services away from the PRIME platform. Vendor application software maintenance (except PRIMOS) is no longer available. Parts and service are not expected to be available in the 3 to 12 year period. On-site personnel with the skills necessary to maintain the system are seeking employment elsewhere. Replacement personnel are difficult to find and require extensive training.

6.0 ALTERNATIVES

This section describes the replacement alternatives for the Safeguards and Security (SAS) systems. The preferred replacement alternative will be chosen for the SAS systems by evaluating them against a set of criteria that include costs, schedule, functions, and flexibility.

6.1 Security Systems Replacement Alternatives

The security systems consist of the Alarm Detection and Display System (ADDS), Alarm Monitoring Operational Support System (AMOSS), and the Secondary Annunciation (SA) System. The same equipment requires replacement for the ADDS, AMOSS and SA Systems. The following are descriptions of alternatives that were judged feasible for the replacement of the security systems.

6.1.1 ARGUS System

This alternative would replace the existing security system with a system designed by Lawrence Livermore National Laboratories (LLNL) and now marketed by Martin Marietta. This system was designed to meet the high-end security requirements of a Category I and II special nuclear material (SNM) storage facility. A number of meetings and telephone conversations with LLNL and Martin Marietta have been conducted to collect the following information.

ADVANTAGES

- (1) The ARGUS System will meet the high-end functional requirements for the Plutonium Finishing Plant (PFP) facility.
- (2) The ARGUS system is used at other U.S. Department Of Energy (DOE) Owned facilities.

DISADVANTAGES

- (1) Cost of the ARGUS System is high. Based on other ARGUS installations and interviews with LLNL, the cost is estimated to be about \$2 million for the PFP facility.
- (2) Proprietary software could not be modified or controlled by Westinghouse Hanford Company (WHC) Safeguards and Security.
- (3) System deficiencies resulting from changes in facility configuration, procedures, and/or policies would be difficult to correct without providing the vendor sensitive knowledge of the deficiency.
- (4) This alternative would require extensive construction to accommodate the consoles and equipment at the PFP, Patrol Operations Center (POC), and AMOSS sites.

COSTS

The estimated cost to implement the ARGUS equipment to replace the PFP ADDS, the AMOSS, and the SA System is approximately \$2 million. This cost is based on other DOE site ARGUS installations. It was not possible to achieve a more accurate estimate through telephone conversations. The LLNL and Martin Marietta would like to preform an in-depth study of the PFP facility before they provide a more detailed cost estimate.

6.1.2 MICON System

This alternative would replace the existing security systems by expanding the existing MICON¹ Process Control System at the PFP facility. The MICON system is currently being installed to monitor and control the heating, ventilating, and air-conditioning (HVAC) System for the PFP facility.

ADVANTAGES

- (1) Costs of the system would be shared with the other infrastructure systems at the PFP facility.
- (2) Existing Alarm Monitoring System would remain operational until all sensors are transferred to the MICON System.

DISADVANTAGES

- (1) The MICON System has no capability of interfacing with the existing closed-circuit televideo (CCTV) system.
- (2) The MICON database was not designed to log textual alarm and operator activity transactions required by DOE Orders. The existing database stores analog information used for strip chart recording.
- (3) The MICON System printer logging functions are limited and currently have no reporting capability of the type required by DOE.
- (4) The files that the MICON System uses for data history are intended for analog information to be used for strip chart type of records.

COST

A cost estimate for using the MICON to replace the security systems was not compiled because of the inability of the MICON System to perform the critical functions indicated Appendix E.

¹ MICON is a trademark of Powell Process Systems Inc.

6.1.3 Graphic Link Alarm Monitoring System

This alternative would replace the existing security system with a Personal Computer Based Alarm Monitoring System (PC-AMS) by Graphic Link. This system would interface with the existing CCTV system and multiplexer loop and replace the HP computers and associated consoles, the disk and tape drives, the ADM and its components, the FEP and the CDAC.

ADVANTAGES

- (1) Personal computer (PC) based software modules could be used.
- (2) Graphical user interface could be used.
- (3) The PC-AMS interfaces with existing security system sub-systems.
- (4) This system has the capability of importing Area and facility graphic maps.
- (5) Eliminates current problems with existing FEP system.
- (6) Future upgrades (faster PCs)
- (7) Graphic Link is installed at several industrial and high security sites, including several federal and state prisons. Sandia recommended Graphic Link in a study it performed for a Air Force customer in 1992.

DISADVANTAGES

- (1) Proprietary software could not be modified or controlled by WHC Safeguards and Security.
- (2) System deficiencies resulting from changes in facility configuration, procedures and/or policies would be difficult to correct without providing the vendor sensitive knowledge of the deficiency.
- (3) System operators will require retraining in the use of the new system.
- (4) System managers will require retraining to provide the required site-specific data changes and incorporate Hanford site-specific graphics.

COSTS

The estimated cost to implement the Graphic Link PC-Based Alarm Monitoring System (PC-AMS) equipment to replace the PFP ADDS, the AMOSS, and the SA System is approximately \$960k. The estimate includes the design, procurement, engineering, and installation costs. This cost includes operator, system manager, and maintenance training. See Appendix I for Kaiser cost estimate for the Graphic Link System alternative.

6.1.4 New Hewlett Packard Platform

This alternative would replace the existing Hewlett Packard (HP) 1000 F series computers and disk drives with new HP equipment. The other subsystem such as the CCTV System, alarm display map (ADM), and multiplexer (MUX) loop will remain the same.

ADVANTAGES

- (1) The conversion of the Hanford application programs could be accomplished in a relatively short period. Tests have been performed showing that most programs can be converted by recompiling and linking them on a new generation computer.
- (2) Operators are trained in the existing operator interface to the ADDS system and, therefore, retraining is unnecessary. Training required will be minor (i.e. new boot procedure).
- (3) Analysts are knowledgeable in the system and can maintain the system at the same level as the current system.
- (4) WHC would have control over the software and any future modifications.
- (5) The new generation computers are faster and have more capacity than the current 1000 F series computers. The extra speed and capacity would allow future enhancements that have not been possible in the past due to the limitations of the current system.
- (6) HP equipment has proven reliability.
- (7) The existing security system software is a known quantity and provides the high level security functions required by DOE Orders as proven by the successful completion of numerous DOE inspection and evaluation audits.
- (8) Implementation costs would be minimal as no console or equipment racks aside from the HP computer racks would require reconfiguration.
- (9) Sole source would be justified because the existing application software was designed to operate on HP equipment.

DISADVANTAGES

- (1) Initial hardware costs would be high (about \$500k to replace the PFP, AMOSS, and POC computers).
- (2) Some modification of the existing application software may be required to work with the new HP generation operating system. The modifications are expected to be minimal and not difficult to perform.

- (3) The existing HP system uses a specialized driver to communicate with the multiplexer loop. Some modification may be required.
- (4) The cost of equipment would require capital monies.

COSTS

The estimated cost of implementing the new generation HP computer equipment to replace the PFP ADDS, the AMOSS, and the SA is approximately \$710k. See appendix H for the ICF-KH estimate for the HP computer implementation costs.

Project costs based on line item funding such as program management, project documentation preparation, specifications for bids, etc. are provided in the total project cost estimate by ICF-KH for the STPO replacement analysis WHC-SD-CP-ES-161 Rev.0. See Appendix J for project costs.

6.2 Multiplexer Loop Replacement Alternatives

The following are descriptions of alternatives that were judged feasible for the replacement of the MUX loop at the PFP facility.

6.2.1 LONWORKS System

The LONWORKS multiplexer is developed by Intelligent Energy Corp. of Lakewood, Colorado.

The LONWORKS system is comprised of the following hardware/software:

Programmable LONWORKS Network Server (PLNS) - This is a PC-AT computer compatible peripheral card. The PLNS will act as the MUX interface, replacing the existing front end processor (FEP). The PLNS also provides an RS-485 communications path to the PC/104 adapters and flexible input/output (I/O) controllers, used to replace the existing MUXs.

PC/104 Adapter - The PC/104 serves as a network node that provides the interface between the PLNS and the flexible I/O control modules. For each PFP MUX that is replaced, one PC/104 Adapter will be required.

Flexible I/O Control Module - The flexible I/O module monitors four analog inputs and controls four relay outputs. Multiple I/O control modules can be connected to a PC/104 Adapter. The PFP facility currently has about 700 sensors and the 100K basins have about 50 sensors. About 188 flexible I/O control modules would be required.

ADVANTAGES

- (1) This system appears to have the functionality required to replace the MUXs at PFP.

- (2) The modular design makes this system flexible and easy to expand.

DISADVANTAGES

- (1) The cost of the flexible I/O module per analog input and output channels would be high.
- (2) A new flexible I/O module would have to be installed for every four sensors added to system.
- (3) The MUX interface programs in the alarm monitoring host computer will have to be modified to work with LONWORKS.

COSTS

The estimated equipment cost for the LONWORKS alternative is \$107.4K. See Appendix F for hardware/software cost breakdown of using the LONWORKS system to replace the PFP MUX Loop.

Project costs such as program management, project documents preparation, specifications for bids, etc. are provided in the total project cost estimate by Kaiser for the STPO replacement analysis WHC-SD-CP-ES-161 Rev.0.

6.2.2 Mason & Hanger Input/Output System

The I/O System was developed by Mason & Hanger National, Inc., located in Huntsville, Alabama. The system is designed to fully integrate with the Graphic Link, Version 5.39 and later, or the system can be interfaced with existing Hewlett Packard system with minimal software development. The software necessary to configure and operate the I/O System is provided with the hardware.

The I/O system hardware consists of input and output boards, each of which will support 32 points, and a controller card containing the system logic functions. Each controller card is capable of supporting a total of four I/O Boards, in any combination of Input or Output Cards, up to a maximum capacity of 128 points per controller card. Multiple controller cards can be interfaced as necessary to support up to 32,000 supervised alarm points for each Graphic Link or Hewlett Packard system.

Individual alarm points can be configured as follows:

Mode Control - Each alarm point may be set to any of three modes: secure, access and inactive.

Extended Tamper - If the circuit values of supervised alarm points change beyond predetermined parameters, then an alarm specific to the condition (short, open, or value change) will be generated.

ADVANTAGES

- (1) The modular design makes this system flexible and easy to expand.
- (2) This system appears to have the functionality required to replace the MUXs at PFP.
- (3) Existing HP alarm monitoring computers can communicate with the I/O system with minimal program modification.
- (4) Mason & Hanger has designed the I/O system to fully integrate with Graphic Link PC Based alarm monitoring system.

DISADVANTAGES

The MUX interface programs in the alarm monitoring host computer will have to be modified to work with the Mason & Hanger I/O System.

COSTS

The estimated equipment cost for the Mason & Hanger alternative is \$45.5K. See Appendix G for hardware/software cost breakdown of using the Mason & Hanger I/O System to replace the PFP MUX loop.

Project costs such as program management, project documentation preparation, specifications for bids, etc., are provided in the total project cost estimate by ICF KH for the STPO replacement analysis, WHC-SD-CP-ES-161 Rev.0.

6.3 Nuclear Material Safeguards System Alternatives

The following are descriptions of alternatives that were judged feasible for the replacement of the Nuclear Material Safeguards System (NMSS) at the PFP facility.

The alternatives for the NMSS listed in WHC-SD-CP-ES-161 Rev. 0 resulted in the following alternatives.

6.3.1 Do Nothing

The first alternative represents use of the existing system for varying lengths of time, then using manual techniques beyond that point. It was decided that these alternatives are equivalent since the stockpile approach equals elimination of the system and going to manual reporting at a later time. The manual approach to accounting and reporting was a much more viable alternative prior to the assumption that the PFP would come under increasing International Atomic Energy Agency (IAEA) inspections. Because IAEA expects rapid turnaround on data requests, this option is no longer considered viable. Extending the life of the system to a period where extended downtime is expected is likewise not acceptable. Delay in granting inspection requests is

interpreted by IAEA as attempting to cover up violations of the Non-Proliferation Treaty (NPT).

ADVANTAGES

- (1) There would be minimum capital cost.
- (2) No engineering changes would be required.
- (3) There is a possibility that new technology or mission may eliminate the need for the system.

DISADVANTAGES

- (1) Operating costs will continue to rise.
- (2) Vendor support may not be available.
- (3) Replacement parts may not be available.
- (4) The possibility of total system failure and inability to recover from a system failure increases with time.

COST

Approximately \$200,000 to \$300,000 mat be required to stockpile equipment

6.3.2 Migrate to New Platform

Migrating the system to a new platform is not considered a viable alternative, since a major problem with the existing system is the antiquated, increasingly patched software and the difficulty in finding qualified software engineers willing to learn (approximately 6 to 12 months) software that is viewed as being out-of-date.

With the new hardware platforms available, software conversion will be the major expense since much of the data-base structure and security is linked to the proprietary Prime Computer Corporation software.

ADVANTAGES

- (1) Vendor support would be available (hardware and software).
- (2) The hardware is considered reliable.
- (3) The operator interface may be retained.
- (4) Operating costs would be lower.

DISADVANTAGES

- (1) Professional development problems still exist due to the retention of the same application software.
- (2) The initial cost to procure equipment and convert software would be high.
- (3) The current software (Hanford application) is not flexible.

COST

Capital line item is estimated to cost \$3 million to \$4 million.

6.3.3 Integrate with Another System

Integrating with another system was deemed impractical since no system exists that could support the NMSS accounting. The main problem in integrating the NMSS with another system is the classification of the NMSS and the Level III quality requirements.

ADVANTAGES

- (1) This alternative could reduce capital/expense costs of system replacement.
- (2) This alternative could reduce operating costs.
- (3) The reuse of some system/application software may be possible.

DISADVANTAGES

- (1) There is no existing database systems to support the host computer.
- (2) The host system and network would have to be a classified system.

COST

The estimated cost would be greater than \$1 million.

6.3.4 Replace Hardware and Software

Replacing the hardware and software was deemed to be the most desirable alternative. This will provide new hardware (microcomputer) and software platforms that can be upgraded indefinitely in the existing microcomputer environment. This environment provides a large user base for both hardware and software manufacturers for a considerable period of time. This user base further provides a large amount of transportability across hardware brands and

limited transportability across software brands. Additionally, the hardware and applications software is relatively inexpensive because of the wide distribution of both.

ADVANTAGES

- (1) Increased reliability, reduced maintenance requirements.
- (2) This alternative would provide better vendor support.
- (3) This alternative would provide better internal (onsite) support.
- (4) This alternative would provide increased flexibility.
- (5) This alternative would reduce operating costs

DISADVANTAGES

- (1) This alternative would require a long lead-time to develop the application software.
- (2) The initial cost to procure equipment and convert software would be high.
- (3) All the application software would need to be customized.
- (4) This alternative may require extensive personnel training.
- (5) This alternative may require extensive QA documentation.

COST

The estimated cost would be approximately \$3.5 million (based on LANMAS example).

6.4 Vault Safety Inventory System Alternatives

The following are descriptions of alternatives that were judged feasible for the replacement of the NMSS at the PFP facility.

The combining of alternatives for the VSIS listed in WHC-SD-CP-ES-161 Rev.0 resulted in the following alternatives.

6.4.1 Do Nothing

The first alternative represents use of the existing system for varying lengths of time, then using manual techniques beyond that point. It was decided that these alternatives are equivalent since funding cycles now cause the do nothing and stockpile approaches to equal elimination of the system and

going to manual surveillance. Manual surveillance of the SNM now under VSIS would create greatly increased manpower costs and radiation dose. Dose would be expected to increase by orders of magnitude.

ADVANTAGES

- (1) This alternative would require no initial costs.
- (2) No engineering changes would be required.
- (3) There is a possibility that new technology or mission may eliminate the need for the system.

DISADVANTAGES

- (1) Operating costs will continue to rise.
- (2) Vendor support may not be available in the near future.
- (3) Replacement parts may not be available in the near future.
- (4) There is the possibility of total system failure and the inability to recover from system failures increases with time.

COST

It is estimated that the cost to stockpile equipment would be approximately \$200,000 to \$300,000.

6.4.2 Migrate to New Platform

Migrating the system to a new platform is not considered a viable alternative, since a major problem with the existing system is the antiquated software and the difficulty in finding qualified software engineers willing to learn (approximately 6 to 12 months) software that is viewed as being out-of-date. With the new hardware platforms available, software conversion will be the major expense.

ADVANTAGES

- (1) The vendor support would be available for a new system. (hardware and software).
- (2) The system would be designed to retain the current functionality.
- (3) The new system would have more reliable hardware than the existing system.

- (4) The new system could be designed to retain same operator interface (less training).
- (5) A more reliable system would reduce operating cost.

DISADVANTAGES

- (1) Professional development problems still exist due to the retaining the same application software.
- (2) There is a possible interface problem to existing data acquisition equipment (Motorola central processing unit).
- (3) The initial cost to procure equipment and convert software would be high.

COST

The estimated cost would be \$2 million to \$3 million, based on line item funding.

6.4.3 Integrate with Another System

Integrating with another system was deemed impractical since no system exists at PFP to support the VSIS surveillance operations. With the drastic downsizing of computer equipment along with increases in the power of the smaller computers, the practicality and desirability of this option is questionable.

ADVANTAGES

- (1) This alternative could reduce capital/expense costs of system replacement.
- (2) This alternative could reduce operating costs.
- (3) The reuse of some system/application software may be possible.

DISADVANTAGES

- (1) There is no existing database systems to support the host computer.
- (2) The host system and network would have to be a classified system.

COST

The estimated cost is greater than \$1 million.

6.4.4 Replace Hardware and Software

A document of alternatives, stating the costs of various functions that were assumed by the then proposed VSIS, lists exposure costs of the manual system. Document SD-339-ES-001 lists 4.1 man-rem and 600 staff-hours per inventory. Bulge checks were determined to cost 0.82 man-rem and 20 manhours per monthly bulge check. The study found a total of 34.4 man-rem per year. The neutron portion of the dose makes up one-half to two-thirds of the dose with most of the remaining dose coming from a weak gamma. A factor of 0.6 was applied to the readings to allow for the use of lead aprons which are effective only against the gamma. A dose of approximately 21 man-rem can be assumed to be the annual dose. At a dose of 750 mrem per person, 27.5 people would exceed dose limits each year performing inventories and bulge checks. (This assumes that personal dose would be authorized to exceed the 500 mrem goal set by WHC.) The dose does not include the exposure received for transport and measurement of SNM and other activities such as maintenance of the vaults.

ADVANTAGES

- (1) Increased reliability, reduced maintenance requirements.
- (2) This alternative would provide better vendor support.
- (3) This alternative would provide better internal (onsite) support.
- (4) This alternative would provide increased flexibility.
- (5) This alternative would reduce operating costs

DISADVANTAGES

- (1) This alternative would require a long lead-time to develop the application software.
- (2) The initial cost to procure equipment and convert software would be high.
- (3) All the application software would need to be customized.
- (4) This alternative may require extensive personnel training.
- (5) This alternative may require extensive QA documentation.
- (6) Personnel would receive an increase in exposure during installation.

COST

The estimated cost for this alternative is approximately \$2 million.

7.0 EVALUATION CRITERIA

The following criteria will be used to determine the preferred alternative for the replacement of each Safeguards and Security (SAS) System. Each criterion is assigned a weight factor according to its perceived importance. The preferred alternative is determined by grading the alternatives against the criteria. The preferred alternative is the one that receives the highest grade.

Safety impacts	Safety includes impacts to implement the system or PFP operations.
DOE compliance	Compliance with DOE Orders for Safeguards and Security Systems for Category I and II Special Nuclear Material Storage facilities.
Immediate cost	These costs include hardware/software and installation costs.
Long term cost	These costs include maintenance and operator training.
Schedule to implement	Implementation includes the time and effort to install the system at the PFP facility.
Availability	The availability of the system hardware/software.
Flexibility	The ability of the system to accommodate future enhancements.
Functionality	This includes the ability of the system to perform the critical functions required for Category I and II special nuclear material storage facilities.

See Appendix J for a matrix of criteria versus system evaluated.

8.0 PREFERRED ALTERNATIVES

8.1 Security Systems Replacement Alternative

This study has eliminated two of the four alternatives for replacing the Plutonium Finishing Plant (PFP) Alarm Detection and Display System (ADDS).

- The ARGUS System was judged to be too costly and was a more sophisticated system than is needed at the PFP facility.
- The existing MICON Process Control System currently in use at PFP cannot provide the critical functions required for the replacement of the ADDS.
- The Hewlett Packard "A" series computer platform and the personal computer (PC-) Based Graphic Link Alarm Monitoring System (AMS) remain feasible alternatives. Both of these alternatives are being tested, and a determination will be made based on critical function performance and implementation cost.

The current concerns with the Hewlett Packard "A" series computer is whether or not the existing application programs can operate on the new computers and the cost effectiveness of installation as compared to the Graphic Link System. Initial testing started in November 1994 and many of the existing programs modules have been successfully transported to the new "A" series computer. Additional testing is required to ensure that the remaining programs can be transported successfully. The cost of the Hewlett Packard equipment is expected to be higher than the PC-AMS equipment, but the cost of installing the Hewlett Packard equipment should be significantly lower. The new Hewlett Packard equipment will provide greater flexibility and expandability while retaining all of the functions required for the successful completion of the U.S. Department Of Energy (DOE) inspection and evaluation audits. Operator retraining will not be required and existing configuration controls will not be affected if this alternative is selected.

- The PC-based AMS by Graphic Link has demonstrated many of the functions required for the PFP security system. The cost of the Graphic Link system equipment will be less than that of the Hewlett Packard computers. The implementation costs of the PC-based system may be considerably higher than the Hewlett Packard computers. The Graphic Link system will replace the majority of the equipment in the operator consoles as well as the system computers. A redesign of the operator consoles will be required. Initial testing started in April 1994 and many of the existing functions have been successfully demonstrated. A concern still exists that a few remaining critical functions may be difficult or

impossible to demonstrate. Functions will be demonstrated by the end of January 1995. These functions include the level of redundancy equal to the existing PFP security system, alarm and operator activity database archiving, and system reliability (system up time). The Graphic Link software program "History" will provide the activity database. The PFP Graphic Link system will be one of the first field tests for this program.

8.2 Multiplexer Loop Replacement Alternative

The Mason & Hanger input/output (I/O) System is judged to be the best alternative based on the evaluation criteria matrix of Appendix J.

The modular design makes this system flexible and easy to expand.

This system seems to have the functionality required to replace the multiplexers (MUX) at PFP.

Existing alarm monitoring computers can communicate with minimal program modification.

The system is designed to fully integrate with Graphic Link, or the system can be interfaced with the existing Hewlett Packard system with minimal software development.

The software necessary to configure and operate the I/O System is provided as part of the hardware costs.

The estimated equipment cost for the Mason & Hanger alternative is \$45.5K.

See Appendix G for hardware/software cost breakdown of using the Mason & Hanger I/O system to replace the PFP MUX loop.

Project costs such as program management, project documentation preparation, specifications for bids, etc., are provided in the total project cost estimate by Kaiser Engineers Hanford for the Security Transition Program Office (STPO) replacement analysis WHC-SD-CP-ES-161 Rev.0. This cost estimate is based on line item funding.

8.3 Nuclear Material Safeguards System Alternative

This section presents the proposed hardware and software platform upon which the Nuclear Material Safeguards System (NMSS) will reside. It contains the specific hardware and software, the associated costs, and the mode of implementation. The replacement implementation will span over a three year period. Details of the NMSS replacement are provided in WHC-SD-GN-ES-20012, Rev. 0 *Feasibility/Alternatives Study for the Planned Replacement of Nuclear Material Safeguards System (NMSS)*.

8.3.1 Hardware and Software Platform Replacement

In place of the PRIME 9755 host computer, PC-486 computers will be used. These computers will operate on a limited access file server. The NMSS functionality will be developed on a Paradox platform supporting up to six concurrent users. The new system will be tested in parallel with the existing NMSS for up to six months to ensure that the NMSS functionality is retained.

8.3.2 Cost Estimates and Implementation

The total cost estimate is \$885K over a three year period and includes

- Hardware/software cost: \$267.5K

This includes computer hardware, associated software and application development.

- Implementation Cost: \$617.5K

This includes network cabling setup, programmer support, maintenance contract and training.

The cost estimates are based on the following assumptions:

- The cost estimates are based on 1994 constant dollars; no contingency and out-year escalation factors are included.
- One analyst is required to maintain the existing NMSS and two analysts are required to perform program development for the new system over 2.5 years.
- Two computer networks will be maintained concurrently during the new system development and parallel testing for a six month period.

8.3.3 LANMAS

At the present time, DOE is sponsoring the development of a generic nuclear material accountability system that may be used DOE site-wide. Using this approach, hardware and software might be acquired as an alternate preferred concept for the NMSS replacement study. Because costs for both hardware and software (conversion of the core design to site-specific Hanford needs) are estimated to be higher than the alternate described above (i.e., \$1,228K compared to \$885K) and completion of the LANMAS core design is scheduled for late fiscal year 1995, this option may be eliminated from further consideration. In the meantime, however, WHC Safeguards continues to follow development of the core design for possible implementation at Hanford.

8.4 Vault Safety Inventory System Alternative

This section presents the existing Vault Safety and Inventory System (VSIS) configuration, the proposed replacement system configuration, the associated components, the costs of the proposed system, and the mode of implementation. The replacement implementation will span over a 3 year period.

8.4.1 Existing Configuration

Figure 8-1 shows the configuration of the existing VSIS, as described in Section 5.5. The core of the system consists of the host computer, PRIME 2350, and the microcomputers, Motorola 6809. These, and their associated software, are the critical components no longer being manufactured, and are in need of replacement. Figure 8-1 also indicates the interface supports required of the VSIS.

Figure 8-1. Vault Safety Inventory System (VSIS) - Existing.

8.4.2 Replacement Configuration

Figure 8-2 shows the configuration of the proposed VSIS replacement system. Those portions of the hardware that require replacement are indicated with dash-lined figures. The system replacement espouses cost-effectiveness

and flexibility. It preserves the existing system layout and, thus, aids understanding of the system.

Figure 8-2. Vault Safety Inventory System (VSIS) - Replacement.

8.4.3 Hardware and Software Platform Replacement

In place of the host computer, PRIME 2350, a PC-486 real-time, programmable interrupt, large-capacity server will be used. The server will operate on a limited access network. The Motorola 6809 microcomputers will be replaced by PC-486's. The associated hardware components will also need to be replaced. These include such components as Kludge cards, concentrator cards, controller cards and system power supplies.

Software requirements include application software, data acquisition software, and system software. Off-the-shelf software will be utilized wherever possible. Custom-developed software and software conversion will be kept to a minimum.

The VSIS functionality will be developed to support the interface requirements as shown in Figure 8-2. The new system will be tested in parallel with the

existing VSIS for up to six months to ensure that the VSIS functionality is retained.

8.4.4 Cost Estimates and Implementation

The total cost estimate is \$1,475K over a 3-year period and includes the following:

- Concentrator replacement modules: \$122K
 - Hardware cost: \$10K

This includes 42 concentrator cards, 9 controller cards, and 9 racks.

 - Implementation Cost: \$112K

This includes removal, installation, and general engineering support.
- Motorola replacement modules: \$213K
 - Hardware Cost: \$45K

This includes 4 bus-compatible 486's to replace Motorola, 4 Kludge cards (3 PIA, memory, and address generator), and miscellaneous hardware parts. Also included are the 4 canister monitoring units (CMU) power supplies.

 - Implementation Cost: \$168K

This includes removal, installation, electronic engineering support, and data acquisition software support.
- PRIME 2350 Replacement Modules: \$1,140K
 - Hardware Cost: \$65K

This includes new work stations/peripherals and commercial software.

 - Implementation Cost: \$1,075K

This includes support for data conversion software packages, applications software, and software/Quality Assurance/testing documentation.

The cost estimates are based on the following assumptions:

- The cost estimates are based on 1994 constant dollars; no contingency and out-year escalation factors are included.
- One analyst is required to maintain the existing VSIS and two analysts are required to perform program development for the new system over 2.5 years.
- Two computer networks will be concurrently maintained during the new system development and parallel testing for a six month period.

9.0 PROJECT COST ESTIMATE

LINE ITEM APPROACH

Kaiser Engineers Hanford provided a detailed cost estimate for a project to accomplish the Safeguards and Security (SAS) systems upgrades recommended in WHC-SD-CP-ES-161, Rev. 0, Replacement Analysis for Safeguards and Security Systems of Hanford Protected Areas. This estimate is included as Appendix K to this study. These upgrades included replacement of the Nuclear Material Safeguards System (NMSS), replacement of the Vault Safety and Inventory System (VSIS), installation of a remote surveillance system, installation of an item monitoring system, replacement of Alarm Detection and Display System (ADDS), replacement of the Alarm Monitoring Operational Support System (AMOSS), replacement of the Secondary Annunciation (SA) System, and replacement of the Multiplexer (MUX) loops.

This engineering study has validated the need to replace the MUX loops and the NMSS, VSIS, ADDS, Secondary Annunciation, and AMOSS computers. The installation of a remote surveillance system and the installation of an item monitoring system were not validated in this study as they are not required to maintain the current state of SAS systems operations. This study was prepared to address the urgently required SAS upgrades. Any future expansions of SAS systems will be addressed in future engineering studies.

The costs in Appendix K were calculated in fiscal year 1994 dollars, escalation costs were added, and 30% contingency costs were added. The total project estimate was \$9.83 million capital and \$7.73 million expense. A request for the combined \$17.56 million for fiscal year 1998 funding has been submitted by the Plutonium Finishing Plant (PFP).

The portion of this estimate which applies to the security system upgrades was calculated in fiscal year 1994 dollars to be \$3.15 million of capital monies and \$1.48 million of expense monies. With contingency and escalation factors included, the expected cost for the security upgrades is \$5.19 million capital and \$2.24 million expense. This is a baseline estimate only.

The portion of this estimate which applies to the safeguards system upgrades were calculated in fiscal year 1994 dollars to be \$2.84 million of capital monies and \$3.65 million of expense monies. Because the work to install a remote surveillance system and an item monitoring system has been descoped, these costs can be descoped from the estimate (see Appendix K, work breakdown structure line numbers 542, 544, 642 and 644). The revised estimate for the safeguards system upgrades in fiscal year 1994 dollars is \$1.23 million of capital monies and \$2.55 million of expense monies. With escalation and contingency factors included, the expected cost is \$2.01 million capital and \$3.86 million expense.

The best estimate that can be made at this time for the entire project is \$4.38 million capital and \$4.03 million expense in fiscal year 1994 dollars. This equates to \$7.20 million capital and \$6.10 million expense with

escalation and contingency factors included. This combined cost of \$13.30 million is a reduction of \$4.26 million from the request for funding already submitted by PFP.

10.0 REFERENCES

Risk Impacts To The Plutonium Finishing Plants Safeguards And Security Systems (U)

WHC-SD-CP-ES-161 Rev.0, Replacement Analysis for Safeguards and Security Systems of Hanford Protected Areas

WHC-SD-GN-ES-20012 Rev.0, Feasibility / Alternatives Study for the Planned Replacement of Nuclear Material Safeguards System (NMSS)

WHC-SP-0421, Evaluation Criteria for Security Alarm Monitoring System Software

DOE Order 5633.2A, Control and Accountability of Nuclear Materials: Responsibilities and Authorities

DOE Order 5633.3B, Control and Accountability of Nuclear Materials

DOE Manual 5632.1C-1, Manual for Protection and Control of Safeguards and Security Interests

Federal Specifications W-A-450C, Interior Sensors and Components

APPENDIX A DOE ORDER CANDIDATE LIST

DOE ORDER	TITLE	ISSUED	VSIS	NMSS	AMS	Comments
DOE N 5630.3A	Protection of Departmental Facilities Against Radiological and Toxicological Sabotage	06/28/93	N	N	N	Not Applicable
DOE 5630.8A	Safeguarding of Naval Nuclear Propulsion Information	07/31/90	N	N	N	Not Applicable
DOE 5630.11A	Safeguards and Security Program	12/07/92	N	N	N	Not Applicable
DOE 5630.12.A	Safeguards and Security Inspection and Assessment Program	06/23/92	N	N	N	Not Applicable
DOE 5630.13A	Master Safeguards and Security Agreements	06/08/92	N	N	N	Not Applicable
DOE 5630.14A	Safeguards and Security Program Planning	06/09/92	N	N	N	Not Applicable
DOE 5630.15	Safeguards and Security Training Program	08/21/92	N	N	N	Not Applicable
DOE 5630.16A	Safeguards and Security Acceptance and Validation Testing Program	06/03/93	N	N	N	Not Applicable
DOE 5630.17	Safeguards and Security (S&S) Standardization Program	09/29/92	N	N	N	Not Applicable
DOE 5631.1A	Security Education Program	12/22/86	N	N	N	Not Applicable
DOE 5631.2C	Personnel Security Program	09/15/92	N	N	N	Not Applicable
DOE 5631.4A	Control of Classified Visits	07/08/92	N	N	N	Not Applicable
DOE 5631.6A	Personnel Security Assurance Program	09/15/92	N	N	N	Not Applicable
DOE 5632.1B	Protection Program Operations	09/08/92	--	--	--	Cancelled by 5632.1C
DOE 5632.1C	Protection and Control of Safeguards and Security Interests	07/15/94	Y	Y	Y	Analyze Further
DOE 5632.2A	Physical Protection of Special Nuclear Material and Vital Equipment	02/09/88	--	--	--	Cancelled by 5632.1C
DOE 5632.3B	Operations Security	01/29/88	--	--	--	Cancelled
DOE 5632.5	Physical Protection of Classified Matter	02/03/88	--	--	--	Cancelled by 5632.1C

APPENDIX A DOE Order Candidate List

WHC-SD-C217-ES-001 Rev.0

DOE ORDER	TITLE	ISSUED	VSIS	NMSS	AMS	Comments
DOE 5632.6	Physical Protection of DOE Property and Unclassified Facilities	02/09/88	--	--	--	Cancelled by 5632.1C
DOE 5632.7	Protective Forces	02/09/88	N	N	N	Not Applicable
DOE 5632.8	Protection Program Operations: Systems Performance Tests	02/04/88	Y	Y	Y	Analyze Further
DOE 5632.9A	Issuance and Control of Security Badges, Credentials, and Shields	09/23/92	--	--	--	Cancelled by 5632.1C
DOE 5632.11	Physical Protection of Unclassified Irradiated Reactor Fuel in Transit	09/15/92	--	--	--	Cancelled by 5632.1C
DOE 5633.2A	Control and Accountability of Nuclear Materials: Responsibilities and Authorities	09/23/92	N	N	Y	Analyze Further
DOE 5633.3A	Control and Accountability of Nuclear Materials	02/12/93	Y	Y	Y	Analyze Further
DOE 5633.4	Nuclear Materials Transactions: Documentation and Reporting	02/09/88	Y	Y	N	Analyze Further
DOE 5633.5	Nuclear Materials Reporting and Data Submission Procedures	05/22/87	Y	Y	N	Analyze Further
DOE 5634.1B	Facility Approvals, Security Surveys, and Nuclear Materials Surveys.	09/15/92	N	N	N	Not Applicable
DOE 5634.3	Foreign Ownership, Control, or Influence Program	06/14/93	N	N	N	Not Applicable
DOE 5635.1A	Control of Classified Documents and Information	02/12/88	--	--	--	Cancelled by 5632.1C
DOE 5635.2B	Protection of Classified National Security Council Information	04/19/85	--	--	--	Cancelled by 5632.1C
DOE 5635.3	Hand-Carrying Classified Matter on Air Carriers	01/29/88	--	--	--	Cancelled by 5632.1C
DOE 5635.4	Protection of Unclassified Controlled Nuclear Information	02/03/88	N	N	N	Not Applicable

APPENDIX A DOE Order Candidate List

WHC-SD-C217-ES-001 Rev.0

DOE ORDER	TITLE	ISSUED	VSIS	NMSS	AMS	Comments
DOE N 5635.10A	Classified Mailing Address	01/28/94	N	N	N	Not Applicable
DOE 5636.1A	Prohibitions on Illicit Wiretapping and Eavesdropping	06/12/92	N	N	N	Not Applicable
DOE 5636.3A	Technical Surveillance Countermeasures Program	02/03/88	N	N	N	Not Applicable
DOE 5639.1	Information Security Program	10/19/92	N	N	N	Not Applicable
DOE N 5639.1	Classified Matter in Sensitive Compartmented Information Facilities	07/02/93	N	N	N	Not Applicable
DOE 5639.3	Violation of Laws, Losses, and Incidents of Security Concerns	09/15/92	N	N	N	Not Applicable
DOE 5639.5	Technical Surveillance countermeasures Program	08/03/92	N	N	N	Not Applicable
DOE 5639.6	Classified Computer Security Program	09/15/92	Y	Y	N	Analyze Further
DOE 5639.7	Operations Security Program	04/30/92	N	N	N	Not Applicable
DOE 5639.8A	Security of Foreign Intelligence Information and Sensitive Compartmented Information Facilities	07/23/93	N	N	N	Not Applicable

Summary List of DOE Orders to Analyze Further

DOE ORDER	TITLE	ISSUED	VSIS	NMSS	AMS
DOE 5632.1C	Protection and Control of Safeguards and Security Interests	07/15/94	X	X	X
DOE 5632.8	Protection Program Operations: Systems Performance Tests	02/04/88	X	X	X
DOE 5633.2A	Control and Accountability of Nuclear Materials: Responsibilities and Authorities	09/23/92			X
DOE 5633.3A	Control and Accountability of Nuclear Materials	02/12/93	X	X	X
DOE 5633.4	Nuclear Materials Transactions: Documentation and Reporting	02/09/88	X	X	
DOE 5633.5	Nuclear Materials Reporting and Data Submission Procedures	05/22/87	X	X	
DOE 5639.6	Classified Computer Security Program	09/15/92	X	X	

APPENDIX B DOE ORDER EVALUATION FOR ADDS MATRIX

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement ? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
CHAPTER I, Protection & Control Planning									
1. SITE SPECIFIC CHARACTERISTICS. Protection programs shall be tailored to address specific site characteristics and requirements, current technology, ongoing programs, operational needs, and to achieve acceptable protection levels that reduce inherent risks on a cost-effective basis.	X		4	5			X		X
2. THREAT. The "Design Basis Threat Policy for the Department of Energy (DOE) Programs and Facilities (U)" shall be used in conjunction with local threat guidance and vulnerability assessments for protection and control program planning.	X		4	5			X		X
3. PROTECTION STRATEGY.									
3.a.(1) A denial strategy shall be used for the protection of a safeguards and security interest (e.g., Category IA special nuclear material, certain radiological sabotage targets) where unauthorized access presents an unacceptable risk. Programs shall be designed to prevent unauthorized control; i.e., an unauthorized opportunity to initiate or credibly threaten to initiate a nuclear dispersal or detonation, or to use available nuclear materials for onsite assembly of an improvised nuclear device.	X		4	3			X		X
3.a.(2) A containment strategy shall be used to prevent the unauthorized removal of Category II or greater special nuclear material.	X		3	4			X		X

(1) 0 - Least, 5 - Most

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	Yes	No			L (2)	M (3)	H (4)	Yes	No	
3.b. Strategies for the protection and control of classified matter shall incorporate the applicable requirements established in Chapter III. In addressing the threat to the Department's information assets, emphasis must be placed on security systems that will detect or deter unauthorized disclosure or modification or the loss of availability of classified and sensitive, but unclassified, information and its unauthorized removal from a site or facility.	X		2	2	X					X
3.e. Safeguards and security systems and critical systems elements shall be performance tested to ascertain their effectiveness in providing countermeasures to address design basis threats.	X		2	2		X				X
Chapter II, Protection of SNM & Vital Equipment										
1. GENERAL.										
1.f. Protective force personnel, as determined by a vulnerability assessment and documented in the Site Safeguards and Security Plan, shall be available and positioned to respond to a verified threat occurrence to contain, interrupt, and/or neutralize adversaries within the required response times.	X		4	5			X			X
1.g. Intrusion detection shall be accomplished through a combination of intrusion sensors and tamper-indicating devices, material surveillance procedures, material accounting and tracking, and/or specialized nuclear measurement techniques.	X		4	5			X			X

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	Yes	No			L (2)	M (3)	H (4)	Yes	No
4. STORAGE.									
4.c. Prevent and/or detect unauthorized access;	X		1	4			X		X
5. CATEGORY I QUANTITIES OF SPECIAL NUCLEAR MATERIAL.									
5.a. In Process. Material shall be used or processed within Material Access Areas. DOE 5633.3A, page III-3, paragraph 3b(1) requires a material surveillance program to detect unauthorized material flows and transfers. Any location within a Material Access Area that contains unattended Category I quantities of special nuclear material in use or process shall be equipped with intrusion detection systems or other effective means of detection approved by the cognizant local Departmental authority for safeguards and security.	X		3	4			X		X
Chapter V, Security & Restricted Access Areas									
1. GENERAL.									
1.f. Means shall be provided to deter and detect unauthorized intrusion into Security Areas. Means include use of intrusion detection sensors and alarm systems, random patrols, and/or visual observation. The protection program shall include suitable means to assess alarms. See paragraph 1, page VI-1 for amplified requirements.	X		4	4			X		X
5. PROTECTED AREA.									

(1) 0 - Least, 5 - Most

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	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
5.a.(2) Exit inspections of personnel, vehicles, and hand-carried items shall be conducted to deter and detect the unauthorized removal of special nuclear material. Specific inspection procedures and special nuclear material/metal detection levels and limitations shall be established and documented. When the Protected Area encompasses a Material Access Area, the exit inspections at the Protected Area boundary may be performed on a random basis with the extent and frequency determined by the cognizant local DOE authority for safeguards and security	X		2	3	X				X
Chapter VI, Protection Element: Intrusion Detection & Assessment Systems									

(1) 0 - Least, 5 - Most

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	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
1. GENERAL. Intrusion detection systems shall be installed to provide reasonable assurance that breaches of security boundaries are detected and that assessment information is provided to protective personnel. Intrusion detection systems shall be provided for Protected Areas as required at page V-5, paragraph 5, Vital Areas as required at page V-6, paragraph 6, and for Material Access Areas and special nuclear material as discussed in paragraphs 2b, 3, and 4 below. Intrusion detection systems shall be provided for protection of classified matter as described at page III-1, paragraph 3. Intrusion detection systems shall also be provided for vaults, vault-type rooms, Sensitive Compartmented Information Facilities, Classified Automated Information System facilities, and Secure Communications Centers. For other applications, the impact of loss or destruction of property and facilities shall be considered when assessing the need for intrusion detection systems.	X		4	5			X		X
1.a. A means for timely detection of intrusion shall be provided by the use of intrusion detection systems and/or protective force fixed posts and/or mobile patrols. Timely assessment of intrusion detection system alarms shall be provided by electronic systems and/or patrols. When used for detection, patrols shall be conducted at random intervals, at a documented frequency.	X		4	5			X		X

(1) 0 - Least, 5 - Most

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DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement ? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
*1.d. There shall be an effective method by which to assess intrusion detection system alarms (e.g., intrusion, false, nuisance, and tamper).	X		4	5			X		X
2. REQUIREMENTS.									
2.a.(3.) Intrusion detection systems shall be operated and maintained in a manner ensuring that the number of false and nuisance alarms does not reduce the system credibility.	X		4	4		X			X
2.a.(4) Intrusion detection systems shall be tamper-resistant or tamper-alarmed, and have components such as sensors, multiplexers, power supply cabinets, sensor processors, junction boxes, and alarm access panels that are also tamper-alarmed for intrusion detection systems protecting Protected Areas, Material Access Areas, or Vital Areas.	X		4	4		X			X
2.b. If intrusion detection alarms are not monitored by an alarm station, an audible and optional visual alarm signal capable of alerting protective personnel on patrol in the area and directing them to the location of the alarm shall be provided. The audible alarm shall be distinguishable from other types of alarms and shall be no less than 65 decibels above ambient background noise level at the farthest location of the responding protective force post.	X		1	3	X				X

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	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
2.c. Compensatory measures shall be provided during times when the intrusion detection system is not in operation or at temporary locations where a permanent intrusion detection system is not practical or cost effective.	X		1	4			X		X
2.d. Systems installed after the effective date of this Manual, used in the protection of Category I quantities of special nuclear material, shall employ redundant, independently routed communication paths to avoid a single point failure. Several intrusion detection sensors may be connected to a common data collection point. The redundant pathways shall begin at a data collection point and be conveyed and reported independently to a physically separated Central Alarm Station and Secondary Alarm Station.	X		4	4			X		X
2.e. Records shall be kept on each actual and/or false nuisance alarm. The record shall be reviewed, analysis performed, and corrective measures taken to correct system malfunctions. The record shall contain, as a minimum: date and time of the alarm; cause of the alarm or a probable cause if definite cause cannot be established; and the identity of the recorder or the operator on duty.	X		4	4		X			X
2.f. Alarm monitoring systems shall be self-checking and shall annunciate system failure in the alarm station(s). For the protection of Category I and II quantities of special nuclear material, alarms shall be annunciated in both the Central Alarm Station and Secondary Alarm Station. Systems shall indicate the type and location of the alarm source.	X		4	4		X			X

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DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal?	
	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
2.h. Each sensor protected zone shall have a unique electronic address code	X		5	3	X				X
4. EXTERIOR SYSTEM SPECIFICATIONS.									
4.a. The false alarm rate for the total perimeter intrusion detection system shall not average more than 1 false alarm per week, per sensor, while maintaining proper detection sensitivity. If the segments can be fully assessed at all times, either visually or by closed-circuit television, a higher false alarm rate and nuisance alarm rate may be tolerated if it does not result in system degradation. This information shall be documented.	X		4	4		X			X
5. INTRUSION DETECTION SYSTEM ALARM ANNUNCIATION AT THE CENTRAL AND SECONDARY ALARM STATION.									
5.a. A facility possessing classified matter under the exclusive protection of a Central Alarm Station shall have its sensors connected by direct, continuously supervised, leased line, or by such other means as to distinguish its alarms from all other alarms monitored by the Central Alarm Station.	X		5	5			X		X
5.b. Alarms shall annunciate audibly and visually to both the Central Alarm Station and the Secondary Alarm Station.	X		5	4	X				X
5.c. Acknowledgement of alarms shall be straightforward and easily performed.	X		3	4		X			X
5.d. Intrusion detection system status indicators shall be provided to indicate when the system is not in working order and to indicate when tampering with any major system component has occurred.	X		5	4		X			X

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	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
5.e. Where applicable, the alarm control system shall have the capability to call the Central Alarm Station and Secondary Alarm Station operators' attention to an alarm-associated video recorder/monitor. The picture quality shall allow the operator to recognize and discriminate between human and animal presence in the camera field-of-view.	X		2	3	X				X
5.f. Video recorders, when used, shall be actuated by alarm signals and operate automatically. The response shall be sufficiently rapid to record an actual intrusion.	X		3	3	X				X
8. PROTECTION OF INTRUSION DETECTION SYSTEMS.									
8.a. GENERAL. Security related equipment shall be protected from unauthorized access in a graded manner consistent with its importance. For protection of Categories I and II special nuclear material, Vital Equipment, and Top Secret and Secret classified matter, all detection/alarm devices, including transmission lines to annunciators, shall be tamper-indicating in both the access and secure modes. System components used for protection of other interests shall be protected, consistent with a cost/benefit analysis determined by each facility.	X		3	4		X			X
8.b.(1) PHYSICAL PROTECTION. See Table VI-1 for information on the location of alarm communications lines, line supervision, and testing, depending on the asset being protected.	X		5	5			X		X

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APPENDIX B DOE ORDER EVALUATION FOR ADDS MATRIX

WHC-SD-C217-ES-001 Rev.0

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	Yes	No			L (2)	M (3)	H (4)		Yes	No
8.c.(1) CLASSES OF LINE SUPERVISION. Performance-based definitions are characterized in Table VI-2 (extracted from Federal Specification W-A-450C), with examples of each class. For consistency in Departmental applications, the following interpretations shall be used:	X		5	5			X			X
(2) LINE SUPERVISION OPTIONS. Testing shall provide assurance that the line or data link is capable of transmitting an alarm signal and that it has not been compromised. Different combinations of line supervision and testing are allowed depending on link routing. The three cases of an alarm link remaining within the Security Area, going through a lower Security Area, and going through an unsecured area, are presented in Table VI-1 for two primary segments of alarm data transmission: from sensor to data gathering panel, and from data gathering panel to data gathering panel or central processing unit.										
8.d. ALARM ANNUNCIATION AND RESPONSE. Line supervision/tamper alarms shall be annunciated in both the Central Alarm Station and Secondary Alarm Station, indicating the type of alarm and the affected equipment. For protective personnel response, a line supervision/tamper alarm shall be treated the same as an intrusion alarm for the area being protected.	X		5	5			X			X
Chapter XI, Protection Element: Acceptance & Validation Testing										
2. REQUIREMENTS.										

- (1) 0 - Least, 5 - Most
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DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement ? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
2.a. Acceptance and validation tests shall be developed to validate operability requirements and system effectiveness of the elements implemented and operating as part of a total system and to provide reasonable assurance of continued operation as a total system.	X		3	5	X				X
2.b. A test program, test plan, and test report shall be documented in accordance with DOE 5630.16A, SAFEGUARDS AND SECURITY ACCEPTANCE AND VALIDATION TESTING PROGRAM.	X		3	5	X				X
2.c. Critical system elements (e.g., security equipment, procedures, and/or people) associated with credible, adversary sequences shall be tested at the frequency specified in the Safeguards and Security Acceptance and Validation Testing Program Plan.	X		3	5		X			X
3. OPERABILITY TESTING.									
3.a. Opening and closing of areas by operating personnel in the normal performance of their activities may be used in some situations as acceptable tests for locking devices, alarm sensors, data communications, and alarm station display and operation. Those critical system elements that are not tested by personnel during normal performance of their activities shall be specifically tested for continuing operability. Testing of multiple system elements, in combination with other elements as a subsystem, is desirable.	X		1	3	X				X
4. EFFECTIVENESS TESTING.									

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement ? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
4.a. Effectiveness testing of equipment involves checking system element operation over the planned range of operation. Equipment effectiveness testing shall be performed at a frequency determined by the operational effectiveness and protection threat levels. Functionality tests shall be performed to verify continued normal detector operation. The functionality test frequency shall be documented.	X		2	5		X			X
4.b. At least every 365 days and after any equipment repairs, each critical system element shall be tested through the conduct of effectiveness tests. Effectiveness testing shall cover the range of performance parameters required in the facility's approved security plans, and include the number of tests specified in the Safeguards and Security Acceptance and Validation Program Plan.	X		2	5			X		X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement ? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	Yes	No			L (2)	M (3)	H (4)	Yes	No
Chapter III, Materials Control									
5. DETECTION/ASSESSMENT. Each facility shall have the capability to detect and assess the unauthorized removal of nuclear materials, consistent with the graded safeguards concept. The system shall be interfaced with the facility's physical protection and other organizational systems, as appropriate, and shall be able to detect removal of SNM from its authorized location (theft/diversion/errors) and provide notification to the protective force and other organizations to respond when such events are detected.	X		2	2	X				X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.2A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS: RESPONSIBILITIES AND AUTHORITIES	Does compliance with the requirement have any dependency on the ADDS.		What impact does the ADDS have on compliance with the requirement ? (Rate from 0-5) ⁽¹⁾	What contribution does the requirement have on achieving the SAS goal? (Rate from 0-5) ⁽¹⁾	What is the minimum cost to be compliant with the requirement if the ADDS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	Yes	No	ADDS	ADDS	L (2)	M (3)	H (4)	Yes	No
9. RESPONSIBILITIES AND AUTHORITIES.									
9.g.(17) Heads of DOE Field Elements shall: Assure cost-effective overall protection at each site, through integration, to the extent practicable, of MC&A systems, procedures, and operations with the associated physical protection systems, procedures, and operations.	X		3	3	N/A				N/A

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

APPENDIX C DOE ORDER EVALUATION FOR NMSS MATRIX

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the NMSS?		What impact does the NMSS have on compliance with the requirement? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS, were not operational?			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
Chapter I, Protection & Control Planning									
1. SITE-SPECIFIC CHARACTERISTICS. Protection programs shall be tailored to address specific site characteristics and requirements, current technology, ongoing programs, operational needs, and to achieve acceptable protection levels that reduce inherent risks on a cost-effective basis.	X		3	3		X			X
2. THREAT. The "Design Basis Threat Policy for the Department of Energy (DOE) Programs and Facilities (U)" shall be used in conjunction with local threat guidance and vulnerability assessments for protection and control program planning.	X		2	2		X			X
3. PROTECTION STRATEGY.									
3.a.(2) A containment strategy shall be used to prevent the unauthorized removal of Category II or greater special nuclear material.	X		2	1	X				X
3.b. Strategies for the protection and control of classified matter shall incorporate the applicable requirements established in Chapter III. In addressing the threat to the Department's information assets, emphasis must be placed on security systems that will detect or deter unauthorized disclosure or modification or the loss of availability of classified and sensitive, but unclassified, information and its unauthorized removal from a site or facility.	X		1	1	X				X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

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(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the NMSS?		What impact does the NMSS have on compliance with the requirement? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS, were not operational?			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
3.e. Safeguards and security systems and critical systems elements shall be performance tested to ascertain their effectiveness in providing countermeasures to address design basis threats.	X		2	2		X			X
Chapter II, Protection of Special Nuclear Material and Vital Equipment									
1.g. Intrusion detection shall be accomplished through a combination of intrusion sensors and tamper-indicating devices, material surveillance procedures, material accounting and tracking, and/or specialized nuclear measurement techniques.	X		2	2		X			X
Chapter III, Protection and Control of Classified Matter									
1.b. Access to classified matter shall be limited to persons who possess appropriate access authorization and who require such access (need-to-know) in the performance of official duties. Controls shall be established to detect and deter unauthorized access to classified matter.									

- (1) 0 - Least, 5 - Most
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 (4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the NMSS?		What impact does the NMSS have on compliance with the requirement? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS, were not operational?			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
4.f.(1) For National Security Information (NSI) classified by an Original Classifier each section, part, paragraph, or similar portion of a classified document shall be marked to show the classification level or be identified as unclassified. In marking portions, the symbols (TS) for TOP SECRET, (S) for SECRET, (C) for CONFIDENTIAL, and (U) for UNCLASSIFIED shall be used. Classification levels of portions of a document shall be shown by the appropriate classification symbol placed immediately following the portion's letter or number, or in the absence of letters or numbers, immediately before the beginning of the portion.	X		1	1	X				X
Chapter XI, Protection Element: Acceptance and Validation Testing									
2.c. Critical system elements (e.g., security equipment, procedures, and/or people) associated with credible, adversary sequences shall be tested at the frequency specified in the Safeguards and Security Acceptance and Validation Testing Program Plan.	X		3	4		X			X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.2A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS		Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
		NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
		Yes	No							
8.	POLICY. The nuclear materials subject to this Order shall be controlled and accounted for in a graded manner consistent with the design basis threat and with their strategic and monetary importance. Where applicable, the site-specific safeguards and security planning document will contain the design basis threat requirements which may reflect some modifications to meet site-specific needs. Material Control and Accountability (MC&A) systems will provide accurate nuclear materials inventory information; control nuclear materials in order to deter and prevent loss or misuse; provide timely and localized detection of unauthorized removals of nuclear materials within specified limits; provide assurance that all nuclear materials are accounted for and that theft/diversion has not occurred; and assist in the prevention of dispersal of nuclear materials. In addition, DOE will:	X		4	4		X			X
8.d.	Facilitate the development and implementation of foreign country and International Atomic Energy Agency (IAEA) safeguards systems.	X		5	5		X			X
9. RESPONSIBILITIES AND AUTHORITIES.										
9.g.(17)	Heads of DOE Field Elements shall: Assure cost-effective overall protection at each site, through integration, to the extent practicable, of MC&A systems, procedures, and operations with the associated physical protection systems, procedures, and operations.	X		3	3	N/A				N/A

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K < \$ 1000 K Capital or > \$ 200 K < \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS				L (2)	M (3)	H (4)	Yes	No
	Yes	No							
Chapter II, Materials Accountability									
2. ACCOUNTING SYSTEMS.									
2.a.(4) Accounting System Data Base and Procedures. For each facility procedures shall be maintained describing the structure and operation of the nuclear materials accounting system. The procedures shall accurately reflect current nuclear material accounting practices. Specific requirements for accounting procedures include the following: Recording, reporting, and submission of data to NMSS by material type and reporting unit, as specified in DOE 5633.4 and DOE 5633.5.	X		4	4		X			X
2.b.(1) Account Structure. A facility shall consist of one or more MBAs established to identify the location and quantity of nuclear materials in the facility. For each facility, readily retrievable accountability data shall be maintained by MBA that reflects quantities of nuclear materials on inventory, quantities of nuclear material received and shipped, and other adjustments to inventory.	X		4	4		X			X
2.b.(2) Account Structure. The MBA account structure shall provide the capability to localize inventory differences and provide a system of checks and balances for verifying the accuracy of the accountability data and records.	X		4	4		X			X

- (1) 0 - Least, 5 - Most
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 (4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
2.c.(1) Records and Reports. For each facility, management shall maintain records, submit data, and issue reports as required by DOE 5633.4 and facility procedures. These reports shall accurately describe all nuclear material transactions and inventories. Inventory adjustments shall be identified by MBA and shall be reported consistent with requirements of this Order, DOE 5633.4 and DOE 5633.5.	X		5	5		X			X
2.c.(2) Records and Reports. Nuclear materials records shall be updated only by authorized personnel, and the records system shall provide an audit trail for all transactions affecting the nuclear materials data base.	X		5	5		X			X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
2.c.(3) Records and Reports. The MBA records system shall be capable of being updated daily or upon demand for all nuclear materials transactions. (This requirement is for the updating of records based on reports or information; it is not a requirement on how quickly a facility must be able to complete measurements.) In addition, the records system shall be capable of generating book inventory listings for all SNM within 3 hours. For all other nuclear material, the timing for generation of book inventories shall be within 24 hours. Validating the accuracy of the accounting record system shall be conducted according to testing methodology, testing frequency, and record maintenance requirements contained in DOE 5630.16 and applicable Department guidance. Performance requirements for accounting record system accuracy are contained in Chapter I, paragraph 4.	X		5	5		X			X
6. MATERIAL CONTROL INDICATORS.									

- (1) 0 - Least, 5 - Most
 (2) Low < \$ 500 K Capital & < \$ 200 K annual expense
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 (4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
6.b.(2) Inventory Difference Evaluation. Procedures for establishing control limits for inventory differences shall be based on variance propagation using current data. The data should reflect operating conditions for the material balance period of the inventory. Alternatively, other statistically-valid techniques may be used but must be justified on the basis of factors such as limited data, low transfer rates, categories, and major process variations. The methodology shall be approved by the cognizant Manager, DOE Field Office. Historical inventory difference data shall be evaluated for comparison with the statistically based limits, where applicable. Where the propagated or otherwise statistically based methods do not yield control limits consistent with historical data, efforts shall be made to resolve the discrepancies between the two.	X		2	2	X				X
6.c.(1) Evaluation of Other Inventory Adjustments. Each facility's management shall establish a documented program for evaluating all inventory adjustments entered in the accounting records. The program shall include written procedures including equations for applying radioactive decay and fission/transmutation adjustments. A program for holdup adjustments must be justified on the basis of measurements or other factors. Procedures shall be outlined for the statistical review of inventory adjustments using techniques such as tests of trends, biases, and correlation.	X		4	4		X			X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

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(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
Chapter III, Materials Control									
2. ACCESS CONTROLS.									
2.b. Data Access. Each facility shall have a graded program to assure that only authorized persons have the ability to enter, change, or access material control and accountability data and information.	X		4	4		X			X
2.d. Other Considerations. Access controls similar to those described in paragraphs 2b and c above shall be designed to protect against data/equipment falsification or manipulation and shall detect unauthorized activities during emergency or other unusual conditions.	X		4	4		X			X
3. MATERIAL SURVEILLANCE.									
3.a.(1) Material Surveillance Mechanisms. Specific material surveillance methodologies may include the following: Automated means (e.g., monitoring devices, sensors or other instrumentation) to detect anomalies and to report alarm conditions.	X		2	2	X				X
3.a.(3) Material Surveillance Mechanisms. Specific material surveillance methodologies may include the following: Process logs, inventory records, or other information to indicate anomalies and trigger investigatory actions.	X		4	4	X				X
4. MATERIAL CONTAINMENT.									

- (1) 0 - Least, 5 - Most
 (2) Low < \$ 500 K Capital & < \$ 200 K annual expense
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 (4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
4.b. MBA. Each facility shall have controls to ensure that nuclear materials used, processed, or stored within an MBA are controlled in accordance with the graded safeguards concept. Additionally, these controls shall ensure that materials are removed only via authorized pathways/portals and are subject to transfer and verification procedures as identified in Chapter II, paragraph 5.	X		4	4			X		X
5. DETECTION/ASSESSMENT.									

(1) 0 - Least, 5 - Most

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(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
5.a. Tamper-Indicating Devices. The reliance on TIDs as a safeguards measure is directly dependent on the environment in which the tamper-indicating device resides and the material being tamper-safed. Each facility shall have a documented program, administered by the MC&A organization, for control of TIDs and to assure that TIDs are used to the extent possible to detect violations of container integrity. DOE-wide standardized TIDs should be used when available through DOE standardized procurement (see DOE 5630.17). Testing of TID integrity, location, and application and the TID record system shall be conducted according to testing methodology, testing frequency, and record maintenance requirements contained in DOE 5630.16 and applicable Department guidance. Performance requirements for TIDs are contained in Chapter I, paragraph 4, of this Order. The Safeguards Seal Reference Manual, issued by SA-10, can facilitate in the selection, application, and verification of TIDs. The TID control program shall specify, as a minimum, the following elements: (1) Acquisition/procurement/destruction; (2) Types of TIDs utilized; (3) Assurance of unique TIDs identification; (4) Storage; (5) Issuance; (6) Personnel authorized to apply, remove, and dispose of TIDs; (7) Containers on which TIDs are to be applied;	X		3	3	X				X

(1) 0 - Least, 5 - Most

(2) Low < \$ 500 K Capital & < \$ 200 K annual expense

(3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.

(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.4 NUCLEAR MATERIALS TRANSACTIONS: DOCUMENTATION AND REPORTING	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
8. FORMS.									
8.i. DOE/NRC F 741, "Nuclear Material Transaction Report," and DOE/NRC F 741A, "Nuclear Material Transaction Report (Continuation Page)," hereinafter referred to together as DOE/NRC F 741/741A, contain information necessary for the documentation of transactions involving nuclear materials. The forms shall be used to: (1) Document transfers of nuclear material between facilities, adjustments to inventories, programmatic transfers within facilities, and changes in financial responsibility. (2) Document inventory changes by all DOE facilities selected under the provisions of the U.S./IAEA Agreement.	X		4	3			X		X
8.j. DOE/NRC F 742, "Material Balance Report," contains the information necessary for summarizing transactions and reporting material balances.	X		4	3			X		X
8.k. DOE/NRC F 742C, "Physical Inventory Listing," is used by facilities selected under the provisions of the U.S./IAEA Agreement to supply the IAEA with information necessary for reporting of nuclear materials inventories. DOE/NRC F 742C contains essentially the same information as DOE F DP-733 and DOE F DP-733A. All policies and most requirements applicable to DOE F DP-733 and DOE F DP-733A also shall apply to DOE/NRC F 742C.	X		4	3			X		X

- (1) 0 - Least, 5 - Most
 (2) Low < \$ 500 K Capital & < \$ 200 K annual expense
 (3) Medium > \$ 500 K < \$ 1000 K Capital or > \$ 200 K < \$ 1000 K annual expense.
 (4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.4 NUCLEAR MATERIALS TRANSACTIONS: DOCUMENTATION AND REPORTING	Does compliance with the requirement have any dependency on the following.		What impact does the NMSS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the NMSS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	NMSS		NMSS	NMSS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
9. RESPONSIBILITIES AND AUTHORITIES.									
9.a.(3) Director of Safeguards and Security (DP-34) shall: Assure that the data documentation and collection policies, procedures, and standards of DOE with respect to nuclear safeguards are at least comparable in their effectiveness to those of NRC.	X		3	2			X		X
9.b.(1)(b) Heads of Field Organizations shall: Require each contractor facility, and DOE office, as appropriate, under their jurisdiction to: Prepare additional data and reports required by the field organization in the performance of its mission.	X		4	4			X		X
10. PROCEDURES AND REQUIREMENTS.									
10.b.(5) Radioactive decay shall be reported on material balance reports for reporting periods when the decay has reached accountable quantities or as directed by the cognizant operations office.	X		2	3	X				X
10.d. Data Processing Procedures. In addition to the guidance provided in this paragraph, specific procedures for completing each data processing form listed on page 4, paragraph 8 and for submitting the data to the Nuclear Materials Management and Safeguards System are contained in DOE 5633.5, Nuclear Materials Reporting and Data Submission Procedures.	X		2	3		X			X

- (1) 0 - Least, 5 - Most
 (2) Low < \$ 500 K Capital & < \$ 200 K annual expense
 (3) Medium > \$ 500 K ≤ \$ 1000 K Capital or > \$ 200 K ≤ \$ 1000 K annual expense.
 (4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

APPENDIX D DOE ORDER EVALUATION FOR VSIS MATRIX

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS, have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
Chapter I, Protection & Control Planning									
1. SITE SPECIFIC CHARACTERISTICS. Protection programs shall be tailored to address specific site characteristics and requirements, current technology, ongoing programs, operational needs, and to achieve acceptable protection levels that reduce inherent risks on a cost-effective basis.	X		3	4		X			X
2. THREAT. The "Design Basis Threat Policy for the Department of Energy (DOE) Programs and Facilities (U)" shall be used in conjunction with local threat guidance and vulnerability assessments for protection and control program planning.	X		2	2		X			X
3. PROTECTION STRATEGY.									
3.a.(2) A containment strategy shall be used to prevent the unauthorized removal of Category II or greater special nuclear material.	X		3	1			X		X
3.b. Strategies for the protection and control of classified matter shall incorporate the applicable requirements established in Chapter III. In addressing the threat to the Department's information assets, emphasis must be placed on security systems that will detect or deter unauthorized disclosure or modification or the loss of availability of classified and sensitive, but unclassified, information and its unauthorized removal from a site or facility.	X		1	1	X				X

- (1) 0 - Least, 5 - Most
 (2) Low < \$ 500 K Capital & < \$ 200 K annual expense
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DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS, have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
3.e. Safeguards and security systems and critical systems elements shall be performance tested to ascertain their effectiveness in providing countermeasures to address design basis threats.	X		2	2			X		X
Chapter II, Protection of SNM & Vital Equipment									
1. GENERAL.									
1.g. Intrusion detection shall be accomplished through a combination of intrusion sensors and tamper-indicating devices, material surveillance procedures, material accounting and tracking, and/or specialized nuclear measurement techniques.	X		4	4			X		X
4. STORAGE.									
4.c. Prevent and/or detect unauthorized access;	X		4	4			X		X
5. CATEGORY I QUANTITIES OF SPECIAL NUCLEAR MATERIAL.									

(1) 0 - Least, 5 - Most

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(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS, have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
5.a. In Process. Material shall be used or processed within Material Access Areas. DOE 5633.3A, page III-3, paragraph 3b(1) requires a material surveillance program to detect unauthorized material flows and transfers. Any location within a Material Access Area that contains unattended Category I quantities of special nuclear material in use or process shall be equipped with intrusion detection systems or other effective means of detection approved by the cognizant local Departmental authority for safeguards and security.	X		4	4		X			X
Chapter III, Protection and Control of Classified Matter									
1. GENERAL.									
1.b Access to classified matter shall be limited to persons who possess appropriate access authorization and who require such access (need to know) in the performance of official duties. Controls shall be established to detect and deter unauthorized access to classified matter.	X		2	2	X				X
4. MARKING.									

(1) 0 - Least, 5 - Most

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APPENDIX D DOE ORDER EVALUATION FOR VSIS MATRIX

WHC-SD-C217-ES-001 Rev.0

DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS have on compliance with the requirement? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal?
	Yes	No			L (2)	M (3)	H (4)	
4.f.(1) For National Security Information (NSI) classified by an Original Classifier each section, part, paragraph, or similar portion of a classified document shall be marked to show the classification level or be identified as unclassified. In marking portions, the symbols (TS) for TOP SECRET, (S) for SECRET, (C) for CONFIDENTIAL, and (U) for UNCLASSIFIED shall be used. Classification levels of portions of a document shall be shown by the appropriate classification symbol placed immediately following the portion's letter or number, or in the absence of letters or numbers, immediately before the beginning of the portion.	X		1	1	X			X
Chapter XI, Protection Element: Acceptance & Validation Testing								
2. REQUIREMENTS.								
2.c. Critical system elements (e.g., security equipment, procedures, and/or people) associated with credible adversary sequences shall be tested at the frequency specified in the Safeguards and Security Acceptance and Validation Testing Program Plan.	X		3	4		X		X
4. EFFECTIVENESS TESTING.								

- (1) 0 - Least, 5 - Most
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DOE ORDER 5632.1C-1 PROTECTION AND CONTROL OF SAFEGUARDS AND SECURITY INTERESTS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS, have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
4.a. Effectiveness testing of equipment involves checking system element operation over the planned range of operation. Equipment effectiveness testing shall be performed at a frequency determined by the operational effectiveness and protection threat levels. Functionality tests shall be performed to verify continued normal detector operation. The functionality test frequency shall be documented.	X		2	2			X		X
4.b. At least every 365 days and after any equipment repairs, each critical system element shall be tested through the conduct of effectiveness tests. Effectiveness testing shall cover the range of performance parameters required in the facility's approved security plans, and include the number of tests specified in the Safeguards and Security Acceptance and Validation Program Plan.	X		2	3			X		X

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(4) High > \$ 1000 K Capital or > \$ 1000 K annual expense.

DOE ORDER 5633.2A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS: RESPONSIBILITIES AND AUTHORITIES.	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS, have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
8. POLICY. The nuclear materials subject to this Order shall be controlled and accounted for in a graded manner consistent with the design basis threat and with their strategic and monetary importance. Where applicable, the site-specific safeguards and security planning document will contain the design basis threat requirements which may reflect some modifications to meet site-specific needs. Material Control and Accountability (MC&A) systems will provide accurate nuclear materials inventory information; control nuclear materials in order to deter and prevent loss or misuse; provide timely and localized detection of unauthorized removals of nuclear materials within specified limits; provide assurance that all nuclear materials are accounted for and that theft/diversion has not occurred; and assist in the prevention of dispersal of nuclear materials. In addition, DOE will:	X		4	4			X		X
8.a. Assure that material control and material accountability measures are designed to facilitate, to the extent practical, cost effective integration of the operational mission of the program with environmental, health, and safety, and physical protection considerations.	X		5	5			X		X
8.d. Facilitate the development and implementation of foreign country and International Atomic Energy Agency (IAEA) safeguards systems.	X		3	1			X		X
9. RESPONSIBILITIES AND AUTHORITIES.									

(1) 0 - Least, 5 - Most

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DOE ORDER 5633.2A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS: RESPONSIBILITIES AND AUTHORITIES.	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS, have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS, were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
9.g.(17) Heads of DOE Field Elements shall: Assure cost-effective overall protection at each site, through integration, to the extent practicable, of MC&A systems, procedures, and operations with the associated physical protection systems, procedures, and operations.	X		3	3	N/A				N/A

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DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
Chapter II, Materials Accountability									
3. INVENTORIES.									
3.a.(1) Physical Inventories. Each facility's management shall implement a physical inventory program for nuclear materials consistent with the requirements defined below. Minimum physical inventory frequencies for MBAs are provided in Figure II-1.	X		4	4			X		X
3.a.(8) Deviations to inventory frequency requirements described in Figure II-1 may be approved in accordance with DOE 5630.11A for inventories containing large numbers of items, items stored in high radiation fields, critical assemblies and other situations (e.g., dynamic, in-process, or continuous inventories) where alternative control mechanisms provide assurance that unreported changes in inventories would be detected. Inventory values shall be determined in time to provide for computation and reconciliation of inventories and determination of inventory differences, consistent with DOE reporting requirements stated in DOE 5633.4 and approved inventory frequencies.	X		5	5			X		X
Chapter III, Materials Control									
2. ACCESS CONTROLS.									

- (1) 0 - Least, 5 - Most
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DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
2.a. Materials Access. Each facility shall have a documented program to ensure that only properly authorized personnel have access to nuclear materials. This program shall address procedures and mechanisms to detect/respond to access by unauthorized personnel. In order to minimize the potential for unauthorized access to nuclear material, the amount of material in use shall be limited to that necessary for operational requirements, and excess material shall be stored in repositories or kept in enclosures designed to assure that access will be limited to authorized individuals.	X		4	4			X		X
2.b. Data Access. Each facility shall have a graded program to assure that only authorized persons have the ability to enter, change, or access material control and accountability data and information.	X		4	4			X		X
2.d. Other Considerations. Access controls similar to those described in paragraphs 2b and c above shall be designed to protect against data/equipment falsification or manipulation and shall detect unauthorized activities during emergency or other unusual conditions.	X		4	4			X		X
3. MATERIAL SURVEILLANCE.									
3.a.(1) Material Surveillance Mechanism. Automated means (e.g., monitoring devices, sensors or other instrumentation) to detect anomalies and to report alarm conditions.	X		4	4			X		X

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DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.		What impact does the VSIS have on compliance with the requirement ? (Rate from 0 - 5) (1)	What contribution does the requirement have on achieving the SAS goal ? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal ?	
	VSIS		VSIS	VSIS	L (2)	M (3)	H (4)	Yes	No
	Yes	No							
3.a.(3) Material Surveillance Mechanism. Process Logs, inventory records, or other information to indicate anomalies and trigger investigatory actions.	X		4	4	X				X
3.b.(1). Material Surveillance Programs. Category I and II. The material surveillance program for Category I and II quantities of SNM shall assure that materials are in authorized locations and shall detect unauthorized material flows and transfers. Evaluations of Category I locations shall be performed to determine system capabilities to assess material losses from MAA and PA boundaries. Evaluations of Category II locations shall be performed to determine system capabilities to assess material losses from the PA boundary.	X		4	4			X		X
4. MATERIAL CONTAINMENT.									
4.a. MAA and PA. The facility shall have controls to assure that Category I quantities of SNM are used, processed or stored only within an MAA contained in a PA and that Category II quantities of SNM are used, processed, or stored only within a PA.	X		4	4			X		X
4.b. MBA. Each facility shall have controls to ensure that nuclear materials used, processed, or stored within an MBA are controlled in accordance with the graded safeguards concept. Additionally, these controls shall ensure that materials are removed only via authorized pathways/portals and are subject to transfer and verification procedures as identified in Chapter II, paragraph 5.	X		4	4			X		X

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DOE ORDER 5633.3A CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS	Does compliance with the requirement have any dependency on the following.	What impact does the VSIS have on compliance with the requirement? (Rate from 0 - 5) (1)		What contribution does the requirement have on achieving the SAS goal? (Rate from 0 - 5) (1)	What is the minimum cost to be compliant with the requirement if the VSIS were not operational			Can a deviation or partial deviation from this requirement significantly reduce costs and still achieve the SAS goal?	
		VSIS	No		L (2)	M (3)	H (4)	Yes	No
4.c. Storage Repositories. The facility shall have controls for nuclear materials held in storage repositories consistent with the graded safeguards concept.	X			4			X		X
5. DETECTION/ASSESSMENT.									
5.d. Daily Administrative Checks. A facility-specific daily administrative checks program shall be implemented for each Category I MBA (or multiple MBAs where rollup to a Category I quantity of SNM is credible). The scope and extent of the checks shall be determined and approved by the DOE Field Office based upon recognized vulnerabilities. The administrative checks program shall specify the detection objectives, performance procedures, documentation requirements, and response actions.	X			5			X		X

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APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
	<u>GENERAL FUNCTIONS</u>	X		24hr. data base I.D. of console only
C	All alarm state and mode changes and operator actions shall be logged to a data base and hardcopy.	X		
C	Alarms shall be audibly and visually annunciated.	X		
C	Audible Tone must be acknowledged by operator to be silenced: - Each new alarm must enable audible tone. - Each new alarm must be acknowledged by operator.	X		handled admin. or configuration of system
C	All alarms must be manually assessed by an operator. After operator assessment the alarm shall be automatically or manually cleared from the display.	X		Easy for single sensor, difficult for many sensors
C	An alarm cannot be cleared unless the sensor(s) have returned to normal/secure state(s) or have been placed in maintenance or access mode(s).	X		
C	The time interval, on a quiescent system, between intruder detection to alarm annunciation shall not exceed the interval on the current system. This time interval is currently one second.	X		
C	An existing alarm event shall give a visual indication of sensor state changes.	X		
C	The re-alarmed of a sensor shall not cause a new event.	X		

APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

WHC-SD-C217-ES-001 Rev.0

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
H	Re-alarmed of a sensor shall not cause a repeated audible annunciation or require re-acknowledging by operator.	X		latching input showing state on graphics monitor
C	System trouble information is displayed to the operator.	X		
C	<p>The system shall be capable of filtering state changes as follows:</p> <p>Chattering Filter - Will not degrade system performance. Once a sensor is determined to be chattering subsequent state changes are not be reported.</p> <p>Sensor Mode Filter - State changes are filtered by the sensor mode. Sensors that are in the inactive mode do not report any state changes. Sensors in the access mode report only state changes between tamper and reset; state changes between alarm and reset are not reported. (The muxes currently perform this function.)</p>	X	X	two actions required to change modes, limits of memory may need additional mem. cards.
	VIDEO / CCTV FUNCTIONS (AUTOMATIC) On A Quiescent System		X	
H	Up to 2 video images (Live) are automatically displayed upon new event.		X	
H	At least 1 and up to 3 events can display 2 video images automatically.		X	
H	Video recorders are activated when video images are automatically displayed.		X	
H	When video recorders are activated the tape counter and related event number are recorded on printer and in the database.		X	

APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

WHC-SD-C217-ES-001 Rev.0

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
H	When video recorders are approaching end of tape a warning is displayed to operator and logged to the printer and the data base.		X	
H	Cameras numbers relating to the event are displayed to the operator as part of the event information. (event block)		X	
H	Indication of which video images (camera numbers) are displayed on which monitors (currently color coded) as part of the event information.		X	
	VIDEO /CCTV OPERATOR CONTROLLED FUNCTIONS (UP TO 3) From the operators console:			
M	Operators can select or de-select monitor pairs for automatic control. At least one pair must remain active.		X	
L	Operator can initiate/terminate up to three camera sequences from a list of pre-defined sequences from the operators console. Camera sequences automatically terminate when monitors are required for alarm video display.		X	
M	Operators can substitute cameras for other cameras for automatic control. Operators can restore substituted cameras to as originally defined, either all at once or individually.		X	
L	Operators can initiate a camera test that sequences through all cameras 1 time. A camera test cannot be aborted. (The no-abort feature not necessary desired.)		X	
H	Camera Images relating to an event can be selected for display from the "event block".		X	
	GRAPHICAL FUNCTIONS		X	

APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

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C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
C	Area Map is <u>always</u> available.		X	
C	Area Map shows current ADM mode/state of all perimeter zones and buildings.	X		
L	Exterior camera status is indicated (status = displayed/not displayed on a monitor).		X	
H	When a zone graphic is displayed the corresponding level graphic is displayed (if one exists).		X	
H	Level graphics show a collection of associated zones and cameras with an indication of zone ADM state/modes. It also shows camera status (displayed/not displayed on a monitor).		X	
C	Zone Graphics shows a single zone with sensors, indicating current ADM mode/state.	X		
L	Zone Graphic may also be a description of a trouble event and may include dynamic text information.	X		
C	Operator can request a specific zone graphic to be displayed. (Associated Level graphics is also displayed.)	X		
H	Operator can request a specific level graphic to be displayed. (Current zone graphic being displayed is not affected.)	X		
C	Operator can request the zone graphic associated with the event via the event block.		X	
H	WHEN THERE ARE NO EVENTS (Quiescent System)- A zone graphic is automatically displayed upon receipt of an alarm in a timely manner (typically less than 3 seconds).		X	

APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

WHC-SD-C217-ES-001 Rev.0

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
C	When graphics are displayed, new events will not over write existing graphics.		X	
L	Operator can request the current sensor status display: ID's, Types, Modes, and States. (all sensor status map)	X		
H	Operator can request a display of access set status (sensor ID's, mode,state).	X		
	REPORTS FUNCTIONS From the operators console:			
M	Operators can select hardcopy device (primary or secondary)		X	
C	Operators can request the following reports to hardcopy device.		X	
C	1 ALL SENSOR (status)			
C	2 INACTIVE SENSOR			
C	3 ACCESS SENSOR			
C	4 SENSOR CHECKOFF			
L	5 ALL CAMERA			
L	6 ALL ACCESS SET			
M	7 INDIVIDUAL ACCESS SET			
L	8 INDIVIDUAL ZONE CAMERA REPORT			
L	9 INDIVIDUAL ZONE SENSOR REPORT			
C	10 SENSOR VERIFICATION			
L	11 EVENT SENSOR REPORT			
C	ALL OUTPUT TO HARDCOPY DEVICE IS QUEUED PER HARDCOPY DEVICE.		X	
	STATUS CHANGE FUNCTIONS			

APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

WHC-SD-C217-ES-001 Rev.0

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
C	User ID is required to have access to status change functions. The name associated with user ID is used for all logging related to status changes. (User must log onto the system prior to going to Status Change Functions. Up to 3 users may be logged on at one time.)		X	
C	Operator can change mode of sensors individually.	X		
C	Operator can update HP sensor mode and state to match current MUX and SDM values.			N/A
C	Operators can change mode of sensors by pre-defined group (access set) (access and secure only).	X		
C	Operators can change status of SDMs (active or inactive).			N/A
C	Operator must specify length of time a sensor or access set will be placed in access. When time limit expires and the sensor mode has not been changed, a trouble event is displayed to operator.	X		must increase # of tags - more memory
	SYSTEM VALIDATION FUNCTIONS			
H	Operators can verify the state and mode of sensors by multiplexer.		X	
H	Operators can verify the state and mode of sensors by SDM (Remote MUX).		X	
C	Operators can verify the state and mode of a single sensor.	X		no print out - no printer
C	A trouble event will be generated and displayed to the operator when a sensor mode does not verify. The event shows both the HP mode and device (MUX or SDM) mode. Trouble events cannot be assessed/disposed until the operator corrects the discrepancy.			N/A

APPENDIX E MICON FUNCTIONAL COMPATIBILITY MATRIX

WHC-SD-C217-ES-001 Rev.0

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
	COMMANDS PAGE FUNCTIONS			
C	Operator can initiate a MUX/SDM self test (all MUXs and SDMs one time). <ul style="list-style-type: none"> - System will generate a trouble event if a MUX or SDM does not report. Individual MUX or SDM are identified. - System will generate a trouble event if one or more sensors fail the self test. Individual sensor(s) are identified. 			N/A system is self testing
L	Operator can clear graphics (both zone and level).	X		
C H	Operator can generate a "Manual event" Used to verify system is working Used to log keyboard inputs to hard copy device and database.		X	
C	Operator can initialize alarm display map (ADM) (synchronize ADM and Host Computer data bases)			N/A
	SECONDARY ANNUNCIATION FUNCTIONS		X	
C	New events and new alarms are sent to POC for logging (not displayed).		X	
C	System health/operational status for both primary and secondary computers is periodically (pre-defined time) sent to POC.		X	
C	If event is not acknowledge within a timeout period (pre-defined) then event block is sent to POC for display to operator as well as audible annunciation and all subsequent events until all PFP events are assessed/disposed.		X	remote terminal would report all alarms - no filtering

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY
C	Operators can initiate the sending of an event block (INTRUDER button) to POC.		X	
	PRINTER LOG and DATABASE INFORMATION			
C	New Event (event number, description, date, time)	X		
C	Alarm (New) (event number, description, date, time)	X		
C	New State Changes (event number, type, date, time)	X		
C	Acknowledge (event number, date, time)	X		
C	Assessment/disposition (Canned and Keyboard input)		X	
C	Keyboard Logs (Messages) (Information Not Assessment/disposition)		X	
C	Operator Sensor Mode Changes (operator name, mode, time/date)		X	
C	Operator Log On (operator name, time/date)			
C	Operator Information Request - Sensor Analog Value Request MUX/SDM Self Test MUX/SDM Verification			
C	Download Request to MUX/SDM			N/A
C	Equipment Failures (Equipment type, time/date)	X		
C	Trouble Events (Printer Off Line, Open File Error, Down equipment)	X		

C A T	EXISTING PFP SECURITY SYSTEM FUNCTIONS	MICON PLATFORM		
		PASS	FAIL	LEVEL OF DIFFICULTY

The category of the function is designated in the far left column marked CAT. The categories are defined as follows:

C - Critical
H - Highly desirable
M - Moderately desirable
L - Least desirable

DEFINITIONS

ASSESSMENT - The reason why the alarm was generated and may optionally include disposition.

DISPOSITION - The clearing the alarm from the display.

ACKNOWLEDGE - The recognition of alarm by the operator.

STATE - The condition of a sensor, shall include: secure, alarm, tamper (open and short are variations of tamper).

MODE - Is the filtering of sensor state changes by the sensor array (IMUX). Modes shall include:

- Secure - The reporting of all sensor state changes.
- Access - Filters sensor state changes to the alarm state. Tamper state changes and associated secure state changes are reported in this mode.
- Inactive - Filter of all state changes.

ZONE - A grouping of sensor by location, function, priority or system for purposes of alarm reporting.

ACCESS SET - A grouping of sensor by location, function, priority or system for purposes of sensor control.

EVENT - Notification from the system requiring operator action. Typical events include: alarms, hardware failures, and software failures.

ALARM EVENT - The reporting of states changes from one or more sensors in a zone.

CHATTERING SENSOR

Changing between exactly two states (any two)

2) The changes are happening at or below a pre-defined time interval

3) A pre-defined minimum number of changes have occurred.

Once a sensor is determined to be chattering subsequent state changes are not be reported.

AN EVENT BLOCK CONTAINS THE FOLLOWING INFORMATION:

- 1 ZONE IDENTIFICATION
- 2 ZONE DESCRIPTION
- 3 EVENT IDENTIFICATION
- 4 TIME OF EVENT CREATION
- 5 CAMERA NO. RELATED TO ZONE (IF ANY)
- 6 MONITOR CAMERAS ARE DISPLAYED ON (IF ANY)
- 7 VISUAL INDICATION OF SENSOR TYPES AND STATES RELATED TO EVENT.
- 8 VISUAL INDICATION OF EVENT STATUS (ACKNOWLEDGE OR NOT) BLINKING UNTIL MANUALLY ACKNOWLEDGED BY OPERATOR
- 9 VISUAL INDICATION THAT A GRAPHIC EXISTS FOR THE ZONE

The following commands functions can be performed from the "Event Block":

ACKNOWLEDGE THE EVENT

ASSESS THE EVENT (goes to assessment page for canned or keyboard log of assessments)

DISPLAY GRAPHICS (IF AVAILABLE)

DISPLAY VIDEO (IF AVAILABLE)

NOTIFY POC (INTRUDER)

APPENDIX F LONWORKS SYSTEM COSTS

LONWORKS SYSTEM MUX REPLACEMENT

The following table provides a list of equipment required and an estimated hardware/software costs to replace the existing multiplexer loop.

Item No.	Description	Model No.	Qty	Unit Price	Total Price
1	Programmable LONWORKS Network Server (PLNS) replaces the 2 FEPs	3400100	2	1,295.00	2,590.00
2	486PC to support PLNS		2	3,500.00	7,000.00
3	LonTalk Adapter-one adapter for each MUX replaced 9 + 2 for 100K areas + 4 spares	3300104	15	250.00	3,750.00
4	Flexible I/O Control Module - one for every 4 sensors + spares sensors at PFP and 100K = $750/4=188$	3200300	188	395.00	74,260.00
6	Standard 56" Rack mount Cabinet.		9	2,200.00	19,800.00
TOTAL					107,400.00

APPENDIX G MASON & HANGER SYSTEM COSTS**MASON & HANGER I/O SYSTEM MUX REPLACEMENT COSTS**

The following table provides a list of equipment required and an estimated hardware/software costs to replace the existing multiplexer loop.

Item No.	Description	Model No.	Qty	Unit Price	Total Price
1	ARNET SmartPort Plus PC-card with connector panel. HP to MUX interface	24 Ports	2	1,000.00	2,000.00
2	486PC to support ARNET		2	3,500.00	7,000.00
3	Controller Board one for every 4 I/O boards	Control	11	400.00	4,400.00
4	Input Board 32 Chan. Per Board	Input	26	350.00	9,100.00
5	Output Board 32 Chan. Per Board	Output	2	575.00	1,150.00
6	Standard 56" Rack mount Cabinet.		9	2,200.00	19,800.00
TOTAL					43,450.00

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

The following table provides the procurement costs of Hewlett Packard equipment for the replacement of the computers located at the PFP, the Secondary Annunciation point at the POC, and the AMOSS located at 231-Z. A total of five computers require replacing.

Item No.	Description	Model No.	Qty	Unit Price	Total Price
1	Processor A900 - floating point, VIS,SIS, WCS, RTE-A/VC+ 12009A HP-IP I/F and 20 Slot Box.	2999A	5	31,050.00	155,250.00
2	Memory Card - 8 MB	12221B	5	12,000.00	60,000.00
3	Steel Cabinet - 56" tall includes power distribution unit and four 120 CFM fans.	29431G	0	5,681.25	0.00
4	Duplex Register Interface - 8 or 16 bit parallel. Includes 48 pin connector kit.	12006A	5	975.00	4,875.00
5	SCSI Interface - Includes single ended SCSI Cable and SCSI Bus Terminator	12016A	5	1,177.50	5,887.50
6	Disk Drive - 2 Gbyte SCSI-2 single disk and up to 8 Gbyte DAT.tape Expandable 325 rackmount. Includes power supple and cord.	C3021R	3	6,737.50	20,212.50
7	Disk Drive - 2 Gbyte SCSI-2 single disk and up to 8 Gbyte no tape Dr. Expandable 325 rackmount. Includes power supple and cord.	C3023R	2	4,812.50	9,625.00

Item No.	Description	Model No.	Qty	Unit Price	Total Price
8	8 Channel Async Mux I/F - Includes interface, 8 port RS-232 panel, mount bracket, 3 meter cable extender kit and manual.	12040D	8	2,175.00	17,400.00
9	Terminal (HP 700/96) - 14" white display with 8 pages of memory, 80/132 column, high resolution characters, full overscan and VT220 compatibility. Localization required.	C1064W	0	671.25	0.00
10	Cable - 5 meter United States/European RFI filtering modem cable.	40242M	0	59.29	0.00
11	Printer - 54dbA 840 Lpm Line Impact Printer. Standard enclosure and passive stacker.	C2354A	5	9,501.80	47,509.00
12	DS Cards	12007B	5	4,242.70	21,213.50
13	Data Integrity Software	92050A	5	6,747.00	33,735.00
14	FORTTRAN 77 Compiler Software (Right to Copy)	92836A	5	3,400.00	17,000.00
15	SYMBOLIC DEBUG/1000 Software (Right to Copy)	92860A	5	3,400.00	17,000.00
16	IMAGE/1000- II Data Base Management Software (Right to Copy)	92081A	0	10,120.50	0.00
17	Update to current version of operating system. (Right to Copy)		5	3,400.00	17,000.00

Item No.	Description	Model No.	Qty	Unit Price	Total Price
18	Training - RTE A System Manager	22949S	0	1,845.00	0.00
TOTAL					426,707.50

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217
K6056
FILE NO. C217

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R01 - PROJECT COST SUMMARY

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BY JJM

COST CODE	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
000	ENGINEERING	45,000	20	9,000	54,000
060	Project Management	20,000	15	3,000	23,000
600	UTILITIES	597,000	5	33,000	630,000
	(ADJUSTED TO MEET DOE 5100.4)	0		3,000	3,000
	PROJECT TOTAL	662,000	7	48,000	710,000

TYPE OF ESTIMATE	Study Estimate	01/06/95
ARCHITECT ENGINEER	LCM	
OPERATING CONTRACTOR		

REMARKS:

Estimate for Hewlett-Packard Replacement with New HP.

(ROUNDED/ADJUSTED TO THE NEAREST " 1,000 / 10,000 " - PERCENTAGES NOT RECALCULATED TO REFLECT ROUNDING)

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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DATE 01/06/95 11:14:58
BY JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
111000	DEFINITIVE DESIGN ONSITE E/C	26640	0	26640	0.79	210	26850	32221
121000	ENGINEERING/INSPECTION-ONSITE E/C	17760	0	17760	2.12	377	18137	21764
SUBTOTAL 1	ENGINEERING	44400	0	44400	1.32	587	44987	53985
220000	PROCUREMENT-O/C	534240	0	534240	0.79	4220	538460	565384
311000	PFP - Alarm Display & Det Sys(ADDS)	22557	0	22557	2.12	478	23035	25339
312000	Alarm Mon Op Sup Sys (AMOSS)	11774	0	11774	2.12	250	12024	13226
313000	POC - Secondary Annunciation	22557	0	22557	2.12	478	23035	25339
SUBTOTAL 31	FA CONST-ONSITE E/C	56888	0	56888	2.12	1206	58094	63904
400000	PROJECT MANAGEMENT-O/C	20000	0	20000	1.59	318	20318	23366
PROJECT TOTAL		655,528	0	655,528	0.97	6,331	661,859	706,639

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R03 - ESTIMATE BASIS SHEET

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BY JJM

1. DOCUMENTS AND DRAWINGS

=====

DOCUMENTS: Safeguards & Security System Replacement Study - PFP Transition Engineering - Dated November 1994.
Internal Memo 94-C217-001 - LOI

DRAWINGS: None

2. MATERIAL PRICES

=====

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL. VENDOR INFORMATION WAS OBTAINED BY WHC FOR THE HEWLETT-PACKARD COMPUT

3. LABOR RATES

=====

CURRENT KEH BASE CRAFT RATES, AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-95), INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES AND TRAVEL WHERE APPLICABLE, PER HANFORD SITE STABILIZATION AGREEMENT, APPENDIX A (EFFECTIVE 09-06-95). NON CRAFT HOURLY RATES ARE BASED ON THE 1995 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-95).

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS

=====

A.) ONSITE CONSTRUCTION FORCES GENERAL REQUIREMENTS, TECHNICAL SERVICES AND CRAFT OVERHEAD COSTS ARE INCLUDED AS A COMPOSITE PERCENTAGE BASED ON THE ICF KH ESTIMATING FACTOR/BILLING SCHEDULE, REVISION 0, DATED MARCH 3, 1994. THE TOTAL COMPOSITE PERCENTAGE APPLIED TO ONSITE CONSTRUCTION FORCES LABOR, FOR THIS PROJECT, IS 93% FOR SHOP WORK AND 112% FOR FIELD WORK, WHICH IS REFLECTED IN THE "OH&P/B&I" COLUMN OF THE ESTIMATE DETAIL.

5. ESCALATION

=====

ESCALATION PERCENTAGES WERE CALCULATED BY THE HANFORD MATERIAL & LABOR ESCALATION STUDY, DATED JANUARY 1995.

6. ROUNDING

=====

U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE 1-32 SUBPARAGRAPH (M), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE 1-11, DATED 10-31-84.

7. REMARKS

=====

- A) ELECTRICAL MATERIAL PRICING IS BASED ON OBTAINING THE BEST AVAILABLE PRICE, NOT ON BUYING FROM SMALL OR DISADVANTAGED BUSINESS SET ASIDE.
- B) IT IS ASSUMED THAT THE NEW HP EQUIPMENT WILL FIT IN EXISTING RACKS AND CONSOLES WITH A MINIMUM REWORK NECESSARY TO THE EXISTING RACKS.
- C) IT IS ASSUMED ALL EXISTING CABLING WILL BE REUSED.
- D) IT IS ASSUMED THE EXISTING PROGRAMMING WILL WORK WITH NO MODIFICATIONS.
- E) IT IS ASSUMED THAT OPERATOR TRAINING WILL NOT BE REQUIRED.

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217

** TEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R04 - COST CODE ACCOUNT SUMMARY

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DATE 01/06/95 11:15:06
BY JJM

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
=====								
000	ENGINEERING							
111000	DEFINITIVE DESIGN ONSITE E/C	26640	0	26640	0.79	210	26850	32221
121000	ENGINEERING/INSPECTION-ONSITE E/C	17760	0	17760	2.12	377	18137	21764
TOTAL 000	ENGINEERING	44400	0	44400	1.32	587	44987	53985
060	PROJECT MANAGEMENT							
400000	PROJECT MANAGEMENT-O/C	20000	0	20000	1.59	318	20318	23366
TOTAL 060	PROJECT MANAGEMENT	20000	0	20000	1.59	318	20318	23366
600	UTILITIES							
220000	PROCUREMENT-O/C	534240	0	534240	0.79	4220	538460	565384
311000	PFP - Alarm Display & Det Sys(ADDs)	22557	0	22557	2.12	478	23035	25339
312000	Alarm Mon Op Sup Sys (AMOSS)	11774	0	11774	2.12	250	12024	13226
313000	POC - Secondary Annunciation	22557	0	22557	2.12	478	23035	25339
TOTAL 600	UTILITIES	591128	0	591128	0.92	5426	596554	629288
=====								
PROJECT TOTAL		655,528	0	655,528	0.97	6,331	661,859	706,639
=====								

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
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JOB NO. C-217 K6056
FILE NO. C217

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

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DATE 01/06/95 11:15:13
BY JJM

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
=====								
ENGINEERING								
00	TECHNICAL SERVICES	44400	0	44400	1.32	587	20	53985
	TOTAL ENGINEERING	44,400	0	44,400	1.32	587	20	53,985
CONSTRUCTION								
16	ELECTRICAL	591128	0	591128	0.92	5426	5	629288
19	PROJECT MANAGEMENT	20000	0	20000	1.59	318	15	23366
	TOTAL CONSTRUCTION	611,128	0	611,128	0.94	5,744	6	652,654
=====								
PROJECT TOTAL			0	655,528	0.97	6,331	7	706,639

KAISER ENGINEERS HANFORD
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JOB NO. C-217 K6056
FILE NO. C217

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

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DATE 01/06/95 15:07:30
BY JJM

REFERENCE: ESTIMATE BASIS SHEET PAGE 3 OF 7
COST CODE ACCOUNT SUMMARY PAGE 4 OF 7

THE U.S. DEPARTMENT OF ENERGY - RICHLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION" DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A STUDY ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 20 TO 35 %.

CONTINGENCY IS EVALUATED AT THE THIRD COST CODE LEVEL AND SUMMARIZED AT THE PRIMARY AND SECONDARY COST CODE LEVEL OF THE DETAILED COST ESTIMATE.

ENGINEERING

ALLOWANCE OF 20% WAS USED.

AVERAGE ENGINEERING CONTINGENCY 20 %

CONSTRUCTION

CSI 16 & 19 - AN AVERAGE ALLOWANCE OF 6% WAS USED DUE TO THE RELATIVE EASE OF INSTALLING THE NEW EQUIPMENT IN EXISTING RACKS AND CONSOLES AND OPERATOR TRAINING IS NOT REQUIRED.

AVERAGE CONSTRUCTION CONTINGENCY 6 %

AVERAGE PROJECT CONTINGENCY 17 %

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
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** TEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R07 - ONSITE INDIRECT COSTS BY WBS

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DATE 01/06/95 11:15:20
BY JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
=====	=====	=====	=====	=====	=====	=====	=====
111000	DEFINITIVE DESIGN ONSITE E/C	26640	0.00	0	0	0	0
121000	ENGINEERING/INSPECTION-ONSITE E/C	17760	0.00	0	0	0	0
220000	PROCUREMENT-O/C	534240	0.00	0	0	0	0
311000	PFP - Alarm Display & Det Sys(ADDS)	22557	0.00	0	0	0	0
312000	Alarm Mon Op Sup Sys (AMOSS)	11774	0.00	0	0	0	0
313000	POC - Secondary Annunciation	22557	0.00	0	0	0	0
400000	PROJECT MANAGEMENT-O/C	20000	0.00	0	0	0	0
=====							
PROJECT TOTAL		655,528		0	0	0	0

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056

** TEST - INTERACTIVE ESTIMATING **

Cost Estimate for SAS Upgrade

Study Estimate

DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
111000	DEFINITIVE DESIGN ONSITE E/C										
111000.00	TECHNICAL SERVICES										
111000.0000011	ECNs to Modify Drawings Allowance of 6 Drawing Changes	000	6 ea	360	26640	0	0	0	0	0	26640
SUBTOTAL	TECHNICAL SERVICES			360	26,640	0	0	0	0	0	26,640
TOTAL	COST CODE 00000 WBS 111000 (ESCALATION 0.79% - CONTINGENCY 20.00 %)			360	26,640	0	0	0	0	0	26,640
TOTAL WBS 111000	DEFINITIVE DESIGN ONSITE E/C			360	26,640	0	0	0	0	0	26,640

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
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** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate

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DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
121000	ENGINEERING/INSPECTION-ONSITE E/C										
121000.00	TECHNICAL SERVICES										
121000.0000011	Field Engr/Inspect During Construction - Allowance	000	1 ls	240	17760	0	0	0	0	0	17760
SUBTOTAL	TECHNICAL SERVICES			240		0	0	0	0	0	
					17,760		0		0		17,760
TOTAL	COST CODE 00000			240		0	0	0	0	0	
	WBS 121000				17,760		0		0		17,760
	(ESCALATION 2.12% - CONTINGENCY 20.00 %)										
TOTAL WBS 121000	ENGINEERING/INSPECTION-ONSITE E/C			240		0	0	0	0	0	
					17,760		0		0		17,760

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

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Westinghouse Hanford Company
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** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate

PAGE 3
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DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
220000	PROCUREMENT-O/C										
220000.16	ELECTRICAL										
220000.1656511	Hewlett Packard #2999A A900 Processor - Floating Point, VIS,SIS,WCS etc. Replace Exist Unit on Rack	6200	5 ea	0	0	0	155250	0	0	0	155250
220000.1656513	Hewlett Packard #12221B 8MB Memory Card	6200	5 ea	0	0	0	60000	0	0	0	60000
220000.1656515	Hewlett Packard #12006A Duplex Register Interface 8 or 16 Bit Parallel	6200	5 ea	0	0	0	4875	0	0	0	4875
220000.1656517	Hewlett Packard #12016A SCSI Interface	6200	5 ea	0	0	0	5888	0	0	0	5888
220000.1656519	Hewlett Packard #C3021R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte DAT.tape	6200	3 ea	0	0	0	20213	0	0	0	20213
220000.1656521	Hewlett Packard #C3023R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte No tape	6200	2 ea	0	0	0	9625	0	0	0	9625
220000.1656523	Hewlett Packard #120400 8 Channel Async MUX I/F - Incl Interface, 8 Port Pnl, Mntg Bckt & Cable	6200	8 ea	0	0	0	17400	0	0	0	17400
220000.1656525	Hewlett Packard #C2345A Printer 54dba 840 Lpm Line Impact Printer	6200	5 ea	0	0	0	47509	0	0	0	47509
220000.1656527	Hewlett Packard #12007B DS Cards	6200	5 ea	0	0	0	21214	0	0	0	21214
220000.1656529	Hewlett Packard #92050A Data Integrity Software	6200	5 ea	0	0	0	33735	0	0	0	33735
220000.1656531	Hewlett Packard #92836A Fortran 77 Compiler Software (right to copy)	6200	5 ea	0	0	0	17000	0	0	0	17000
220000.1656533	Hewlett Packard #92860A Symbolic Debug/1000 Software (right to copy)	6200	5 ea	0	0	0	17000	0	0	0	17000
220000.1656535	Hewlett Packard # Update to Current Version of Operating System (right to	6200	5 ea	0	0	0	17000	0	0	0	17000

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

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BY JJM

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
=====											
	copy)										
SUBTOTAL	ELECTRICAL			0		0	426,709	0	0	0	426,709
	SALES TAX 7.80 %						33283		0		33283
	WAREHOUSING 17.40 %						74247				74247

TOTAL	COST CODE 62016			0		0	534,239	0	0	0	534,239
	WBS 220000										
	(ESCALATION 0.79% - CONTINGENCY 5.00 %)										

TOTAL WBS 220000 PROCUREMENT-O/C				0		0	534,239	0	0	0	534,239

APPENDIX H HEWLETT PACKARD COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056

** TEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
311000	PPF - Alarm Display & Det Sys(ADDS)										
311000.16	ELECTRICAL										
311000.1656011	Hewlett Packard #2999A A900 Processor - Floating Point, VIS,SIS,WCS etc. Replace Exist Unit on Rack	6200F	2 ea	48	1630	0	0	0	0	1826	3456
311000.1656013	Hewlett Packard #12221B 8MB Memory Card	6200F	2 ea	8	272	0	0	0	0	305	577
311000.1656015	Hewlett Packard #12006A Duplex Register Interface 8 or 16 Bit Parallel	6200F	2 ea	8	272	0	0	0	0	305	577
311000.1656017	Hewlett Packard #12016A SCSI Interface	6200F	2 ea	8	272	0	0	0	0	305	577
311000.1656019	Hewlett Packard #C3021R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte DAT.tape	6200F	1 ea	12	408	0	0	0	0	457	865
311000.1656021	Hewlett Packard #C3023R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte No tape	6200F	1 ea	8	272	0	0	0	0	305	577
311000.1656023	Hewlett Packard #12040D 8 Channel Async MUX I/F - Incl Interface,8 Port Pnl, Mntg Bckt & Cable	6200F	3 ea	24	815	0	0	0	0	913	1728
311000.1656025	Hewlett Packard #C2345A Printer 54dba 840 Lpm Line Impact Printer	6200F	2 ea	32	1087	0	0	0	0	1217	2304
311000.1656027	Hewlett Packard #12007B DS Cards	6200F	2 ea	8	272	0	0	0	0	305	577
311000.1656029	Hewlett Packard #92050A Data Integrity Software	6200F	2 ea	4	136	0	0	0	0	152	288
311000.1656031	Hewlett Packard #92836A Fortran 77 Compiler Software (right to copy)	6200F	2 ea	4	136	0	0	0	0	152	288
311000.1656033	Hewlett Packard #92860A Symbolic Debug/1000 Software (right to copy)	6200F	2 ea	4	136	0	0	0	0	152	288
311000.1656035	Hewlett Packard # Update to Current Version of Operating System (right to	6200F	2 ea	4	136	0	0	0	0	152	288

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Westinghouse Hanford Company
JOB NO. C-217 K6056

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
311000.1699048	copy) ATP & TEST ALLOWANCE Assume 3 Men 2 Days	6200F	2 Job	96	3260	0	200	0	0	3651	7111
SUBTOTAL	ELECTRICAL (FIELD)			268		0		0		10,197	
	DOUBLE SECURITY 10.00 %			26	9,104		200		0		19,501
	GENERAL FOREMAN 5.00 %			14	910						910
	CONSUMABLES 6.00 %				500						500
	SALES TAX 7.80 %						12				12
	WAREHOUSING 17.40 %						16		0		16
	OH&P (ON MARKUPS ONLY)						36				36
										1580	1580
TOTAL	COST CODE 62016 WBS 311000 (ESCALATION 2.12% - CONTINGENCY 10.00 %)			309		0		0		11,777	
					10,515		265		0		22,557
TOTAL WBS 311000 PFP - Alarm Display & Det Sys(ADDS)				309		0		0		11,777	
					10,515		265		0		22,557

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DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
312000	Alarm Mon Op Sup Sys (AMOSS)										
312000.16	ELECTRICAL										
312000.1656011	Hewlett Packard #2999A A900 Processor - Floating Point, VIS,SIS,WCS etc. Replace Exist Unit on Rack	6200F	1 ea	24	815	0	0	0	0	913	1728
312000.1656013	Hewlett Packard #12221B 8MB Memory Card	6200F	1 ea	4	136	0	0	0	0	152	288
312000.1656015	Hewlett Packard #12006A Duplex Register Interface 8 or 16 Bit Parallel	6200F	1 ea	4	136	0	0	0	0	152	288
312000.1656017	Hewlett Packard #12016A SCSI Interface	6200F	1 ea	4	136	0	0	0	0	152	288
312000.1656019	Hewlett Packard #C3021R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte DAT.tape	6200F	1 ea	12	408	0	0	0	0	457	865
312000.1656023	Hewlett Packard #12040D 8 Channel Async MUX I/F - Incl Interface,8 Port Pnl, Mntg Bckt & Cable	6200F	2 ea	16	543	0	0	0	0	608	1151
312000.1656025	Hewlett Packard #C2345A Printer 54dba 840 lpm Line Impact Printer	6200F	1 ea	16	543	0	0	0	0	608	1151
312000.1656027	Hewlett Packard #12007B DS Cards	6200F	1 ea	4	136	0	0	0	0	152	288
312000.1656029	Hewlett Packard #92050A Data Integrity Software	6200F	1 ea	2	68	0	0	0	0	76	144
312000.1656031	Hewlett Packard #92836A Fortran 77 Compiler Software (right to copy)	6200F	1 ea	2	68	0	0	0	0	76	144
312000.1656033	Hewlett Packard #92860A Symbolic Debug/1000 Software (right to copy)	6200F	1 ea	2	68	0	0	0	0	76	144
312000.1656035	Hewlett Packard # Update to Current Version of Operating System (right to copy)	6200F	1 ea	2	68	0	0	0	0	76	144
312000.1699048	ATP & TEST ALLOWANCE Assume 3 Men 2 Days	6200F	1 Job	48	1630	0	100	0	0	1826	3556
SUBTOTAL	ELECTRICAL	(FIELD)		140	4,755	0	100	0	0	5,324	10,179

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
	DOUBLE SECURITY 10.00 %			14	475						475
	GENERAL FOREMAN 5.00 %			7	261						261
	CONSUMABLES 6.00 %						6				6
	SALES TAX 7.80 %						8		0		8
	WAREHOUSING 17.40 %						18				18
	OH&P (ON MARKUPS ONLY)									825	825
<hr/>											
TOTAL	COST CODE 62016			161		0		0		6,149	
	WBS 312000				5,492		132		0		11,774
	(ESCALATION 2.12% - CONTINGENCY 10.00 %)										
<hr/>											
TOTAL WBS 312000 Alarm Mon Op Sup Sys (AMOSS)				161		0		0		6,149	
					5,492		132		0		11,774

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DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
313000	POC - Secondary Annunciation										
313000.16	ELECTRICAL										
313000.1656011	Hewlett Packard #2999A A900 Processor - Floating Point, VIS,SIS,WCS etc. Replace Exist Unit on Rack	6200F	2 ea	48	1630	0	0	0	0	1826	3456
313000.1656013	Hewlett Packard #12221B 8MB Memory Card	6200F	2 ea	8	272	0	0	0	0	305	577
313000.1656015	Hewlett Packard #12006A Duplex Register Interface 8 or 16 Bit Parallel	6200F	2 ea	8	272	0	0	0	0	305	577
313000.1656017	Hewlett Packard #12016A SCSI Interface	6200F	2 ea	8	272	0	0	0	0	305	577
313000.1656019	Hewlett Packard #C3021R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte DAT.tape	6200F	1 ea	12	408	0	0	0	0	457	865
313000.1656021	Hewlett Packard #C3023R Disk Drive - 2 Gbyte SCSI-2 Single Disk & 8 Gbyte No tape	6200F	1 ea	8	272	0	0	0	0	305	577
313000.1656023	Hewlett Packard #12040D 8 Channel Async MUX I/F - Incl Interface,8 Port Pnl, Mntg Bckt & Cable	6200F	3 ea	24	815	0	0	0	0	913	1728
313000.1656025	Hewlett Packard #C2345A Printer 54dba 840 Lpm Line Impact Printer	6200F	2 ea	32	1087	0	0	0	0	1217	2304
313000.1656027	Hewlett Packard #12007B DS Cards	6200F	2 ea	8	272	0	0	0	0	305	577
313000.1656029	Hewlett Packard #92050A Data Integrity Software	6200F	2 ea	4	136	0	0	0	0	152	288
313000.1656031	Hewlett Packard #92836A Fortran 77 Compiler Software (right to copy)	6200F	2 ea	4	136	0	0	0	0	152	288
313000.1656033	Hewlett Packard #92860A Symbolic Debug/1000 Software (right to copy)	6200F	2 ea	4	136	0	0	0	0	152	288
313000.1656035	Hewlett Packard # Update to Current Version of Operating System (right to	6200F	2 ea	4	136	0	0	0	0	152	288

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
REPORT TOTAL				1,380	70,922	0	534,903	20,000	0	29,704	655,529

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
313000.1699048	copy) ATP & TEST ALLOWANCE Assume 3 Men 2 Days	6200F	2 Job	96	3260	0	200	0	0	3651	7111
SUBTOTAL	ELECTRICAL	(FIELD)		268		0		0		10,197	
	DOUBLE SECURITY 10.00 %			26	9,104		200		0		19,501
	GENERAL FOREMAN 5.00 %			14	500						910
	CONSUMABLES 6.00 %						12				500
	SALES TAX 7.80 %						16		0		12
	WAREHOUSING 17.40 %						36				16
	OH&P (ON MARKUPS ONLY)									1580	36
TOTAL	COST CODE 62016			309		0		0		11,777	
	WBS 313000				10,515		265		0		22,557
	(ESCALATION 2.12% - CONTINGENCY 10.00 %)										
TOTAL WBS 313000 POC - Secondary Annunciation				309		0		0		11,777	
					10,515		265		0		22,557

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
400000	PROJECT MANAGEMENT-O/C										
400000.19	PROJECT MANAGEMENT										
400000.1900011	OC (WHC) Project Management	060	1 ls	0	0	0	0	20000	0	0	20000
SUBTOTAL	PROJECT MANAGEMENT			0		0		20,000	0	0	20,000
					0		0		0		20,000
TOTAL	COST CODE 06019			0		0		20,000	0	0	20,000
	WBS 400000				0		0		0		20,000
	(ESCALATION 1.59% - CONTINGENCY 15.00 %)										
TOTAL WBS 400000	PROJECT MANAGEMENT-O/C			0		0		20,000	0	0	20,000
					0		0		0		20,000

APPENDIX H HEWLETT PACKARD COMPUTER COSTS ESCALATION ANALYSIS SCHEDULE

Project No/Work Order No C-217									
Title: SAS Upgrades at PFP - HP Sys Replacement									
Date 01/08/95									
Requested By: G Rippey									
Prepared by: J Mucha									
Fiscal Year									
Calendar Year									
Months									
WBS									
110000									
DEFINITIVE DESIGN									
120000									
ENG SUPT / INSPECTION									
200000									
PROCUREMENT									
310000									
CF CONSTRUCTION									
400000									
PROJECT MANAGEMENT									
Escalation Rate									
Rate Table									
Escalation Rate									
0.75%									
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APPENDIX I GRAPHIC LINK COMPUTER COSTS

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R01 - PROJECT COST SUMMARY

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BY JJM

COST CODE =====	DESCRIPTION =====	ESCALATED TOTAL COST =====	CONTINGENCY % =====	TOTAL TOTAL =====	TOTAL DOLLARS =====
000	Engineering	114,000	20	23,000	137,000
060	Project Management	58,000	15	9,000	67,000
600	Utilities	355,000	16	56,000	411,000
961	Technical Support	177,000	30	53,000	230,000
962	Training	98,000	15	15,000	113,000
	(ADJUSTED TO MEET DOE 5100.4)			2,000	2,000
=====					
PROJECT TOTAL		802,000	19	158,000	960,000

TYPE OF ESTIMATE	Study Estimate	01/06/95	REMARKS: Estimate To Replace Hewlett-Packard Computers With a PC Computer Based System.
ARCHITECT ENGINEER			
OPERATING CONTRACTOR			

(ROUNDED/ADJUSTED TO THE NEAREST " 1,000 / 10,000 " - PERCENTAGES NOT RECALCULATED TO REFLECT ROUNDING)

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

PAGE 2 OF 7
DATE 01/06/95 13:48:17
BY JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
111000	Definitive Design Onsite E/C	88800	0	88800	1.32	1172	89972	107967
112000	SW Design/Development (OC) WHC	175040	0	175040	1.32	2311	177351	230556
121000	Engineering/Inspection-Onsite E/C	23088	0	23088	3.56	822	23910	28692
SUBTOTAL 1	Engineering	286928	0	286928	1.50	4305	291233	367215
221000	PFP - Alarm Display & Det Sys(ADDs)	106942	0	106942	1.06	1134	108076	113479
222000	Alarm Mon Op Sup Sys (AMOSS)	21069	0	21069	2.41	508	21577	22656
223000	POC - Secondary Annunciation	33558	0	33558	3.27	1097	34655	36388
SUBTOTAL 22	Procurement-O/C	161569	0	161569	1.70	2739	164308	172523
310000	Training	94720	0	94720	3.27	3097	97817	112490
311000	PFP - Alarm Display & Det Sys(ADDs)	62793	0	62793	3.27	2053	64846	81058
312000	Alarm Mon Op Sup Sys (AMOSS)	58669	0	58669	3.27	1918	60587	75734
313000	POC - Secondary Annunciation	62793	0	62793	3.27	2053	64846	81058
SUBTOTAL 31	FA Const-Onsite E/C	278975	0	278975	3.27	9121	288096	350340
400000	Project Management-O/C	56160	0	56160	2.69	1511	57671	66321
PROJECT TOTAL		783,632	0	783,632	2.26	17,676	801,308	956,399

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R03 - ESTIMATE BASIS SHEET

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BY JJM

1. DOCUMENTS AND DRAWINGS

=====

DOCUMENTS: Safeguards & Security System Replacement Study - PFP Transition Engineering - Dated November 1994.
Internal Memo 94-C217-001 - LOI

DRAWINGS: None

2. MATERIAL PRICES

=====

UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL. VENDOR INFORMATION WAS OBTAINED FOR THE FOLLOWING ITEMS:

3. LABOR RATES

=====

CURRENT KEH BASE CRAFT RATES, AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-95), INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES AND TRAVEL WHERE APPLICABLE, PER HANFORD SITE STABILIZATION AGREEMENT, APPENDIX A (EFFECTIVE 09-06-95). NON CRAFT HOURLY RATES ARE BASED ON THE 1995 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KEH FINANCE (EFFECTIVE 10-01-95).

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS

=====

A.) ONSITE CONSTRUCTION FORCES GENERAL REQUIREMENTS, TECHNICAL SERVICES AND CRAFT OVERHEAD COSTS ARE INCLUDED AS A COMPOSITE PERCENTAGE BASED ON THE ICF KH ESTIMATING FACTOR/BILLING SCHEDULE, REVISION 0, DATED MARCH 3, 1994. THE TOTAL COMPOSITE PERCENTAGE APPLIED TO ONSITE CONSTRUCTION FORCES LABOR, FOR THIS PROJECT, IS 93% FOR SHOP WORK AND 112% FOR FIELD WORK, WHICH IS REFLECTED IN THE "OH&P/B&I" COLUMN OF THE ESTIMATE DETAIL.

5. ESCALATION

=====

ESCALATION PERCENTAGES WERE CALCULATED BY THE HANFORD MATERIAL & LABOR ESCALATION STUDY, DATED January 1995.

6. ROUNDING

=====

U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE I-32 SUBPARAGRAPH (M), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE I-11, DATED 10-31-84.

7. REMARKS

=====

A) ELECTRICAL MATERIAL PRICING IS BASED ON OBTAINING THE BEST AVAILABLE PRICE, NOT ON BUYING FROM SMALL OR DISADVANTAGED BUSINESS SET ASIDE.

B) It is assumed that the existing racks and consoles will require extensive modifications to install the new PC Based System.

C) It is assumed extensive software modifications are required and the new system will require operator training.

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R04 - COST CODE ACCOUNT SUMMARY

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DATE 01/06/95 13:48:24
BY JJM

COST CODE/WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
=====								
000 Engineering								
111000	Definitive Design Onsite E/C	88800	0	88800	1.32	1172	89972	107967
121000	Engineering/Inspection-Onsite E/C	23088	0	23088	3.56	822	23910	28692
TOTAL 000	Engineering	111888	0	111888	1.78	1994	113882	136659
060 Project Management								
400000	Project Management-O/C	56160	0	56160	2.69	1511	57671	66321
TOTAL 060	Project Management	56160	0	56160	2.69	1511	57671	66321
600 Utilities								
221000	PFP - Alarm Display & Det Sys(ADDS)	106942	0	106942	1.06	1134	108076	113479
222000	Alarm Mon Op Sup Sys (AMOSS)	21069	0	21069	2.41	508	21577	22656
223000	POC - Secondary Annunciation	33558	0	33558	3.27	1097	34655	36388
311000	PFP - Alarm Display & Det Sys(ADDS)	62793	0	62793	3.27	2053	64846	81058
312000	Alarm Mon Op Sup Sys (AMOSS)	58669	0	58669	3.27	1918	60587	75734
313000	POC - Secondary Annunciation	62793	0	62793	3.27	2053	64846	81058
TOTAL 600	Utilities	345824	0	345824	2.53	8763	354587	410373
961 Technical Support								
112000	SW Design/Development (OC) WHC	175040	0	175040	1.32	2311	177351	230556
TOTAL 961	Technical Support	175040	0	175040	1.32	2311	177351	230556
962 Training								
310000	Training	94720	0	94720	3.27	3097	97817	112490
TOTAL 962	Training	94720	0	94720	3.27	3097	97817	112490
=====								
PROJECT TOTAL		783,632	0	783,632	2.26	17,676	801,308	956,399
=====								

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

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BY JJM

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
ENGINEERING								
00	Technical Services	111888	0	111888	1.78	1994	20	136659
TOTAL ENGINEERING		111,888	0	111,888	1.78	1,994	20	136,659
CONSTRUCTION								
00	Technical Services	269760	0	269760	2.00	5408	25	343046
16	Electrical	345824	0	345824	2.53	8763	16	410373
19	Project Management	56160	0	56160	2.69	1511	15	66321
TOTAL CONSTRUCTION		671,744	0	671,744	2.33	15,682	19	819,740
=====								
PROJECT TOTAL		783,632	0	783,632	2.26	17,676	19	956,399

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
Cost Estimate for SAS Upgrade
Study Estimate
DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

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BY JJM

REFERENCE: ESTIMATE BASIS SHEET PAGE 3 OF 7
COST CODE ACCOUNT SUMMARY PAGE 4 OF 7

THE U.S. DEPARTMENT OF ENERGY - RICHLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION" DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A Study ESTIMATE SHOULD HAVE AN OVERALL RANGE OF 20 TO 35 % .

CONTINGENCY IS EVALUATED AT THE THIRD COST CODE LEVEL AND SUMMARIZED AT THE PRIMARY AND SECONDARY COST CODE LEVEL OF THE DETAILED COST ESTIMATE.

ENGINEERING

An allowance of 20% contingency was used for Definitive Design & Field Engineering/Inspection.
An allowance of 30% contingency was used for SW Design/Development due to the possibility of problems and delays which might be encountered during this phase.

AVERAGE ENGINEERING CONTINGENCY 26 %

CONSTRUCTION

An allowance of 5% contingency was used for Procurement due to standard equipment being purchased.
An average of 22% was applied to Construction and Training due to Unknown problems which might arise during this installation and implementation phase.

AVERAGE CONSTRUCTION CONTINGENCY 16 %

AVERAGE PROJECT CONTINGENCY 19 %

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056
FILE NO. C217ALT

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R07 - ONSITE INDIRECT COSTS BY WBS

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BY JJM

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT %	ADMINISTRATION TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
=====	=====	=====	=====	=====	=====	=====	=====
111000	Definitive Design Onsite E/C	88800	0.00	0	0	0	0
112000	SW Design/Development (OC) WHC	175040	0.00	0	0	0	0
121000	Engineering/Inspection-Onsite E/C	23088	0.00	0	0	0	0
221000	PFP - Alarm Display & Det Sys(ADDS)	106942	0.00	0	0	0	0
222000	Alarm Mon Op Sup Sys (AMOSS)	21069	0.00	0	0	0	0
223000	POC - Secondary Annunciation	33558	0.00	0	0	0	0
310000	Training	94720	0.00	0	0	0	0
311000	PFP - Alarm Display & Det Sys(ADDS)	62793	0.00	0	0	0	0
312000	Alarm Mon Op Sup Sys (AMOSS)	58669	0.00	0	0	0	0
313000	POC - Secondary Annunciation	62793	0.00	0	0	0	0
400000	Project Management-O/C	56160	0.00	0	0	0	0
PROJECT TOTAL		783,632		0	0	0	0

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

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BY JJM

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
111000	Definitive Design Onsite E/C										
111000.00	Technical Services										
111000.0000011	ECNs to Modify Drawings Allowance of 12 Drawing Changes (extensive mods) Installation Drawings	000	12 ea	1200	88800	0	0	0	0	0	88800
SUBTOTAL	Technical Services			1,200	88,800	0	0	0	0	0	88,800
TOTAL	COST CODE 00000 WBS 111000 (ESCALATION 1.32% - CONTINGENCY 20.00 %)			1,200	88,800	0	0	0	0	0	88,800
TOTAL WBS 111000	Definitive Design Onsite E/C			1,200	88,800	0	0	0	0	0	88,800

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056

** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

PAGE 2
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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
112000	SW Design/Development (OC) WHC										
112000.00	Technical Services										
112000.0002011	System SW Design/Development Allow 3 Persons 13 Weeks	961	1 ls	1560	115440	0	0	0	0	0	115440
112000.0002015	MUX Loop Interface Mods	961	1 ls	0	0	0	0	30000	0	0	30000
112000.0002018	Prepare System & User Documentation - Allow 1 person 8 weeks	961	1 ls	320	23680	0	0	0	0	0	23680
112000.0002021	Update Standard Operating Procedures - Allow 1 person 2 weeks	961	1 ls	80	5920	0	0	0	0	0	5920
SUBTOTAL	Technical Services			1,960		0		30,000		0	
					145,040		0		0		175,040
TOTAL	COST CODE 96100 WBS 112000 (ESCALATION 1.32% - CONTINGENCY 30.00 %)			1,960		0		30,000		0	
					145,040		0		0		175,040
TOTAL WBS 112000	SW Design/Development (OC) WHC			1,960		0		30,000		0	
					145,040		0		0		175,040

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
JOB NO. C-217 K6056

** TEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

PAGE 3
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BY JJM

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
121000	Engineering/Inspection-Onsite E/C										
121000.00	Technical Services										
121000.0000011	Field Engr/Inspect During Construction - Allowance Allow 24 Hr/Month	000	1 ls	312	23088	0	0	0	0	0	23088
SUBTOTAL	Technical Services			312	23,088	0	0	0	0	0	23,088
TOTAL	COST CODE 00000 WBS 121000 (ESCALATION 3.56% - CONTINGENCY 20.00 %)			312	23,088	0	0	0	0	0	23,088
TOTAL WBS 121000	Engineering/Inspection-Onsite E/C			312	23,088	0	0	0	0	0	23,088

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
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** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
221000	PFP - Alarm Display & Det Sys(ADDS)										
221000.16	Electrical										
221000.1656200	*****	6200F	0	0	0	0	0	0	0	0	0
	Procurement - Hard/Software										
221000.1656201	Personal Computer - 486DX266	6200F	6 ea	0	0	0	34380	0	0	0	34380
	AST Premmia 4/66D, 8MB, 500 MB Hard Drive, 17"Monitr										
221000.1656204	IRTU/MCC Cards/Rack	6200F	2 ea	0	0	0	3800	0	0	0	3800
221000.1656207	Arnet Serial Expansion	6200F	2 ea	0	0	0	1990	0	0	0	1990
221000.1656210	CCTV Interface	6200F	1 ea	0	0	0	615	0	0	0	615
221000.1656213	VCR Interface	6200F	1 ea	0	0	0	500	0	0	0	500
221000.1656216	HP LaserJet 4 Printer	6200F	1 ea	0	0	0	1580	0	0	0	1580
221000.1656219	Dot Matrix Printer	6200F	1 ea	0	0	0	500	0	0	0	500
221000.1656222	External Modem	6200F	1 ea	0	0	0	99	0	0	0	99
	(2400/1200/300 baud)										
221000.1656225	GLNet Redundancy/Switching	6200F	1 ea	0	0	0	5000	0	0	0	5000
	Equipment (estimate)										
221000.1656250	*****	6200F	0	0	0	0	0	0	0	0	0
	Graphic Link Software										
	1st Computer Full Price										
221000.1656251	GL Kernal	6200F	1 ea	0	0	0	6000	0	0	0	6000
	1st Computer - Full Price										
221000.1656253	Alarm & Control Module	6200F	1 ea	0	0	0	2000	0	0	0	2000
	1st Computer - Full Price										
221000.1656255	CCTV Module	6200F	1 ea	0	0	0	2000	0	0	0	2000
	1st Computer - Full Price										
221000.1656257	GL Net	6200F	1 ea	0	0	0	2000	0	0	0	2000
	1st Computer - Full Price										
221000.1656259	GL History	6200F	1 ea	0	0	0	5000	0	0	0	5000
	1st Computer - Full Price										
221000.1656261	Pocket Pager Module	6200F	1 ea	0	0	0	1000	0	0	0	1000
	1st Computer - Full Price										
221000.1656270	*****	6200F	0	0	0	0	0	0	0	0	0
	Graphic Link Software										
	Add Computers 1/2 Price										
221000.1656271	GL Kernal	6200F	3 ea	0	0	0	9000	0	0	0	9000
	Add Computer - 1/2 Price										
221000.1656273	Alarm & Control Module	6200F	3 ea	0	0	0	3000	0	0	0	3000
	Add Computer - 1/2 Price										
221000.1656275	CCTV Module	6200F	3 ea	0	0	0	3000	0	0	0	3000
	Add Computer - 1/2 Price										

APPENDIX I GRAPHIC LINK COMPUTER COSTS

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
Westinghouse Hanford Company
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** IEST - INTERACTIVE ESTIMATING **
PC Alternate - Cost Estimate for SAS Upgrade
Study Estimate
DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

PAGE 5
DATE 01/06/95 13:48:45
BY JJM

ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
221000.1656277	GL Net	6200F	1 ea	0	0	0	1000	0	0	0	1000
	Add Computer - 1/2 Price										
221000.1656290	*****	6200F	0	0	0	0	0	0	0	0	0
	Misc Workstation Software										
221000.1656291	OEMM	6200F	6 ea	0	0	0	258	0	0	0	258
221000.1656293	Laplink	6200F	6 ea	0	0	0	630	0	0	0	630
221000.1656295	Microsoft Bus Mouse	6200F	6 ea	0	0	0	390	0	0	0	390
<hr/>											
SUBTOTAL	Electrical	(FIELD)		0		0		0		0	
					0		83,742		0		83,742
	CONSUMABLES 2.00 %						1674				1674
	SALES TAX 7.80 %						6662		0		6662
	WAREHOUSING 17.40 %						14862				14862
<hr/>											
TOTAL	COST CODE 62016			0		0		0		0	
	WBS 221000				0		106,941		0		106,941
	(ESCALATION 1.06% - CONTINGENCY 5.00 %)										
<hr/>											
TOTAL WBS 221000 PFP - Alarm Display & Det Sys(ADDS)				0		0		0		0	
					0		106,941		0		106,941

APPENDIX I GRAPHIC LINK COMPUTER COSTS

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Westinghouse Hanford Company
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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
222000	Alarm Mon Op Sup Sys (AMOSS)										
222000.16	Electrical										
222000.1656200	*****	6200F	0	0	0	0	0	0	0	0	0
	Procurement - Hard/Software										
222000.1656270	*****	6200F	0	0	0	0	0	0	0	0	0
	Graphic Link Software										
	Add Computers 1/2 Price										
222000.1656271	GL Kernal	6200F	2 ea	0	0	0	6000	0	0	0	6000
	Add Computer - 1/2 Price										
222000.1656273	Alarm & Control Module	6200F	2 ea	0	0	0	2000	0	0	0	2000
	Add Computer - 1/2 Price										
222000.1656275	CCTV Module	6200F	2 ea	0	0	0	2000	0	0	0	2000
	Add Computer - 1/2 Price										
222000.1656277	GL Net	6200F	2 ea	0	0	0	2000	0	0	0	2000
	Add Computer - 1/2 Price										
222000.1656279	GL History	6200F	1 ea	0	0	0	2500	0	0	0	2500
	Add Computer - 1/2 Price										
222000.1656281	Pocket Pager Module	6200F	1 ea	0	0	0	500	0	0	0	500
	Add Computer - 1/2 Price										
222000.1656290	*****	6200F	0	0	0	0	0	0	0	0	0
	Misc Workstation Software										
222000.1656291	OEMM	6200F	4 ea	0	0	0	172	0	0	0	172
222000.1656293	Lapl原因	6200F	4 ea	0	0	0	420	0	0	0	420
222000.1656295	Microsoft Bus Mouse	6200F	4 ea	0	0	0	260	0	0	0	260
222000.1656297	Paradox 4.0	6200F	1 ea	0	0	0	446	0	0	0	446
222000.1656299	PC Paintbrush	6200F	2 ea	0	0	0	200	0	0	0	200
	*										

SUBTOTAL	Electrical	(FIELD)		0	0	0	16,498	0	0	0	16,498
	CONSUMABLES 2.00 %						329				329
	SALES TAX 7.80 %						1312		0		1312
	WAREHOUSING 17.40 %						2928				2928
TOTAL	COST CODE 62016			0	0	0	21,068	0	0	0	21,068
	WBS 222000				0				0		
	(ESCALATION 2.41% - CONTINGENCY 5.00 %)										
TOTAL WBS 222000 Alarm Mon Op Sup Sys (AMOSS)				0	0	0	21,068	0	0	0	21,068

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
223000	POC - Secondary Annunciation										
223000.16	Electrical										
223000.1656200	***** Procurement - Hard/Software	6200F	0	0	0	0	0	0	0	0	0
223000.1656270	***** Graphic Link Software Add Computers 1/2 Price	6200F	0	0	0	0	0	0	0	0	0
223000.1656271	GL Kernal Add Computer - 1/2 Price	6200F	4 ea	0	0	0	12000	0	0	0	12000
223000.1656273	Alarm & Control Module Add Computer - 1/2 Price	6200F	4 ea	0	0	0	4000	0	0	0	4000
223000.1656275	CCTV Module Add Computer - 1/2 Price	6200F	4 ea	0	0	0	4000	0	0	0	4000
223000.1656277	GL Net Add Computer - 1/2 Price	6200F	2 ea	0	0	0	2000	0	0	0	2000
223000.1656279	GL History Add Computer - 1/2 Price	6200F	1 ea	0	0	0	2500	0	0	0	2500
223000.1656281	Pocket Pager Module Add Computer - 1/2 Price	6200F	1 ea	0	0	0	500	0	0	0	500
223000.1656290	***** Misc Workstation Software	6200F	0	0	0	0	0	0	0	0	0
223000.1656291	OEMM	6200F	6 ea	0	0	0	258	0	0	0	258
223000.1656293	Laplink	6200F	6 ea	0	0	0	630	0	0	0	630
223000.1656295	Microsoft Bus Mouse	6200F	6 ea	0	0	0	390	0	0	0	390
SUBTOTAL	Electrical	(FIELD)		0	0	0	26,278	0	0	0	26,278
	CONSUMABLES 2.00 %						525				525
	SALES TAX 7.80 %						2090				2090
	WAREHOUSING 17.40 %						4663				4663
TOTAL	COST CODE 62016			0	0	0	33,558	0	0	0	33,558
	WBS 223000				0				0		
	(ESCALATION 3.27% - CONTINGENCY 5.00 %)										
TOTAL WBS 223000 POC - Secondary Annunciation				0	0	0	33,558	0	0	0	33,558

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
310000	Training										
310000.00	Technical Services										
310000.0006401	Prepare CAS Operator Training Program - Allow 2 Person 6 Weeks	962	1 1st	480	35520	0	0	0	0	0	35520
310000.0006404	Train CAS Operators Training Program - Allow 30 Person 24 Hr/ea	962	1 ls	720	53280	0	0	0	0	0	53280
310000.0006407	Train System Analysts Allow 2 Person 1 Week	962	1 ls	80	5920	0	0	0	0	0	5920
SUBTOTAL	Technical Services			1,280	94,720	0	0	0	0	0	94,720
TOTAL	COST CODE 96200 WBS 310000 (ESCALATION 3.27% - CONTINGENCY 15.00 %)			1,280	94,720	0	0	0	0	0	94,720
TOTAL WBS 310000 Training				1,280	94,720	0	0	0	0	0	94,720

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
311000	PFP - Alarm Display & Det Sys(ADDS)										
311000.16	Electrical										
311000.1656401	Reconfigure Exist Racks and Consoles	6200F	1 lot	320	10867	0	500	0	0	12171	23538
311000.1656411	System Installation 4 men 2 Weeks	6200F	1 lot	320	10867	0	500	0	0	12171	23538
311000.1699048	ATP & TEST ALLOWANCE Assume 3 Men 2 Days	6200F	2 Job	96	3260	0	200	0	0	3651	7111
SUBTOTAL	Electrical	(FIELD)		736		0		0		27,993	
	DOUBLE SECURITY 10.00 %			73	24,994		1,200		0		54,187
	GENERAL FOREMAN 5.00 %			40	2499						2499
	CONSUMABLES 6.00 %						72				72
	SALES TAX 7.80 %						99		0		99
	WAREHOUSING 17.40 %						221				221
	OH&P (ON MARKUPS ONLY)									4338	4338
TOTAL	COST CODE 62016			850		0		0		32,331	
	WBS 311000				28,868		1,592		0		62,792
	(ESCALATION 3.27% - CONTINGENCY 25.00 %)										
TOTAL WBS 311000	PFP - Alarm Display & Det Sys(ADDS)			850		0		0		32,331	
					28,868		1,592		0		62,792

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
312000	Alarm Mon Op Sup Sys (AMOSS)										
312000.16	Electrical										
312000.1656401	Reconfigure Exist Racks and Consoles	6200F	1 lot	320	10867	0	500	0	0	12171	23538
312000.1656411	System Installation 4 men 2 Weeks	6200F	1 lot	320	10867	0	500	0	0	12171	23538
312000.1699048	ATP & TEST ALLOWANCE Assume 3 Men 2 Days	6200F	1 Job	48	1630	0	100	0	0	1826	3556
SUBTOTAL	Electrical	(FIELD)		688		0		0		26,168	
	DOUBLE SECURITY 10.00 %			68	23,364		1,100		0		50,632
	GENERAL FOREMAN 5.00 %			37	2336						2336
	CONSUMABLES 6.00 %				1285		66				1285
	SALES TAX 7.80 %						90		0		66
	WAREHOUSING 17.40 %						202				90
	OH&P (ON MARKUPS ONLY)									4055	202
TOTAL	COST CODE 62016			794		0		0		30,223	
	WBS 312000				26,985		1,459		0		58,669
	(ESCALATION 3.27% - CONTINGENCY 25.00 %)										
TOTAL WBS 312000 Alarm Mon Op Sup Sys (AMOSS)				794		0		0		30,223	
					26,985		1,459		0		58,669

KAISER ENGINEERS HANFORD
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** IEST - INTERACTIVE ESTIMATING **
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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
=====											
REPORT TOTAL				7,966	492,529	0	166,213	30,000	0	94,887	783,630

APPENDIX I GRAPHIC LINK COMPUTER COSTS

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
313000	POC - Secondary Annunciation										
313000.16	Electrical										
313000.1656401	Reconfigure Exist Racks and Consoles	6200F	1 lot	320	10867	0	500	0	0	12171	23538
313000.1656411	System Installation 4 men 2 Weeks	6200F	1 lot	320	10867	0	500	0	0	12171	23538
313000.1699048	ATP & TEST ALLOWANCE Assume 3 Men 2 Days	6200F	2 Job	96	3260	0	200	0	0	3651	7111
SUBTOTAL	Electrical	(FIELD)		736		0		0		27,993	
	DOUBLE SECURITY 10.00 %			73	24,994		1,200		0		54,187
	GENERAL FOREMAN 5.00 %			40	1374						2499
	CONSUMABLES 6.00 %						72				1374
	SALES TAX 7.80 %						99		0		72
	WAREHOUSING 17.40 %						221				99
	OH&P (ON MARKUPS ONLY)									4338	221
										4338	4338
TOTAL	COST CODE 62016			850		0		0		32,331	
	WBS 313000				28,868		1,592		0		62,792
	(ESCALATION 3.27% - CONTINGENCY 25.00 %)										
TOTAL WBS 313000 POC - Secondary Annunciation				850		0		0		32,331	
					28,868		1,592		0		62,792

APPENDIX I GRAPHIC LINK COMPUTER COSTS

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PC Alternate - Cost Estimate for SAS Upgrade
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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
400000	Project Management-O/C										
400000.19	Project Management										
400000.1900011	OC (WHC) Project Management Allowance of 40 Hr/Month	060	1 ls	720	56160	0	0	0	0	0	56160
SUBTOTAL	Project Management			720		0		0		0	
					56,160		0		0		56,160
TOTAL	COST CODE 06019			720		0		0		0	
	WBS 400000				56,160		0		0		56,160
	(ESCALATION 2.69% - CONTINGENCY 15.00 %)										
TOTAL WBS 400000	Project Management-O/C			720		0		0		0	
					56,160		0		0		56,160

ESCALATION ANALYSIS SCHEDULE

Project No/Work Order No.C-217
Title: SAS Upgrades at PFP - PC Based Sys Replacement
Date:01/06/95
Requested By:G Rippey
Prepared by: J Mucha

APPENDIX J CRITERIA EVALUATION

The following table provides the criteria rating for the security system replacement alternatives. The ratings are a best guess based on the information available at the time.

The order compliance and functionality criteria rating for the PC and HP are To Be Determined (TBD) during on going evaluation and testing.

The immediate cost rating is based on procurement and installation costs.

The long term cost rating is based on maintenance and training. The PC may require additional maintenance personnel.

The schedule rating is based on time and effort to install the system at the PFP facility. Type of funding is not considered because depending on the time and budgets, capital or expense money requests/approval may push the implementation out a year or two.

	ARGUS	MICON	HP	PC
SAFETY	excellent	excellent	excellent	excellent
ORDER COMPLIANCE	excellent	poor	TBD	TBD
IMMEDIATE COST	high	medium	medium	low/medium
LONG TERM COST	medium	medium	low	medium
SCHEDULE	long	medium	short/medium	short/medium
AVAILABILITY	good	excellent	excellent	excellent
FLEXIBILITY	excellent	poor	excellent	excellent
FUNCTIONALITY	excellent	poor	TBD	TBD

The following table provides the criteria rating for the Multiplexer alternatives.

	LONWORKS	MASON & HANGER
SAFETY	excellent	excellent
ORDER COMPLIANCE	excellent	excellent
IMMEDIATE COST	high	medium
LONG TERM COST	high	high
SCHEDULE	medium	medium
AVAILABILITY	good	good
FLEXIBILITY	good	excellent
FUNCTIONALITY	good	excellent

APPENDIX K PROJECT COST ESTIMATE

This cost estimate is the same as provided for the STPO study WHC-SD-CP-ES-161 Rev.0 "Replacement Analysis for Safeguards and Security Systems of Hanford Protected Areas". The Kaiser estimators have indicated that the project costs of the original STPO study are still valid for this study.

APPENDIX K PROJECT COST ESTIMATE

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
DEPARTMENT OF ENERGY
JOB NO. STUDY ESTIMATE

** IEST - INTERACTIVE ESTIMATING **
HANFORD SAFEGUARDS AND SECURITY TRANSITION PROJECT
PROTECTED AREA SYSTEMS for check issue only
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
511A00	PROJECT MANAGEMENT	159210	0	159210	20.38	32447	191657	249154
511B00	PSAR/FSAR	53070	0	53070	8.75	4644	57714	75028
511C00	SYS CONFIG/TESTING	159210	0	159210	33.25	52937	212147	275792
511D10	SPECIFICATION PREP & APRVL	79634	0	79634	24.19	19263	98897	128567
511D20	SYSTEM PROCUREMENT	906952	0	906952	27.35	248051	1155003	1501504
	SUBTOTAL 511D PROCUREMENT - (OC)	986586	0	986586	27.09	267314	1253900	1630071
511E00	INSTALLATION DESIGN	222000	0	222000	24.19	53702	275702	358412
511F10	PFP - INSTALLATION	1434328	0	1434328	27.35	392289	1826617	2374601
	SUBTOTAL 511F INSTALLATION	1434328	0	1434328	27.35	392289	1826617	2374601
511G00	OUTAGE PLANNING	53070	0	53070	33.25	17646	70716	91931
511H00	ESCORT SERVICES	79605	0	79605	27.35	21772	101377	131790
	SUBTOTAL 511 AMS STA, PFP MUX	3147079	0	3147079	26.78	842751	3989830	5186779
	SUBTOTAL 51 REPL PROT AREA ALM MON SYS	3147079	0	3147079	26.78	842751	3989830	5186779
541A00	PROJECT MANAGEMENT	11600	0	11600	20.38	2364	13964	18153
541B00	PSAR/FSAR	6380	0	6380	8.75	558	6938	9020
541C00	HCS PROCUREMENT	88608	0	88608	27.35	24234	112842	129769
541D00	INSTALLATION DESIGN	148000	0	148000	24.19	35801	183801	238942
541E00	INSTALLATION	74827	0	74827	27.35	20465	95292	123880
	SUBTOTAL 541 LANMAS	329415	0	329415	25.32	83422	412837	519764
542A00	PROJECT MANAGEMENT	79750	0	79750	20.38	16253	96003	124804
542B00	PSAR/FSAR	9860	0	9860	8.75	863	10723	13940
542C00	INSTALLATION DESIGN	118400	0	118400	24.19	28641	147041	191153
542D00	SAFEGUARD CCTV/AUDIO - CONSTRUCTION	388660	0	388660	27.35	106298	494958	643446
	SUBTOTAL 542 VAULT ACCESS/ALARA UPGRADES	596670	0	596670	25.48	152055	748725	973343
543A00	PROJECT MANAGEMENT	26680	0	26680	20.38	5437	32117	41753

APPENDIX K PROJECT COST ESTIMATE

WHC-SD-C217-ES-001 Rev.0

KAISER ENGINEERS HANFORD
DEPARTMENT OF ENERGY
JOB NO. STUDY ESTIMATE

** TEST - INTERACTIVE ESTIMATING **
HANFORD SAFEGUARDS AND SECURITY TRANSITION PROJECT
PROTECTED AREA SYSTEMS for check issue only
DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS		
543B00	PSAR/FSAR	10208	0	10208	8.75	893	11101	30	3330	14432
543C00	SYSTEM PROCUREMENT	132179	0	132179	27.35	36151	168330	30	50499	218829
543D00	INSTALLATION DESIGN	148000	0	148000	24.19	35801	183801	30	55140	238942
543E00	INSTALLATION	534226	0	534226	27.35	146111	680337	30	204101	884438
543F00	SYSTEM INTEGRATION/TESTING	53070	0	53070	33.25	17646	70716	30	21215	91931
	SUBTOTAL 543 VSIS	904363	0	904363	26.76	242039	1146402	30	343920	1490325
544A00	PROJECT MANAGEMENT	13340	0	13340	20.38	2719	16059	30	4818	20876
544B00	PSAR/FSAR	9860	0	9860	8.75	863	10723	30	3217	13940
544C00	SYSTEM PROCUREMENT	375399	0	375399	27.35	102672	478071	30	143421	621492
544D00	INSTALLATION DESIGN	148000	0	148000	24.19	35801	183801	30	55140	238942
544E00	INSTALLATION	351867	0	351867	27.35	96235	448102	30	134431	582533
544F00	SYSTEM INTEGRATION/TESTING	106140	0	106140	33.25	35292	141432	30	42429	183861
	SUBTOTAL 544 INVENTORY TECHNOLOGY	1004606	0	1004606	27.23	273582	1278188	30	383456	1661644
	SUBTOTAL 54 NUCLEAR MAT CONTROL & ACCOU	2835054	0	2835054	26.49	751098	3586152	30	1058918	4645076
	SUBTOTAL 5 PROT. AREA SYS - CAPITAL	5982133	0	5982133	26.64	1593849	7575982	30	2255867	9831855
611A00	SAFETY/ENVIR DOC - PRE-CAPITAL	26680	0	26680	8.75	2335	29015	30	8704	37719
611B00	PLANT SUPPORT	159210	0	159210	20.38	32447	191657	30	57497	249154
611C00	SAS SUPPORT	159210	0	159210	20.38	32447	191657	30	57497	249154
611E00	FDC PREPARATION	165340	0	165340	5.81	9606	174946	30	52484	227430
611F00	CDR PREPARATION	603210	0	603210	8.75	52781	655991	30	196797	852788
611G00	AMS TRANSITION SUPPORT	106140	0	106140	33.25	35292	141432	30	42429	183861
611H00	ADP DOC PREP, APRVL, & COORDINATION	115130	0	115130	24.19	27850	142980	30	42894	185874
611I00	ADP LONG RANGE PLANNING	8874	0	8874	24.19	2147	11021	30	3306	14327
611J00	PROCUREMENT BID REVIEW	53070	0	53070	28.66	15210	68280	30	20484	88764
611L00	TRAINING - MAINT/SOFTWARE/PATROL	84970	0	84970	33.25	28253	113223	30	33967	147189
	SUBTOTAL 611 ALM MON CMPTR SYS REPLACEME	1481834	0	1481834	16.09	238368	1720202	30	516059	2236260
	SUBTOTAL 61 REPL PROT AREA ALM MON SYS	1481834	0	1481834	16.09	238368	1720202	30	516059	2236260
641A00	PC RELATED PROCUREMENTS - HCS	182152	0	182152	27.35	49819	231971	10	23197	255168
641B00	TRAVEL EXPENSE	34000	0	34000	24.19	8225	42225	10	4222	46447

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DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
641C00	OC CONTRACTS & PROCUREMENT	128002	0	128002	24.69	31605	10	175568
641E00	IRM SERVICES	266800	0	266800	33.25	88711	10	391062
641F00	IRM SUPPORT COSTS	1157100	0	1157100	33.25	384736	15	1773111
SUBTOTAL 641 LANMAS		1768054	0	1768054	31.85	563096	13	2641356
642A00	SAFETY/ENVIR DOC - PRE-CAPITAL	12528	0	12528	8.75	1096	30	17711
642B00	PLANT SUPPORT	53070	0	53070	20.38	10816	30	83051
642C00	SAS SUPPORT	26680	0	26680	20.38	5437	30	41753
642D00	PROJECT MANAGEMENT	26680	0	26680	20.38	5437	30	41753
642E00	INSTALLATION DESIGN	74000	0	74000	24.19	17901	30	119471
642F00	FDC PREPARATION	145780	0	145780	5.81	8470	30	200525
642G00	CDR PREPARATION	217140	0	217140	8.75	19000	30	306982
642H10	CAM/SMPLR RELOC TO OUT VAULT	47851	0	47851	27.35	13087	30	79219
642H20	EMERG POWER/ADDED HVAC	148261	0	148261	27.35	40549	21	227781
SUBTOTAL 642H CONSTRUCTION		196112	0	196112	27.35	53636	23	307000
SUBTOTAL 642 VAULT ACCESS/ALARA UPGRADES		751990	0	751990	16.20	121793	28	1118246
643A00	SAFETY/ENVIR DOC - PRE-CAPITAL	26680	0	26680	8.75	2335	30	37719
643B00	PLANT SUPPORT	53070	0	53070	20.38	10816	30	83051
643C00	SAS SUPPORT	53070	0	53070	20.38	10816	30	83051
643D00	PROJECT MANAGEMENT	13340	0	13340	20.38	2719	30	20876
643E00	FDC PREPARATION	109380	0	109380	5.81	6355	30	150455
643F00	CDR PREPARATION	175660	0	175660	8.75	15370	30	248339
643G00	SYSTEM INTEGRATION/TESTING	345100	0	345100	33.25	114746	30	597799
SUBTOTAL 643 VSIS		776300	0	776300	21.02	163157	30	1221290
644A00	SAFETY/ENVIR DOC - PRE-CAPITAL	9280	0	9280	8.75	812	30	13120
644B00	PLANT SUPPORT	26680	0	26680	20.38	5437	30	41753
644C00	SAS SUPPORT	26680	0	26680	20.38	5437	30	41753
644D00	PROJECT MANAGEMENT	13340	0	13340	20.38	2719	30	20876
644E00	FDC PREPARATION	90880	0	90880	5.81	5280	30	125008
644F00	CDR PREPARATION	190750	0	190750	8.75	16691	30	269673
SUBTOTAL 644 INVENTORY TECHNOLOGY		357610	0	357610	10.17	36376	30	512183

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WBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION % TOTAL	SUB TOTAL	CONTINGENCY % TOTAL	TOTAL DOLLARS
=====	=====	=====	=====	=====	=====	=====	=====	=====
SUBTOTAL 64	NUCLEAR MAT CONTROL & ACCOU	3653954	0	3653954	24.20 884422	4538376	21 954700	5493075
SUBTOTAL 6	PROT. AREA SYS - EXPENSE	5135788	0	5135788	21.86 1122790	6258578	23 1470759	7729335
=====								
PROJECT TOTAL		11,117,921	0	11,117,921	24.43 2,716,639	13,834,560	27 3,726,626	17,561,190

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511A00	PROJECT MANAGEMENT										
511A00.19	PROJECT MANAGEMENT CLIENT										
511A00.1900561	OPERATING CONTRACTOR (OC) PROJECT MANAGEMENT ALLOW .5 MEN 3 YEARS	770	2745 MH	2745	159210	0	0	0	0	0	159210
SUBTOTAL	PROJECT MANAGEMENT CLIENT			2,745		0	0	0	0	0	
					159,210		0		0		159,210
TOTAL	COST CODE 77019 WBS 511A00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			2,745		0	0	0	0	0	
					159,210		0		0		159,210
TOTAL WBS 511A00 PROJECT MANAGEMENT				2,745		0	0	0	0	0	
					159,210		0		0		159,210

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511B00	PSAR/FSAR										
511B00.00	TECHNICAL SERVICES										
511B00.0001561	OPERATING CONTRACTOR (OC) PSAR/FSAR 1 MAN 6 MONTHS	770	915 MH	915	53070	0	0	0	0	0	53070
SUBTOTAL	TECHNICAL SERVICES			915	53,070	0	0	0	0	0	53,070
TOTAL	COST CODE 77000 WBS 511B00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			915	53,070	0	0	0	0	0	53,070
TOTAL WBS 511B00 PSAR/FSAR				915	53,070	0	0	0	0	0	53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511C00	SYS CONFIG/TESTING										
511C00.00	TECHNICAL SERVICES										
511C00.0016561	SYSTEM CONFIGURATION AND TESTING - 18 MAN MONTHS	770	2745 MH	2745	159210	0	0	0	0	0	159210
SUBTOTAL TECHNICAL SERVICES				2,745	159,210	0	0	0	0	0	159,210
TOTAL COST CODE 77000 WBS 511C00 (ESCALATION 33.25% - CONTINGENCY 30.00 %)				2,745	159,210	0	0	0	0	0	159,210
TOTAL WBS 511C00 SYS CONFIG/TESTING				2,745	159,210	0	0	0	0	0	159,210

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511D10	SPECIFICATION PREP & APRVL										
511D10.00	TECHNICAL SERVICES										
511D10.0016563	SPECIFICATION PREPARATION AND APPROVAL - 9 MAN MONTHS	770	1373 MH	1373	79634	0	0	0	0	0	79634
<hr/>											
SUBTOTAL	TECHNICAL SERVICES			1,373		0	0	0	0	0	
					79,634		0		0		79,634
<hr/>											
TOTAL	COST CODE 77000			1,373		0	0	0	0	0	
					79,634		0		0		79,634
<hr/>											
				1,373		0	0	0	0	0	
TOTAL WBS 511D10 SPECIFICATION PREP & APRVL					79,634		0		0		79,634

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511D20	SYSTEM PROCUREMENT										
511D20.16	ELECTRICAL										
511D20.1656001	ALARM MONITORING SYSTEM HOST COMPUTER AND OPERATOR WORKSTATIONS AND SUPPORT SYSTEM EQUIPMENT	770	1 LOT	0	0	0	500000	0	0	0	500000
511D20.1656004	RDU 310	770	55 EA	0	0	0	55000	0	0	0	55000
511D20.1656007	RDU CAGE	770	9 EA	0	0	0	9000	0	0	0	9000
511D20.1656010	SRT	770	5 EA	0	0	0	12500	0	0	0	12500
511D20.1656101	ALARM MONITORING SYSTEM COMPUTER TRAINING SIMULATOR	770	1 LOT	0	0	0	200000	0	0	0	200000
SUBTOTAL	ELECTRICAL			0	0	0	776,500	0	0	0	776,500
	SALES TAX 7.80 %						60567		0		60567
	WAREHOUSING 9.00 %						69885				69885
TOTAL	COST CODE 77016 WBS 511D20 (ESCALATION 27.35% - CONTINGENCY 30.00 %)			0	0	0	906,952	0	0	0	906,952
TOTAL WBS 511D20 SYSTEM PROCUREMENT				0	0	0	906,952	0	0	0	906,952

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511E00	INSTALLATION DESIGN										
511E00.00	TECHNICAL SERVICES										
511E00.0000101	ONSITE ENGINEER DEFINITIVE DESIGN AND FIELD ENGINEERING/INSPECTION 12 DRAWINGS	000	12 LOT	3000	222000	0	0	0	0	0	222000
SUBTOTAL	TECHNICAL SERVICES			3,000	222,000	0	0	0	0	0	222,000
TOTAL	COST CODE 00000 WBS 511E00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			3,000	222,000	0	0	0	0	0	222,000
TOTAL WBS 511E00	INSTALLATION DESIGN			3,000	222,000	0	0	0	0	0	222,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511F10	PFP - INSTALLATION										
511F10.16	ELECTRICAL										
511F10.1629701	RDU UNITS	501 F	24 JOB	96	3186	0	240	0	0	4269	7695
511F10.1629704	RDU CAGES	501 F	4 JOB	16	531	0	40	0	0	712	1283
511F10.1629707	SRT UNITS	501 F	2 JOB	16	531	0	20	0	0	712	1263
511F10.1629801	CONNECT EXISTING SENSORS TO NEW SECURITY MUX - INCLUDES 50' CONDUIT & WIRE	501 F	190 JOB	4076	135282	0	32997	0	0	181278	349557
511F10.1656451	INSTALL SECURITY MUX IN NEMA 12 ENCLOSURE W/TAMPER SWITCH 2'x 2'x 8"	501 F	2 EA	24	797	0	850	0	0	1068	2715
SUBTOTAL	ELECTRICAL	(FIELD)		4,228		0		0		188,039	
	DOUBLE SECURITY 20.00 %			845	140,327		34,147		0		362,513
	GENERAL FOREMAN 5.00 %			253	28065						28065
	CONSUMABLES 6.00 %				8419						8419
	SALES TAX 7.80 %						2048				2048
	WAREHOUSING 20.00 %						2823		0		2823
	OH&P (ON MARKUPS ONLY)						7239				7239
										48889	48889
TOTAL	COST CODE 50116			5,327		0		0		236,928	
	WBS 511F10				176,812		46,258		0		459,999
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
511F10.16	ELECTRICAL										
511F10.1629701	RDU UNITS	501 W	31 JOB	124	4116	0	310	0	0	5515	9941
511F10.1629704	RDU CAGES	501 W	5 JOB	20	664	0	50	0	0	890	1604
511F10.1629707	SRT UNITS	501 W	3 JOB	24	797	0	30	0	0	1068	1895
511F10.1629802	CONNECT EXISTING SENSORS TO NEW SECURITY MUX - INCLUDES 50' CONDUIT & WIRE	501 W	236 JOB	5063	168041	0	40986	0	0	225175	434202
511F10.1656451	INSTALL SECURITY MUX IN NEMA 12 ENCLOSURE W/TAMPER SWITCH 2'x 2'x 8"	501 W	3 EA	36	1195	0	1275	0	0	1601	4071
SUBTOTAL	ELECTRICAL	(SWP)		5,267		0		0		234,249	
	SWP 15.00%			790	174,813		42,651		0		451,713
	DOUBLE SECURITY 20.00 %			1211	26221						26221
	GENERAL FOREMAN 5.00 %			363	40206						40206
					12062						12062

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
	CONSUMABLES 6.00 %						2559				2559
	SALES TAX 7.80 %						3526		0		3526
	WAREHOUSING 20.00 %						9042				9042
	OH&P (ON MARKUPS ONLY)									105177	105177
TOTAL	COST CODE 50116			7,631		0		0		339,426	
	WBS 511F10				253,304		57,778		0		650,509
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
511F10.16	ELECTRICAL										
511F10.1656001	ALARM MONITORING SYSTEM	770 F	1 LOT	2000	66380	0	20000	0	0	88949	175329
	COMPUTER AND OPERATOR CONSOLES										
511F10.1656101	ALARM MONITORING SYSTEM	770 F	1 LOT	1000	33190	0	1000	0	0	44475	78665
	COMPUTER TRAINING SIMULATOR INSTALLATION										
511F10.1656455	SECURITY MUX UPS - ALLOW ONE PER 5 MUX	770 F	1 EA	8	266	0	750	0	0	356	1372
SUBTOTAL	ELECTRICAL (FIELD)			3,008		0		0		133,780	
	DOUBLE SECURITY 20.00 %			601	99,836		21,750		0		255,366
	GENERAL FOREMAN 5.00 %			180	19967						19967
	CONSUMABLES 6.00 %				5990						5990
	SALES TAX 7.80 %						1305				1305
	WAREHOUSING 20.00 %						1798		0		1798
	OH&P (ON MARKUPS ONLY)						4611				4611
										34782	34782
TOTAL	COST CODE 77016			3,790		0		0		168,562	
	WBS 511F10				125,793		29,464		0		323,820
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
TOTAL WBS 511F10 PFP - INSTALLATION				16,749		0		0		744,918	
					555,909		133,501		0		1,434,329

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511G00	OUTAGE PLANNING										
511G00.00	TECHNICAL SERVICES										
511G00.0000104	OUTAGE PLAN (OC) ALLOW 1 MEN 6 MONTHS	770	915 MH	915	53070	0	0	0	0	0	53070
SUBTOTAL	TECHNICAL SERVICES			915	53,070	0	0	0	0	0	53,070
TOTAL	COST CODE 77000 WBS 511G00 (ESCALATION 33.25% - CONTINGENCY 30.00 %)			915	53,070	0	0	0	0	0	53,070
TOTAL WBS 511G00	OUTAGE PLANNING			915	53,070	0	0	0	0	0	53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
511H00	ESCORT SERVICES										
511H00.00	TECHNICAL SERVICES										
511H00.0020104	ESCORTS ALLOW 2 FOR 9 MONTHS EACH	770	2745 MH	2745	79605	0	0	0	0	0	79605
SUBTOTAL	TECHNICAL SERVICES			2,745	79,605	0	0	0	0	0	79,605
TOTAL	COST CODE 77000 WBS 511H00 (ESCALATION 27.35% - CONTINGENCY 30.00 %)			2,745	79,605	0	0	0	0	0	79,605
TOTAL WBS 511H00	ESCORT SERVICES			2,745	79,605	0	0	0	0	0	79,605

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
541A00	PROJECT MANAGEMENT										
541A00.19	PROJECT MANAGEMENT CLIENT										
541A00.1900561	OPERATING CONTRACTOR (OC) PROJECT MANAGEMENT ALLOW 1 MEN 1.3 MONTH	501	200 MH	200	11600	0	0	0	0	0	11600
<hr/>											
SUBTOTAL	PROJECT MANAGEMENT CLIENT			200		0	0	0	0	0	
					11,600		0		0		11,600
<hr/>											
TOTAL	COST CODE 50119 WBS 541A00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			200		0	0	0	0	0	
					11,600		0		0		11,600
<hr/>											
TOTAL WBS 541A00 PROJECT MANAGEMENT				200		0	0	0	0	0	
					11,600		0		0		11,600

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
541B00	PSAR/FSAR										
541B00.16	ELECTRICAL										
541B00.1656706	PSAS UPDATE	770	110 MH	110	6380	0	0	0	0	0	6380
SUBTOTAL	ELECTRICAL			110		0	0	0	0	0	
					6,380		0		0		6,380
TOTAL	COST CODE 77016			110		0	0	0	0	0	
	WBS 541B00				6,380		0		0		6,380
	(ESCALATION 8.75% - CONTINGENCY 30.00 %)										
TOTAL WBS 541B00 PSAR/FSAR				110		0	0	0	0	0	
					6,380		0		0		6,380

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
541C00	HCS PROCUREMENT										
541C00.16	ELECTRICAL										
541C00.1656706	SERVER - WHC etc	770	1 JOB	0	0	0	50000	0	0	0	50000
541C00.1656708	PRODUCTION PRINTER - WHC	770	1 JOB	0	0	0	15000	0	0	0	15000
541C00.1656721	STU PHONES	770	4 EA	0	0	0	6000	0	0	0	6000
<hr/>											
SUBTOTAL	ELECTRICAL			0		0		0		0	
	SALES TAX 7.80 %				0		71,000		0		71,000
	WAREHOUSING 17.00 %						5538		0		5538
							12070				12070
<hr/>											
TOTAL	COST CODE 77016			0		0		0		0	
	WBS 541C00				0		88,608		0		88,608
	(ESCALATION 27.35% - CONTINGENCY 15.00 %)										
<hr/>											
TOTAL WBS 541C00	HCS PROCUREMENT			0		0	88,608	0	0	0	88,608

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
541D00	INSTALLATION DESIGN										
541D00.00	TECHNICAL SERVICES										
541D00.0000101	ONSITE ENGINEER DEFINITIVE DESIGN AND FIELD ENGINEERING/INSPECTION ALLOWANCE	000	1 LOT	2000	148000	0	0	0	0	0	148000
SUBTOTAL	TECHNICAL SERVICES			2,000	148,000	0	0	0	0	0	148,000
TOTAL	COST CODE 00000 WBS 541D00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			2,000	148,000	0	0	0	0	0	148,000
TOTAL WBS 541D00	INSTALLATION DESIGN			2,000	148,000	0	0	0	0	0	148,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
541E00	INSTALLATION										
541E00.16	ELECTRICAL										
541E00.1610502	1" GRS CONDUIT W/1 6/C FIBER OPTIC CABLES - PFP CONNECT TO EXISTING LOOP	501 W	1000 LF	448	14869	0	5090	0	0	19924	39883
541E00.1656701	INSTALL WORK STATIONS	501 W	17 JOB	68	2257	0	850	0	0	3024	6131
541E00.1656702	INSTALL WORK STATIONS FURNITURE	501 W	17 JOB	68	2257	0	425	0	0	3024	5706
541E00.1656703	INSTALL PRODUCTION PRINTER	501 W	1 JOB	4	133	0	25	0	0	178	336
SUBTOTAL	ELECTRICAL	(SWP)		588	19,516	0	6,390	0	0	26,150	52,056
	SWP 15.00%			88	2927						2927
	DOUBLE SECURITY 20.00 %			135	4488						4488
	GENERAL FOREMAN 5.00 %			40	1346						1346
	CONSUMABLES 6.00 %						383				383
	SALES TAX 7.80 %						528		0		528
	WAREHOUSING 20.00 %						1354				1354
	OH&P (ON MARKUPS ONLY)									11741	11741
TOTAL	COST CODE 50116 WBS 541E00 (ESCALATION 27.35% - CONTINGENCY 30.00 %)			852	28,278	0	8,656	0	0	37,891	74,827
TOTAL WBS 541E00	INSTALLATION			852	28,278	0	8,656	0	0	37,891	74,827

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
542A00	PROJECT MANAGEMENT										
542A00.19	PROJECT MANAGEMENT CLIENT										
542A00.1900661	OPERATING CONTRACTOR (OC) PROJECT MANAGEMENT ALLOW .5 MEN 1.5 YEARS	501	1375 MH	1375	79750	0	0	0	0	0	79750
SUBTOTAL	PROJECT MANAGEMENT CLIENT			1,375	79,750	0	0	0	0	0	79,750
TOTAL	COST CODE 50119 WBS 542A00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			1,375	79,750	0	0	0	0	0	79,750
TOTAL WBS 542A00	PROJECT MANAGEMENT			1,375	79,750	0	0	0	0	0	79,750

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
542B00	PSAR/FSAR										
542B00.00	TECHNICAL SERVICES										
542B00.0002561	OPERATING CONTRACTOR (OC) PSAR/FSAR	501	170 MH	170	9860	0	0	0	0	0	9860
<hr/>											
SUBTOTAL	TECHNICAL SERVICES			170		0	0	0	0	0	
					9,860		0		0		9,860
<hr/>											
TOTAL	COST CODE 50100 WBS 542B00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			170		0	0	0	0	0	
					9,860		0		0		9,860
<hr/>											
TOTAL WBS 542B00 PSAR/FSAR				170		0	0	0	0	0	
					9,860		0		0		9,860

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
542C00	INSTALLATION DESIGN										
542C00.00	TECHNICAL SERVICES										
542C00.0000201	ONSITE ENGINEER DEFINITIVE DESIGN AND FIELD ENGINEERING/INSPECTION ALLOWANCE	000	1 LOT	1600	118400	0	0	0	0	0	118400
SUBTOTAL	TECHNICAL SERVICES			1,600	118,400	0	0	0	0	0	118,400
TOTAL	COST CODE 00000 WBS 542C00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			1,600	118,400	0	0	0	0	0	118,400
TOTAL WBS 542C00	INSTALLATION DESIGN			1,600	118,400	0	0	0	0	0	118,400

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
542D00	SAFEGUARD CCTV/AUDIO - CONSTRUCTION										
542D00.16	ELECTRICAL										
542D00.1654617	CORE DRILL	501 M	10 JOB	160	5310	0	1000	0	0	7115	13425
	SUBTOTAL ELECTRICAL	(MASK)		160		0		0		7,115	
	SWP 100.00%			160	5,310		1,000		0		13,425
	DOUBLE SECURITY 20.00 %			64	5310						5310
	GENERAL FOREMAN 5.00 %			19	2124						2124
	CONSUMABLES 6.00 %				637						637
	SALES TAX 7.80 %						60				60
	WAREHOUSING 20.00 %						82		0		82
	OH&P (ON MARKUPS ONLY)						212				212
										10815	10815
TOTAL	COST CODE 50116			403		0		0		17,930	
	WBS 542D00				13,381		1,354		0		32,666
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
542D00.16	ELECTRICAL										
542D00.1641401	INTERCOM CONDUIT & WIRE ALLOWANCE - 100' PER ROOM	501 W	1000 LF	400	13276	0	1500	0	0	17790	32566
542D00.1641501	INTERCOM SPEAKER HORNS ASSUME 3/ROOM	501 W	30 EA	120	3983	0	4500	0	0	5337	13820
542D00.1641504	INTERCOM MASTER CONTROL	501 W	2 EA	32	1062	0	5000	0	0	1423	7485
542D00.1654601	INSTALL CCTV CAMERA INCLUDES CAMERA, MISC	501 W	31 EA	482	15998	0	47663	0	0	21437	85098
542D00.1654602	INST CCTV CAMERA W/PAN/TILT/ZOOM	501 W	6 EA	144	4779	0	18000	0	0	6404	29183
542D00.1654603	CONDUIT/WIRE AND CONTROL FOR PAN/TILT/ZOOM CAMERAS ALLOW 100' EACH	501 W	600 LF	240	7966	0	1500	0	0	10674	20140
542D00.1654604	CCTV MONITOR 9"	501 W	8 EA	32	1062	0	5200	0	0	1423	7685
542D00.1654605	CCTV CAMERA CONDUIT & CABLE ALLOW 100' PER ROOM	501 W	1000 LF	400	13276	0	3000	0	0	17790	34066
542D00.1654607	10 CAMERA CCTV MANUAL SWITCHER	501 W	1 EA	32	1062	0	3100	0	0	1423	5585
542D00.1654608	40 CAMERA CCTV MANUAL SWITCHER	501 W	1 EA	60	1991	0	12000	0	0	2668	16659
	SUBTOTAL ELECTRICAL	(SWP)		1,942		0		0		86,369	
					64,455		101,463		0		252,287

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
	SWP 15.00%			291	9668						9668
	DOUBLE SECURITY 20.00 %			446	14824						14824
	GENERAL FOREMAN 5.00 %			133	4447						4447
	CONSUMABLES 6.00 %						6087				6087
	SALES TAX 7.80 %						8388		0		8388
	WAREHOUSING 20.00 %						21510				21510
	OH&P (ON MARKUPS ONLY)									38779	38779
<hr/>											
TOTAL	COST CODE 50116.			2,813		0		0		125,148	
	WBS 542D00				93,395		137,449		0		355,994
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
<hr/>											
TOTAL WBS 542D00 SAFEGUARD CCTV/AUDIO - CONSTRUCTION				3,217		0		0		143,079	
					106,776		138,804		0		388,660

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
543A00	PROJECT MANAGEMENT										
543A00.19	PROJECT MANAGEMENT CLIENT										
543A00.1900561	OPERATING CONTRACTOR (OC)	501	460 MH	460	26680	0	0	0	0	0	26680
	PROJECT MANAGEMENT										
	ALLOW .25 MEN 1 YEARS										
SUBTOTAL	PROJECT MANAGEMENT CLIENT			460		0		0		0	
					26,680		0		0		26,680
TOTAL	COST CODE 50119			460		0		0		0	
	WBS 543A00				26,680		0		0		26,680
	(ESCALATION 20.38% - CONTINGENCY 30.00 %)										
TOTAL WBS 543A00	PROJECT MANAGEMENT			460		0		0		0	
					26,680		0		0		26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
543B00	PSAR/FSAR										
543B00.00	TECHNICAL SERVICES										
543B00.0002561	OPERATING CONTRACTOR (OC) PSAR/FSAR ALLOW 1 MAN 5 WEEKS	501	176 MH	176	10208	0	0	0	0	0	10208
SUBTOTAL TECHNICAL SERVICES				176	10,208	0	0	0	0	0	10,208
TOTAL COST CODE 50100 WBS 543B00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)				176	10,208	0	0	0	0	0	10,208
TOTAL WBS 543B00 PSAR/FSAR				176	10,208	0	0	0	0	0	10,208

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
543C00	SYSTEM PROCUREMENT										
543C00.16	ELECTRICAL										
543C00.1650101	CONCENTRATOR REPLACEMENT MODULES	501	0	0	0	0	0	0	0	0	0
543C00.1650102	CONCENTRATOR CARDS	501	42 EA	0	0	0	2940	0	0	0	2940
543C00.1650105	CONTROLLER CARDS	501	9 EA	0	0	0	2250	0	0	0	2250
543C00.1650107	RACKS	501	9 EA	0	0	0	4500	0	0	0	4500
543C00.1650201	MOTOROLA REPLACEMENT MODULES	501	0	0	0	0	0	0	0	0	0
543C00.1650203	486/PENTINIUM TO REPLACE MOTOROLA	501	4 EA	0	0	0	25000	0	0	0	25000
543C00.1650205	KLUDGE CARDS	501	4 EA	0	0	0	4000	0	0	0	4000
543C00.1650207	POWER SUPPLY	501	4 EA	0	0	0	2000	0	0	0	2000
543C00.1650209	MISC H/W PARTS	501	4 EA	0	0	0	2000	0	0	0	2000
543C00.1650301	PRIME 2350 REPLACEMENT MODULES	501	0	0	0	0	0	0	0	0	0
543C00.1650302	NEW WORKSTATION/PERIPHERALS	501	1 LS	0	0	0	50000	0	0	0	50000
543C00.1650305	COMMERCIAL SOFTWARE	501	1 LS	0	0	0	12800	0	0	0	12800
SUBTOTAL	ELECTRICAL			0		0		0		0	
	SALES TAX 7.80 %				0		105,490		0		105,490
	WAREHOUSING 17.50 %						8228		0		8228
							18460				18460
TOTAL	COST CODE 50116 WBS 543C00 (ESCALATION +27.35% - CONTINGENCY 30.00 %)			0	0	0	132,178	0	0	0	132,178
TOTAL WBS 543C00 SYSTEM PROCUREMENT				0	0	0	132,178	0	0	0	132,178

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
543D00	INSTALLATION DESIGN										
543D00.00	TECHNICAL SERVICES										
543D00.0000101	ONSITE ENGINEER DEFINITIVE DESIGN AND FIELD ENGINEERING/INSPECTION ALLOWANCE	000	1 LOT	2000	148000	0	0	0	0	0	148000
SUBTOTAL	TECHNICAL SERVICES			2,000	148,000	0	0	0	0	0	148,000
TOTAL	COST CODE 00000 WBS 543D00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			2,000	148,000	0	0	0	0	0	148,000
TOTAL WBS 543D00	INSTALLATION DESIGN			2,000	148,000	0	0	0	0	0	148,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
543E00	INSTALLATION										
543E00.16	ELECTRICAL										
543E00.1650301	PRIME 2350 REPLACEMENT MODULES	501 F	0	0	0	0	0	0	0	0	0
543E00.1650302	NEW WORKSTATION/PERIPHERALS	501 F	1 LS	80	2655	0	250	0	0	3558	6463
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SUBTOTAL	ELECTRICAL	(FIELD)		80		0		0		3,558	
					2,655		250		0		6,463
	DOUBLE SECURITY 20.00 %			16	531						531
	GENERAL FOREMAN 5.00 %			4	159						159
	CONSUMABLES 6.00 %						15				15
	SALES TAX 7.80 %						20		0		20
	WAREHOUSING 20.00 %						53				53
	OH&P (ON MARKUPS ONLY)									925	925
<hr/>											
TOTAL	COST CODE 50116			100		0		0		4,483	
	WBS 543E00				3,345		338		0		8,166
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
543E00.16	ELECTRICAL										
543E00.1650100	CONCENTRATOR REPLACEMENT MODULES	501 W	0	0	0	0	0	0	0	0	0
543E00.1650101	INSTALL NEW CONNECTORS ON SIGNAL CABLE AND INSTALL ON NEW CARDS	501 W	5400 EA	2700	89613	0	54000	0	0	120081	263694
543E00.1650104	REUSE EXIST CONNECTORS ON SIGNAL CABLE AND INSTALL ON NEW CARDS	501 W	5400 EA	810	26884	0	0	0	0	36025	62909
543E00.1650107	REMOVE OLD EQUIPMENT	501 W	1 LS	180	5974	0	500	0	0	8005	14479
543E00.1650109	INSTALL NEW RACKS	501 W	9 EA	72	2390	0	225	0	0	3203	5818
543E00.1650111	INSTALL NEW CONTROLLER CARDS	501 W	9 EA	72	2390	0	225	0	0	3203	5818
543E00.1650114	INSTALL NEW CONCENTRATOR CARDS	501 W	42 EA	84	2788	0	210	0	0	3736	6734
543E00.1650201	MOTOROLA REPLACEMENT MODULES	501 W	0	0	0	0	0	0	0	0	0
543E00.1650203	486/PENTINIUM TO REPLACE MOTOROLA	501 W	4 EA	48	1593	0	200	0	0	2135	3928
543E00.1650205	KLUDGE CARDS	501 W	4 EA	16	531	0	60	0	0	712	1303
543E00.1650207	POWER SUPPLY	501 W	4 EA	12	398	0	60	0	0	533	991
543E00.1650209	MISC H/W PARTS	501 W	4 EA	12	398	0	60	0	0	533	991
<hr/>											
SUBTOTAL	ELECTRICAL	(SWP)		4,006		0		0		178,166	
					132,959		55,540		0		366,665

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
	SWP 15.00%			600	19943						19943
	DOUBLE SECURITY 20.00 %			921	30580						30580
	GENERAL FOREMAN 5.00 %			276	9174						9174
	CONSUMABLES 6.00 %						3332				3332
	SALES TAX 7.80 %						4592		0		4592
	WAREHOUSING 20.00 %						11774				11774
	OH&P (ON MARKUPS ONLY)									79996	79996

TOTAL	COST CODE 50116			5,804		0		0		258,162	
	WBS 543E00				192,657		75,238		0		526,058
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										

TOTAL WBS 543E00 INSTALLATION				5,905		0		0		262,645	
					196,002		75,577		0		534,225

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
543F00	SYSTEM INTEGRATION/TESTING										
543F00.00	TECHNICAL SERVICES										
543F00.0000321	ELECTRONICS ENGINEER FOR KLUDGE CARDS ALLOW 1 MAN 6 MONTHS	501	1 LS	915	53070	0	0	0	0	0	53070
SUBTOTAL	TECHNICAL SERVICES			915		0	0	0	0	0	53,070
TOTAL	COST CODE 50100 WBS 543F00 (ESCALATION 33.25% - CONTINGENCY 30.00 %)			915	53,070	0	0	0	0	0	53,070
TOTAL WBS 543F00	SYSTEM INTEGRATION/TESTING			915	53,070	0	0	0	0	0	53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
544A00	PROJECT MANAGEMENT										
544A00.19	PROJECT MANAGEMENT CLIENT										
544A00.1900561	OPERATING CONTRACTOR (OC) PROJECT MANAGEMENT ALLOW .25 MEN .5 YEARS	501	230 MH	230	13340	0	0	0	0	0	13340
SUBTOTAL	PROJECT MANAGEMENT CLIENT			230	13,340	0	0	0	0	0	13,340
TOTAL	COST CODE 50119 WBS 544A00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			230	13,340	0	0	0	0	0	13,340
TOTAL WBS 544A00	PROJECT MANAGEMENT			230	13,340	0	0	0	0	0	13,340

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
544B00	PSAR/FSAR										
544B00.00	TECHNICAL SERVICES										
544B00.0002561	OPERATING CONTRACTOR (OC) PSAR/FSAR 1 MAN 5 WEEKS	501	170 MH	170	9860	0	0	0	0	0	9860
SUBTOTAL	TECHNICAL SERVICES			170	9,860	0	0	0	0	0	9,860
TOTAL	COST CODE 50100 WBS 544B00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			170	9,860	0	0	0	0	0	9,860
TOTAL WBS 544B00 PSAR/FSAR				170	9,860	0	0	0	0	0	9,860

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
544C00	SYSTEM PROCUREMENT										
544C00.16	ELECTRICAL										
544C00.1655101	INVENTORY MONITORS	501	0	0	0	0	0	0	0	0	0
544C00.1655103	AIMS UNITS	501	1800 EA	0	0	0	180000	0	0	0	180000
544C00.1655105	RF RECEIVER	501	12 EA	0	0	0	3600	0	0	0	3600
544C00.1655107	RECEIVER PROCESSOR UNIT	501	12 EA	0	0	0	48000	0	0	0	48000
544C00.1655109	MUX 25 CHANNEL	501	2 EA	0	0	0	6000	0	0	0	6000
544C00.1655121	COMPUTER H/W	501	24 EA	0	0	0	12000	0	0	0	12000
544C00.1655131	CARDS 2/RPU COMPUTER S/W	501	1 LOT	0	0	0	50000	0	0	0	50000
	VENDER CUSTOM										
SUBTOTAL	ELECTRICAL			0		0		0		0	
	SALES TAX 7.80 %				0		299,600		0		299,600
	WAREHOUSING 17.50 %						23368		0		23368
							52430				52430
TOTAL	COST CODE 50116			0		0		0		0	
	WBS 544C00				0		375,398		0		375,398
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
TOTAL WBS 544C00	SYSTEM PROCUREMENT			0		0	375,398	0	0	0	375,398

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
544D00	INSTALLATION DESIGN										
544D00.00	TECHNICAL SERVICES										
544D00.0000101	ONSITE ENGINEER	000	1 LOT	2000	148000	0	0	0	0	0	148000
	DEFINITIVE DESIGN AND FIELD ENGINEERING/INSPECTION ALLOWANCE										
SUBTOTAL	TECHNICAL SERVICES			2,000	148,000	0	0	0	0	0	148,000
TOTAL	COST CODE 00000 WBS 544D00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			2,000	148,000	0	0	0	0	0	148,000
TOTAL WBS 544D00	INSTALLATION DESIGN			2,000	148,000	0	0	0	0	0	148,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
544E00	INSTALLATION										
544E00.16	ELECTRICAL										
544E00.1655331	ALLOWANCE FOR CORE DRILLS	501 M	10 EA	160	5310	0	1000	0	0	7115	13425
	SUBTOTAL ELECTRICAL	(MASK)		160		0		0		7,115	
	SWP 100.00%			160	5,310		1,000		0		13,425
	DOUBLE SECURITY 20.00 %			64	2124						5310
	GENERAL FOREMAN 5.00 %			19	637						2124
	CONSUMABLES 6.00 %						60				637
	SALES TAX 7.80 %						82		0		60
	WAREHOUSING 20.00 %						212				82
	OH&P (ON MARKUPS ONLY)									10815	212
	TOTAL	COST CODE 50116		403		0		0		17,930	10815
		WBS 544E00			13,381		1,354		0		32,666
		(ESCALATION 27.35% - CONTINGENCY 30.00 %)									
544E00.16	ELECTRICAL										
544E00.1655101	INVENTORY MONITORS	501 W	0	0	0	0	0	0	0	0	0
544E00.1655103	AIMS UNITS	501 W	1800 EA	900	29871	0	9000	0	0	40027	78398
544E00.1655105	RF RECEIVER	501 W	12 EA	144	4779	0	300	0	0	6404	11483
544E00.1655107	RECEIVER PROCESSOR UNIT	501 W	12 EA	144	4779	0	300	0	0	6404	11483
544E00.1655109	MUX 25 CHANNEL	501 W	2 EA	32	1062	0	50	0	0	1423	2535
544E00.1655121	COMPUTER H/W	501 W	24 EA	48	1593	0	240	0	0	2135	3968
	CARDS 2/RPU										
544E00.1655301	CONDUIT & WIRE RUN FROM RF RECEIVER TO RECV PROC UNIT	501 W	12 EA	24	797	0	240	0	0	1068	2105
	ALLOW 10' 3/4"GRS & TW PR										
544E00.1655305	CONDUIT & WIRE RUN FROM RPU TO VSIS	501 W	10 EA	1200	39828	0	12500	0	0	53370	105698
	ALLOW 500' 3/4"GRS & F.O.										
	CABLE										
544E00.1655308	CONDUIT & WIRE RUN FROM RPU TO VSIS	501 W	2 EA	60	1991	0	1000	0	0	2668	5659
	ALLOW 200' 3/4"GRS & F.O.										
	CABLE										
	SUBTOTAL ELECTRICAL	(SWP)		2,552		0		0		113,499	
	SWP 15.00%			382	84,700		23,630		0		221,829
					12705						12705

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
	DOUBLE SECURITY 20.00 %			586	19481						19481
	GENERAL FOREMAN 5.00 %			176	5844						5844
	CONSUMABLES 6.00 %						1417				1417
	SALES TAX 7.80 %						1953		0		1953
	WAREHOUSING 20.00 %						5009				5009
	OH&P (ON MARKUPS ONLY)									50960	50960
TOTAL	COST CODE 50116			3,697		0		0		164,459	
	WBS 544E00				122,730		32,011		0		319,200
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
TOTAL WBS 544E00 INSTALLATION				4,101	136,111	0	33,365	0	0	182,390	351,867

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
544F00	SYSTEM INTEGRATION/TESTING										
544F00.00	TECHNICAL SERVICES										
544F00.0000312	COMPUTER S/W	501	1 LS	1830	106140	0	0	0	0	0	106140
	WHC (VSIS)										
	ALLOW 1 MAN 1 YEAR										
SUBTOTAL	TECHNICAL SERVICES			1,830	106,140	0	0	0	0	0	106,140
TOTAL	COST CODE 50100			1,830	106,140	0	0	0	0	0	106,140
	WBS 544F00										
	(ESCALATION 33.25% - CONTINGENCY 30.00 %)										
TOTAL WBS 544F00	SYSTEM INTEGRATION/TESTING			1,830	106,140	0	0	0	0	0	106,140

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611A00	SAFETY/ENVIR DOC - PRE-CAPITAL										
611A00.00	TECHNICAL SERVICES										
611A00.0060001	SAFETY/ENVIRONMENTAL DOCUMENTATION 1 MAN 3 MONTHS	900	460 MH	460	26680	0	0	0	0	0	26680
SUBTOTAL	TECHNICAL SERVICES			460	26,680	0	0	0	0	0	26,680
TOTAL	COST CODE 90000 WBS 611A00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			460	26,680	0	0	0	0	0	26,680
TOTAL WBS 611A00	SAFETY/ENVIR DOC - PRE-CAPITAL			460	26,680	0	0	0	0	0	26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611B00	PLANT SUPPORT										
611B00.00	TECHNICAL SERVICES										
611B00.0061001	PLANT SUPPORT- ASSUME .5 MEN FOR 3 YEARS	900	2745 MH	2745	159210	0	0	0	0	0	159210
SUBTOTAL	TECHNICAL SERVICES			2,745	159,210	0	0	0	0	0	159,210
TOTAL	COST CODE 90000 WBS 611B00 (ESCALATION 20.38% - CONTINGENCY 30.00 X)			2,745	159,210	0	0	0	0	0	159,210
TOTAL WBS 611B00	PLANT SUPPORT			2,745	159,210	0	0	0	0	0	159,210

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611C00	SAS SUPPORT										
611C00.00	TECHNICAL SERVICES										
611C00.0061101	SAFEGUARDS AND SECURITY SUPPORT	900	0	0	0	0	0	0	0	0	0
611C00.0061201	SAS SUPPORT - ASSUME .5 MEN FOR 3 YEARS	900	2745 MH	2745	159210	0	0	0	0	0	159210
SUBTOTAL	TECHNICAL SERVICES			2,745		0		0		0	
					159,210		0		0		159,210
TOTAL	COST CODE 90000 WBS 611C00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			2,745		0		0		0	
					159,210		0		0		159,210
TOTAL WBS 611C00 SAS SUPPORT				2,745		0		0		0	
					159,210		0		0		159,210

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611E00	FDC PREPARATION										
611E00.00	TECHNICAL SERVICES										
611E00.0061301	FUNCTIONAL DESIGN CRITERIA PREPARATION - (OC) ASSUME 2 MEN 6 MONTHS	900	1830 MH	1830	106140	0	0	0	0	0	106140
611E00.0061311	FUNCTIONAL DESIGN CRITERIA PREPARATION - (ONSITE DESIGN ENGINEER) ALLOWANCE	900	1 LOT	800	59200	0	0	0	0	0	59200
SUBTOTAL	TECHNICAL SERVICES			2,630		0	0	0	0	0	
					165,340		0		0		165,340
TOTAL	COST CODE 90000 WBS 611E00 (ESCALATION 5.81% - CONTINGENCY 30.00 %)			2,630		0	0	0	0	0	
					165,340		0		0		165,340
TOTAL WBS 611E00	FDC PREPARATION			2,630		0	0	0	0	0	
					165,340		0		0		165,340

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611F00	CDR PREPARATION										
611F00.00	TECHNICAL SERVICES										
611F00.0061401	CONCEPTUAL DESIGN REPORT PREPARATION - (OC) ASSUME 2 MEN 9 MONTHS	900	2745 MH	2745	159210	0	0	0	0	0	159210
611F00.0061411	CONCEPTUAL DESIGN REPORT PREPARATION - (ONSITE DESIGN ENGINEER)	900	1 LOT	6000	444000	0	0	0	0	0	444000
SUBTOTAL	TECHNICAL SERVICES			8,745	603,210	0	0	0	0	0	603,210
TOTAL	COST CODE 90000 WBS 611F00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			8,745	603,210	0	0	0	0	0	603,210
TOTAL WBS 611F00 CDR PREPARATION				8,745	603,210	0	0	0	0	0	603,210

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611G00	AMS TRANSITION SUPPORT										
611G00.00	TECHNICAL SERVICES										
611G00.0063401	AMS TRANSITION SUPPORT (OC) ASSUME .5 MEN 2 YEARS	900	1830 MH	1830	106140	0	0	0	0	0	106140
SUBTOTAL	TECHNICAL SERVICES			1,830		0	0	0	0	0	
					106,140		0		0		106,140
TOTAL	COST CODE 90000 WBS 611G00 (ESCALATION 33.25% - CONTINGENCY 30.00 %)			1,830		0	0	0	0	0	
					106,140		0		0		106,140
TOTAL WBS 611G00	AMS TRANSITION SUPPORT			1,830		0	0	0	0	0	
					106,140		0		0		106,140

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611H00	ADP DOC PREP, APRVL, & COORDINATION										
611H00.00	TECHNICAL SERVICES										
611H00.0060001	ADP DOCUMENT PREPARATION, APPROVAL, AND COORDINATION 1 MAN 13 MONTHS	900	1985 MH	1985	115130	0	0	0	0	0	115130
SUBTOTAL	TECHNICAL SERVICES			1,985		0		0		0	
					115,130		0		0		115,130
TOTAL	COST CODE 90000 WBS 611H00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			1,985		0		0		0	
					115,130		0		0		115,130
TOTAL WBS 611H00	ADP DOC PREP, APRVL, & COORDINATION			1,985		0		0		0	
					115,130		0		0		115,130

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JOB NO. STUDY ESTIMATE

** IEST - INTERACTIVE ESTIMATING **
HANFORD SAFEGUARDS AND SECURITY TRANSITION PROJECT
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DOE_R08 - ESTIMATE DETAIL BY WBS / COST CODE

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / 8 & 1	TOTAL DOLLARS
611100	ADP LONG RANGE PLANNING										
611100.00	TECHNICAL SERVICES										
611100.0060004	ADP LONG RANGE PLANNING ONE MAN MONTH	900	153 MH	153	8874	0	0	0	0	0	8874
SUBTOTAL	TECHNICAL SERVICES			153		0	0	0	0	0	
					8,874		0		0		8,874
TOTAL	COST CODE 90000 WBS 611100 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			153		0	0	0	0	0	
					8,874		0		0		8,874
TOTAL WBS 611100 ADP LONG RANGE PLANNING				153		0	0	0	0	0	
					8,874		0		0		8,874

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611J00	PROCUREMENT BID REVIEW										
611J00.00	TECHNICAL SERVICES										
611J00.0060007	PROCUREMENT BID REVIEW 1 MAN 6 MONTHS	900	915 MH	915	53070	0	0	0	0	0	53070
SUBTOTAL	TECHNICAL SERVICES			915		0		0		0	
					53,070		0		0		53,070
TOTAL	COST CODE 90000 WBS 611J00 (ESCALATION 28.66% - CONTINGENCY 30.00 %)			915		0	0	0	0	0	
					53,070		0		0		53,070
TOTAL WBS 611J00	PROCUREMENT BID REVIEW			915		0	0	0	0	0	
					53,070		0		0		53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
611L00	TRAINING - MAINT/SOFTWARE/PATROL										
611L00.00	TECHNICAL SERVICES										
611L00.0060013	TRAINING COSTS FOR PATROL, MAINTENANCE, SOFTWARE ONE LUMP SUM ALLOWANCE	900	1 LOT	1465	84970	0	0	0	0	0	84970
SUBTOTAL	TECHNICAL SERVICES			1,465	84,970	0	0	0	0	0	84,970
TOTAL	COST CODE 90000 WBS 611L00 (ESCALATION 33.25% - CONTINGENCY 30.00 %)			1,465	84,970	0	0	0	0	0	84,970
TOTAL WBS 611L00	TRAINING - MAINT/SOFTWARE/PATROL			1,465	84,970	0	0	0	0	0	84,970

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
641A00	PC RELATED PROCUREMENTS - HCS										
641A00.16	ELECTRICAL										
641A00.1656801	WORKSTATIONS	770	17 EA	0	0	0	102505	0	0	0	102505
641A00.1656805	SOFTWARE	770	1 LOT	0	0	0	30000	0	0	0	30000
641A00.1656807	PRODUCTION PRINT SHOP	770	1 EA	0	0	0	12059	0	0	0	12059
641A00.1657203	AST UPGRADE	770	1 LOT	0	0	0	1391	0	0	0	1391
<hr/>											
SUBTOTAL	ELECTRICAL			0		0		0		0	
	SALES TAX 7.80 %				0		145,955		0		145,955
	WAREHOUSING 17.00 %						11384		0		11384
							24812				24812
<hr/>											
TOTAL	COST CODE 77016			0		0		0		0	
	WBS 641A00				0		182,151		0		182,151
	(ESCALATION 27.35% - CONTINGENCY 10.00 %)										
<hr/>											
TOTAL WBS 641A00	PC RELATED PROCUREMENTS - HCS			0		0	182,151	0	0	0	182,151

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
641B00	TRAVEL EXPENSE										
641B00.00	TECHNICAL SERVICES										
641B00.0056802	TRAVEL - TRAINING ALLOW 5 @ \$2000 EACH	770	1 LOT	0	0	0	10000	0	0	0	10000
641B00.0056803	TRAVEL - QUARTERLY MEETINGS ALLOW 6 @ \$2000 EACH	770	1 LOT	0	0	0	12000	0	0	0	12000
641B00.0056805	TRAVEL - LANL ALLOW 6 @ \$2000 EACH	770	1 LOT	0	0	0	12000	0	0	0	12000
641B00.0056812	ASSUME SALES TAX IS INCLUDED IN THE TRAVEL EXPENSES SHOWN ABOVE	770	0	0	0	0	0	0	0	0	0
SUBTOTAL	TECHNICAL SERVICES			0	0	0	34,000	0	0	0	34,000
TOTAL	COST CODE 77000 WBS 641B00 (ESCALATION 24.19% - CONTINGENCY 10.00 %)			0	0	0	34,000	0	0	0	34,000
TOTAL WBS 641B00	TRAVEL EXPENSE			0	0	0	34,000	0	0	0	34,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
641C00	OC CONTRACTS & PROCUREMENT										
641C00.00	TECHNICAL SERVICES										
641C00.0056805	LANL - DISCRETIONARY	770	1 LOT	0	0	0	80000	0	0	0	80000
641C00.0056808	SYBASE MAIN. CONTRACT	770	1 LOT	0	0	0	4000	0	0	0	4000
641C00.0056809	SUN MAIN. CONTRACT	770	1 LOT	0	0	0	3000	0	0	0	3000
641C00.0056811	TOOLS	770	1 LOT	0	0	0	2000	0	0	0	2000
SUBTOTAL TECHNICAL SERVICES				0	0	0	89,000	0	0	0	89,000
WAREHOUSING 21.00 %							18690				18690
TOTAL COST CODE 77000				0	0	0	107,690	0	0	0	107,690
WBS 641C00											
(ESCALATION 24.19% - CONTINGENCY 10.00 %)											
641C00.11	EQUIPMENT										
641C00.1156802	WORKSTATIONS FURNITURE	770	17 EA	0	0	0	15770	0	0	0	15770
SUBTOTAL EQUIPMENT				0	0	0	15,770	0	0	0	15,770
SALES TAX 7.80 %							1230				1230
WAREHOUSING 21.00 %							3311				3311
TOTAL COST CODE 77011				0	0	0	20,311	0	0	0	20,311
WBS 641C00											
(ESCALATION 27.35% - CONTINGENCY 10.00 %)											
TOTAL WBS 641C00 OC CONTRACTS & PROCUREMENT				0	0	0	128,001	0	0	0	128,001

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
641E00	IRM SERVICES										
641E00.00	TECHNICAL SERVICES										
641E00.0057201	IRM HARDWARE/NETWORK MAINT	770	1 LOT	500	29000	0	0	0	0	0	29000
641E00.0057209	EDITOR	770	1 LOT	4100	237800	0	0	0	0	0	237800
SUBTOTAL	TECHNICAL SERVICES			4,600		0		0		0	
					266,800		0		0		266,800
TOTAL	COST CODE 77000			4,600		0		0		0	
	WBS 641E00				266,800		0		0		266,800
	(ESCALATION 33.25% - CONTINGENCY 10.00 %)										
TOTAL WBS 641E00	IRM SERVICES			4,600		0		0		0	
					266,800		0		0		266,800

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
641F00	IRM SUPPORT COSTS										
641F00.00	TECHNICAL SERVICES										
641F00.0057306	LANMAS	900	14640 MH	14640	849120	0	0	0	0	0	849120
	ALLOW 8 MAN YEAR										
641F00.0057308	SAFEGUARDS	900	2010 MH	2010	116580	0	0	0	0	0	116580
	ALLOW 1.1 MAN YEAR										
641F00.0057311	SAC	900	3300 MH	3300	191400	0	0	0	0	0	191400
	ALLOW 1.8 MAN YEAR										
SUBTOTAL	TECHNICAL SERVICES			19,950		0		0		0	
					1,157,100		0		0		1,157,100
TOTAL	COST CODE 90000			19,950		0		0		0	
	WBS 641F00				1,157,100		0		0		1,157,100
	(ESCALATION 33.25% - CONTINGENCY 15.00 %)										
TOTAL WBS 641F00	IRM SUPPORT COSTS			19,950		0		0		0	
					1,157,100		0		0		1,157,100

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642A00	SAFETY/ENVIR DOC - PRE-CAPITAL										
642A00.00	TECHNICAL SERVICES										
642A00.0060013	SAFETY/ENVIRONMENTAL DOCUMENTATION	900	216 MH	216	12528	0	0	0	0	0	12528
SUBTOTAL	TECHNICAL SERVICES			216	12,528	0	0	0	0	0	12,528
TOTAL	COST CODE 90000 WBS 642A00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			216	12,528	0	0	0	0	0	12,528
TOTAL WBS 642A00	SAFETY/ENVIR DOC - PRE-CAPITAL			216	12,528	0	0	0	0	0	12,528

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642B00	PLANT SUPPORT										
642B00.00	TECHNICAL SERVICES										
642B00.0061009	PLANT SUPPORT - ASSUME .50 MEN FOR 1 YEARS	900	915 MH	915	53070	0	0	0	0	0	53070
SUBTOTAL	TECHNICAL SERVICES			915	53,070	0	0	0	0	0	53,070
TOTAL	COST CODE 90000 WBS 642B00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			915	53,070	0	0	0	0	0	53,070
TOTAL WBS 642B00 PLANT SUPPORT				915	53,070	0	0	0	0	0	53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642C00	SAS SUPPORT										
642C00.00	TECHNICAL SERVICES										
642C00.0061109	SAFEGUARDS AND SECURITY SUPPORT - ASSUME	900	0 MH	0	0	0	0	0	0	0	0
642C00.0061203	SAS SUPPORT - ASSUME .25 MEN FOR 1 YEARS	900	460 MH	460	26680	0	0	0	0	0	26680
SUBTOTAL	TECHNICAL SERVICES			460	26,680	0	0	0	0	0	26,680
TOTAL	COST CODE 90000 WBS 642C00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			460	26,680	0	0	0	0	0	26,680
TOTAL WBS 642C00 SAS SUPPORT				460	26,680	0	0	0	0	0	26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642D00	PROJECT MANAGEMENT										
642D00.00	TECHNICAL SERVICES										
642D00.0062003	PROJECT MANAGEMENT - ASSUME .25 MEN FOR 1 YEARS	900	460 MH	460	26680	0	0	0	0	0	26680
SUBTOTAL	TECHNICAL SERVICES			460	26,680	0	0	0	0	0	26,680
TOTAL	COST CODE 90000 WBS 642D00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			460	26,680	0	0	0	0	0	26,680
TOTAL WBS 642D00	PROJECT MANAGEMENT			460	26,680	0	0	0	0	0	26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642E00	INSTALLATION DESIGN										
642E00.00	TECHNICAL SERVICES										
642E00.0000201	ONSITE ENGINEER DEFINITIVE DESIGN AND FIELD ENGINEERING/INSPECTION ALLOWANCE	000	1 LOT	1000	74000	0	0	0	0	0	74000
SUBTOTAL	TECHNICAL SERVICES			1,000	74,000	0	0	0	0	0	74,000
TOTAL	COST CODE 00000 WBS 642E00 (ESCALATION 24.19% - CONTINGENCY 30.00 %)			1,000	74,000	0	0	0	0	0	74,000
TOTAL WBS 642E00	INSTALLATION DESIGN			1,000	74,000	0	0	0	0	0	74,000

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642F00	FDC PREPARATION										
642F00.00	TECHNICAL SERVICES										
642F00.0061301	FUNCTIONAL DESIGN CRITERIA PREPARATION - (OC) ASSUME .75 MAN YEARS	900	1370 MH	1370	101380	0	0	0	0	0	101380
642F00.0061311	FUNCTIONAL DESIGN CRITERIA PREPARATION - (ONSITE DESIGN ENGINEER) ASSISTANCE TO OC	900	1 LOT	600	44400	0	0	0	0	0	44400
SUBTOTAL	TECHNICAL SERVICES			1,970		0	0	0	0	0	
					145,780		0		0		145,780
TOTAL	COST CODE 90000 WBS 642F00 (ESCALATION 5.81% - CONTINGENCY 30.00 %)			1,970		0	0	0	0	0	
					145,780		0		0		145,780
TOTAL WBS 642F00 FDC PREPARATION				1,970		0	0	0	0	0	
					145,780		0		0		145,780

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642G00	CDR PREPARATION										
642G00.00	TECHNICAL SERVICES										
642G00.0061401	CONCEPTUAL DESIGN REPORT PREPARATION - (OC) ASSUME 1 MAN YEARS	900	1830 MH	1830	106140	0	0	0	0	0	106140
642G00.0061411	CONCEPTUAL DESIGN REPORT PREPARATION - (ONSITE DESIGN ENGINEER) ALLOWANCE	900	1 LOT	1500	111000	0	0	0	0	0	111000
SUBTOTAL	TECHNICAL SERVICES			3,330	217,140	0	0	0	0	0	217,140
TOTAL	COST CODE 90000 WBS 642G00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			3,330	217,140	0	0	0	0	0	217,140
TOTAL WBS 642G00	CDR PREPARATION			3,330	217,140	0	0	0	0	0	217,140

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642H10	CAM/SMPLR RELOC TO OUT VAULT										
642H10.16	ELECTRICAL										
642H10.1610808	CORE DRILL VAULT WALL	501 M	3 JOB	48	1593	0	300	0	0	2135	4028
SUBTOTAL	ELECTRICAL	(MASK)		48		0		0		2,135	
	SWP 100.00%			48	1,593		300		0		4,028
	DOUBLE SECURITY 20.00 %			19	637						1593
	GENERAL FOREMAN 5.00 %			5	191						637
	CONSUMABLES 6.00 %						18				18
	SALES TAX 7.80 %						24		0		24
	WAREHOUSING 20.00 %						63				63
	OH&P (ON MARKUPS ONLY)									3244	3244
TOTAL	COST CODE 50116			120		0		0		5,379	
	WBS 642H10				4,014		406		0		9,800
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
642H10.16	ELECTRICAL										
642H10.1610801	CONDUIT & WIRE ALLOWANCE	501 W	3 JOB	48	1593	0	600	0	0	2135	4328
642H10.1643501	FURNISH & INSTALL NEW CAM	501 W	3 EA	36	1195	0	15000	0	0	1601	17796
	OUSIDE OF VAULT										
642H10.1643504	FAB & INSTALL NEW CAM	501 W	3 JOB	24	797	0	225	0	0	1068	2090
	SUPPORT RACK										
642H10.1643507	INSTALL CAM SENSOR TUBING	501 W	3 JOB	36	1195	0	300	0	0	1601	3096
SUBTOTAL	ELECTRICAL	(SWP)		144		0		0		6,405	
	SWP 15.00%			21	4,780		16,125		0		27,310
	DOUBLE SECURITY 20.00 %			33	717						717
	GENERAL FOREMAN 5.00 %			9	1099						1099
	CONSUMABLES 6.00 %				329		967				329
	SALES TAX 7.80 %						1333		0		967
	WAREHOUSING 20.00 %						3418				1333
	OH&P (ON MARKUPS ONLY)									2875	3418
TOTAL	COST CODE 50116			208		0		0		9,280	
	WBS 642H10				6,926		21,844		0		38,051
	(ESCALATION 27.35% - CONTINGENCY 30.00 %)										
TOTAL WBS 642H10 CAM/SMPLR RELOC TO OUT VAULT				329		0		0		14,660	
					10,940		22,250		0		47,851

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
642H20	EMERG POWER/ADDED HVAC										
642H20.15	MECHANICAL										
642H20.1500101	INSTALL SPLIT SYSTEM HVAC UNIT - SIMILAR TO B-610 ALL COSTS FOR COMPLETE INSTALLATION - NO DEMO	501 W	2 JOB	928	30800	0	25350	0	0	41272	97422
SUBTOTAL	MECHANICAL	(SWP)		928	30,800	0	25,350	0	0	41,272	97,422
	SWP 15.00%			139	4620						4620
	DOUBLE SECURITY 20.00 %			213	7084						7084
	GENERAL FOREMAN 5.00 %			64	2125						2125
	CONSUMABLES 6.00 %						1521				1521
	SALES TAX 7.80 %						2095		0		2095
	WAREHOUSING 20.00 %						5374				5374
	OH&P (ON MARKUPS ONLY)									18531	18531
TOTAL	COST CODE 50115 WBS 642H20 (ESCALATION 27.35% - CONTINGENCY 20.00 %)			1,344	44,629	0	34,341	0	0	59,803	138,773
642H20.16	ELECTRICAL										
642H20.1645601	INSTALL 100A AUTOMATIC TRANSFER SWITCH	501 W	1 EA	12	398	0	2850	0	0	533	3781
642H20.1645604	MISC CONDUIT & WIRE	501 W	1 LOT	32	1062	0	500	0	0	1423	2985
SUBTOTAL	ELECTRICAL	(SWP)		44	1,460	0	3,350	0	0	1,956	6,766
	SWP 15.00%			6	219						219
	DOUBLE SECURITY 20.00 %			10	335						335
	GENERAL FOREMAN 5.00 %			3	100						100
	CONSUMABLES 6.00 %						201				201
	SALES TAX 7.80 %						276		0		276
	WAREHOUSING 20.00 %						710				710
	OH&P (ON MARKUPS ONLY)									878	878
TOTAL	COST CODE 50116 WBS 642H20 (ESCALATION 27.35% - CONTINGENCY 30.00 %)			63	2,115	0	4,538	0	0	2,834	9,488
TOTAL WBS 642H20 EMERG POWER/ADDED HVAC				1,408	46,744	0	38,879	0	0	62,637	148,261

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643A00	SAFETY/ENVIR DOC - PRE-CAPITAL										
643A00.00	TECHNICAL SERVICES										
643A00.0060001	SAFETY/ENVIRONMENTAL DOCUMENTATION 1 MAN 3 MONTHS	900	460 MH	460	26680	0	0	0	0	0	26680
SUBTOTAL	TECHNICAL SERVICES			460	26,680	0	0	0	0	0	26,680
TOTAL	COST CODE 90000 WBS 643A00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			460	26,680	0	0	0	0	0	26,680
TOTAL WBS 643A00	SAFETY/ENVIR DOC - PRE-CAPITAL			460	26,680	0	0	0	0	0	26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643800	PLANT SUPPORT										
643800.00	TECHNICAL SERVICES										
643800.0061001	PLANT SUPPORT - ASSUME 1 MEN FOR .5 YEARS	900	915 MH	915	53070	0	0	0	0	0	53070
SUBTOTAL	TECHNICAL SERVICES			915	53,070	0	0	0	0	0	53,070
TOTAL	COST CODE 90000 WBS 643800 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			915	53,070	0	0	0	0	0	53,070
TOTAL WBS 643800	PLANT SUPPORT			915	53,070	0	0	0	0	0	53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643C00	SAS SUPPORT										
643C00.00	TECHNICAL SERVICES										
643C00.0061101	SAFEGUARDS AND SECURITY SUPPORT - ASSUME	900	0 MH	0	0	0	0	0	0	0	0
643C00.0061201	SAS SUPPORT - ASSUME 1 MEN FOR .5 YEARS	900	915 MH	915	53070	0	0	0	0	0	53070

SUBTOTAL	TECHNICAL SERVICES			915		0		0		0	
					53,070		0		0		53,070

TOTAL	COST CODE 90000 WBS 643C00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			915		0		0		0	
					53,070		0		0		53,070

TOTAL WBS 643C00 SAS SUPPORT				915		0		0		0	
					53,070		0		0		53,070

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643000	PROJECT MANAGEMENT										
643000.00	TECHNICAL SERVICES										
643000.0062003	PROJECT MANAGEMENT - ASSUME .25 MEN FOR .5 YEARS	900	230 MH	230	13340	0	0	0	0	0	13340
SUBTOTAL	TECHNICAL SERVICES			230	13,340	0	0	0	0	0	13,340
TOTAL	COST CODE 90000 WBS 643000 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			230	13,340	0	0	0	0	0	13,340
TOTAL WBS 643000	PROJECT MANAGEMENT			230	13,340	0	0	0	0	0	13,340

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643E00	FDC PREPARATION										
643E00.00	TECHNICAL SERVICES										
643E00.0061301	FUNCTIONAL DESIGN CRITERIA PREPARATION - (OC) ASSUME .33 MAN YEARS	900	610 MH	610	35380	0	0	0	0	0	35380
643E00.0061311	FUNCTIONAL DESIGN CRITERIA PREPARATION - (ONSITE DESIGN ENGINEER)	900	1 LOT	1000	74000	0	0	0	0	0	74000
SUBTOTAL	TECHNICAL SERVICES			1,610	109,380	0	0	0	0	0	109,380
TOTAL	COST CODE 90000 WBS 643E00 (ESCALATION 5.81% - CONTINGENCY 30.00 %)			1,610	109,380	0	0	0	0	0	109,380
TOTAL WBS 643E00 FDC PREPARATION				1,610	109,380	0	0	0	0	0	109,380

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643F00	CDR PREPARATION										
643F00.00	TECHNICAL SERVICES										
643F00.0061401	CONCEPTUAL DESIGN REPORT PREPARATION - (OC) ASSUME .75 MAN YEARS	900	1370 MH	1370	79460	0	0	0	0	0	79460
643F00.0061411	CONCEPTUAL DESIGN REPORT PREPARATION - (ONSITE DESIGN ENGINEER)	900	1 LOT	1300	96200	0	0	0	0	0	96200
SUBTOTAL	TECHNICAL SERVICES			2,670	175,660	0	0	0	0	0	175,660
TOTAL	COST CODE 90000 WBS 643F00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			2,670	175,660	0	0	0	0	0	175,660
TOTAL WBS 643F00	CDR PREPARATION			2,670	175,660	0	0	0	0	0	175,660

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
643G00	SYSTEM INTEGRATION/TESTING										
643G00.00	TECHNICAL SERVICES										
643G00.0000302	DATA CONVERSION SOFTWARE PACKAGE ALLOW 4 MONTHS	900	1 LS	460	26680	0	0	0	0	0	26680
643G00.0000306	APPLICATIONS SOFTWARE PACKAGE ALLOW 24 MONTHS	900	1 LS	3660	212280	0	0	0	0	0	212280
643G00.0000310	SW/QA/TESTING DOCUMENTATION ALLOW 12 MONTHS	900	1 LS	1830	106140	0	0	0	0	0	106140
SUBTOTAL	TECHNICAL SERVICES			5,950		0	0	0	0	0	
					345,100		0		0		345,100
TOTAL	COST CODE 90000 WBS 643G00 (ESCALATION 33.25% - CONTINGENCY 30.00 %)			5,950		0	0	0	0	0	
					345,100		0		0		345,100
TOTAL WBS 643G00	SYSTEM INTEGRATION/TESTING			5,950		0	0	0	0	0	
					345,100		0		0		345,100

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
644A00	SAFETY/ENVIR DOC - PRE-CAPITAL										
644A00.00	TECHNICAL SERVICES										
644A00.0060013	SAFETY/ENVIRONMENTAL DOCUMENTATION ALLOW 1 MAN 1 MONTH	900	160 MH	160	9280	0	0	0	0	0	9280
SUBTOTAL	TECHNICAL SERVICES			160	9,280	0	0	0	0	0	9,280
TOTAL	COST CODE 90000 WBS 644A00 (ESCALATION 8.75% - CONTINGENCY 30.00 %)			160	9,280	0	0	0	0	0	9,280
TOTAL WBS 644A00	SAFETY/ENVIR DOC - PRE-CAPITAL			160	9,280	0	0	0	0	0	9,280

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
644B00	PLANT SUPPORT										
644B00.00	TECHNICAL SERVICES										
644B00.0061009	PLANT SUPPORT - ASSUME .50 MEN FOR .5 YEARS	900	460 MH	460	26680	0	0	0	0	0	26680
SUBTOTAL	TECHNICAL SERVICES			460	26,680	0	0	0	0	0	26,680
TOTAL	COST CODE 90000 WBS 644B00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			460	26,680	0	0	0	0	0	26,680
TOTAL WBS 644B00 PLANT SUPPORT				460	26,680	0	0	0	0	0	26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
644C00	SAS SUPPORT										
644C00.00	TECHNICAL SERVICES										
644C00.0061109	SAFEGUARDS AND SECURITY SUPPORT - ASSUME	900	0 MH	0	0	0	0	0	0	0	0
644C00.0061203	SAS SUPPORT - ASSUME .5 MEN FOR .5 YEARS	900	460 MH	460	26680	0	0	0	0	0	26680
SUBTOTAL	TECHNICAL SERVICES			460		0		0		0	
					26,680		0		0		26,680
TOTAL	COST CODE 90000 WBS 644C00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			460		0		0		0	
					26,680		0		0		26,680
TOTAL WBS 644C00 SAS SUPPORT				460		0		0		0	
					26,680		0		0		26,680

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
644D00	PROJECT MANAGEMENT										
644D00.00	TECHNICAL SERVICES										
644D00.0062003	PROJECT MANAGEMENT - ASSUME .25 MEN FOR .5 YEARS	900	230 MH	230	13340	0	0	0	0	0	13340
SUBTOTAL	TECHNICAL SERVICES			230	13,340	0	0	0	0	0	13,340
TOTAL	COST CODE 90000 WBS 644D00 (ESCALATION 20.38% - CONTINGENCY 30.00 %)			230	13,340	0	0	0	0	0	13,340
TOTAL WBS 644D00	PROJECT MANAGEMENT			230	13,340	0	0	0	0	0	13,340

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
644E00	FDC PREPARATION										
644E00.00	TECHNICAL SERVICES										
644E00.0061301	FUNCTIONAL DESIGN CRITERIA PREPARATION - (OC) ASSUME .33 MAN YEARS	900	610 MH	610	35380	0	0	0	0	0	35380
644E00.0061311	FUNCTIONAL DESIGN CRITERIA PREPARATION - (ONSITE DESIGN ENGINEER) ASSISTANCE TO OC	900	1 LOT	750	55500	0	0	0	0	0	55500
SUBTOTAL	TECHNICAL SERVICES			1,360	90,880	0	0	0	0	0	90,880
TOTAL	COST CODE 90000 WBS 644E00 (ESCALATION 5.81% - CONTINGENCY 30.00 %)			1,360	90,880	0	0	0	0	0	90,880
TOTAL WBS 644E00	FDC PREPARATION			1,360	90,880	0	0	0	0	0	90,880

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
644F00	CDR PREPARATION										
644F00.00	TECHNICAL SERVICES										
644F00.0061401	CONCEPTUAL DESIGN REPORT PREPARATION - (OC) ASSUME .75 MAN YEARS	900	1375 MH	1375	79750	0	0	0	0	0	79750
644F00.0061411	CONCEPTUAL DESIGN REPORT PREPARATION - (ONSITE DESIGN ENGINEER) ALLOWANCE	900	1 LOT	1500	111000	0	0	0	0	0	111000
SUBTOTAL	TECHNICAL SERVICES			2,875		0	0	0	0	0	
					190,750		0		0		190,750
TOTAL	COST CODE 90000			2,875		0	0	0	0	0	
	WBS 644F00				190,750		0		0		190,750
	(ESCALATION 8.75% - CONTINGENCY 30.00 %)										
TOTAL WBS 644F00 CDR PREPARATION				2,875		0	0	0	0	0	190,750
					190,750		0		0		190,750

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ACCOUNT NUMBER	DESCRIPTION	COST CODE	QUANTITY	MANHOURS	LABOR	EQUIP USAGE	MATERIAL	SUB- CONTRACT	EQUIP- MENT	OH&P / B & I	TOTAL DOLLARS
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
REPORT TOTAL				135,105	7,371,373	0	2,298,326	0	0	1,448,223	11,117,923