



Audit of SCADA Implementation and Operations
Report # 09-07

Prepared by
Office of Inspector General

John W. Williams, Esq., Inspector General
J. Timothy Beirnes, CPA, Director of Auditing
Gary T. Bowen, CIA, Lead Consulting Auditor



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

April 14, 2010

Audit and Finance Committee Members:

Mr. Charles J. Dauray, Chair
Mr. Eric Buermann, Member
Mr. Joe Collins, Member

Re: Audit of SCADA
Implementation and Operations
Audit No. 09-07

This audit was performed pursuant to the Inspector General's authority set forth in Section 20.055, F.S. Our objective focused on determining the adequacy of the system of management controls in effect over SCADA Implementation and Operations. This report was prepared by Tim Beirnes and Gary Bowen.

Sincerely,

A handwritten signature in blue ink, appearing to read "John W. Williams", is written over a large, stylized blue checkmark.

John W. Williams, Esq.
Inspector General

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BACKGROUND

In accordance with the Office of Inspector General's Fiscal Year 2009 Audit Plan, we conducted an audit of the Supervisory Control and Data Acquisition Systems (SCADA) Implementation and Operations.

SCADA is the infrastructure that remotely operates the District's water control structures and provides operations and hydro-meteorological data. (See the SCADA System Schematic at Appendix C). SCADA systems include software and hardware components that scan remote data, log data and system events, alert abnormal conditions, and send operator commands to remote devices such as water control structures to open or close flood control gates. The Operations Control & Hydro Data Management Department located in the Operations and Maintenance Resource Area manages the SCADA system.

The Operations Control & Hydro Data Management Department has two deputy directors, one to manage SCADA, Instrumentation & Telemetry, and one to manage Operations Control & Hydro Data Management. The mission of SCADA, Instrumentation & Telemetry is to design, install, maintain, and repair environmental data recording instrumentation that supports the District's water control and hydrologic/meteorological monitoring network. The mission of Operations Control & Hydro Data Management is to produce, manage, and maintain the operational and hydro-meteorological data, which provides water quality data needed to support the District's operational decision making, and monitoring requirements (such as those required under the Everglades Forever Act, and the Everglades Settlement Agreement).

SCADA, Instrumentation & Telemetry is composed of the following divisions and sections (see organization chart at Appendix B):

- SCADA Instrumentation Division
 - Instrumentation Management and Data Collection – (Maintenance)
 - SCADA & Instrumentation – (Includes Warehouse Asset Management)
- Telemetry Spec & Support Division
 - SCADA Engineering – (Installation)
 - Telemetry Spec & Support – (Programming and Set-up)
 - SCADA Analysis – (Control Room Support)

OBJECTIVE, SCOPE AND METHODOLOGY

The main objective of the audit was to examine the internal controls over the SCADA implementation and operation processes. The audit reviewed the internal controls in the processes relating to installing, maintaining and accounting for SCADA operations. Specifically, the audit reviewed procedures and controls related to: 1) cost efficiency of outsourcing installation and maintenance contracts; 2) vendor selection and oversight for installations and maintenance; and 3) parts inventory procedures, including warehousing and parts issued to vendors.

Our methodology included:

- Interviewing project managers and warehouse support staff to gain an understanding of the parts inventory and warehouse process
- Visiting and observing the warehouse operations
- Reviewing the available documentation and controls over warehouse and materials issuance processes to ensure compliance with appropriate procedures
- Sampling installation and upgrade projects and reviewing supporting documentation related to materials provided to contractors
- Reviewing process and status of the warehouse inventory system implementation
- Interviewing project managers, installation, maintenance and support staff to gain an understanding of the vendor selection and oversight process
- Reviewing documentation and controls over contractor selection and oversight processes to ensure compliance with the District's procurement policies and procedures
- Analyzing the cost of SCADA installation and maintenance and comparing the cost of outsourcing for those services versus the cost of performing those activities by District personnel
- Reviewing the current status of the SCADA system and the plans for replacement and upgrade of system components
- Reviewing prior audit and investigation reports and following up on recommendations

In addition, SCADA, Instrumentation & Telemetry's division directors and section managers were interviewed to obtain an understanding of their division's purpose and function, staffing levels, and major projects and budget items.

Our audit was conducted in accordance with Generally Accepted Government Auditing Standards. These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

EXECUTIVE SUMMARY

Overall, our audit revealed that the SCADA implementation and operation processes are adequate for installing, maintaining, and accounting for SCADA operations. However, processes and controls over parts inventory could be improved, problems relating to expensing capital project costs need to be researched and corrected, and installation and maintenance costs could be reduced based on our findings and recommendations.

We found that the Instrumentation Management & Data Collection and SCADA Engineering Sections make extensive use of contract workers for the maintenance, upgrade, and installation of SCADA sites. We reviewed and concur with SCADA management's analysis and estimate that an equivalent of 39 contract workers could be replaced by 25 in-house staff. This would result in potential savings of \$9.254 million from Fiscal Year 2009 through Fiscal Year 2014, or potential savings of \$1.04 million to \$1.813 million each year.

We also found that the process for awarding project work orders was not as competitive as it could be. Projects are awarded on a rotating basis among eight contractors who were all selected following submissions of Request for Proposals. Since the work orders are not open for bids to all eight firms, but to the contractor next on the rotation list, the process appears to lack competition and may result in greater cost.

In addition, we found that a perpetual inventory of SCADA parts was in the process of being implemented. We were unable to completely review and test the

accuracy of the inventory records because they were incomplete at the time of the audit. However, based on the implementation process being 90% completed, and our understanding of the procedures planned to be implemented, it appears the procedures and controls will be sufficient. SCADA management is encouraged to complete full implementation of the perpetual inventory system.

We also tested project cost accounting and found that the costs associated with six of 10 contractor's installation work orders were expensed instead of capitalized. The capital costs that were incorrectly expensed totaled \$161,857.

In addition, parts supplied to contractors from District inventories could not be easily traced and verified to installation at specific sites in accordance with the work order. Also, there were no procedures in place to ensure parts were released only to authorized individuals.

SCADA OPERATIONS

The functions of each section of the SCADA, Instrumentation & Telemetry Department are discussed in the following sections.

Instrumentation Management and Data Collection

The Instrumentation Management and Data Collection section is responsible for the maintenance of the SCADA sites. The section has 25 full time employees and also utilizes the equivalent of 10 additional personnel supplied under maintenance contracts with 9 different contractors. According to the SCADA Instrumentation and Telemetry Maintenance Database (SCADA Site Information Report), the following represents a breakdown of the active and inactive SCADA sites which are serviced by a combination of contractors and District employees.



Remote Gate Structure

Active SCADA Sites		
	Site Family (1)	Number of Sites
Active Sites Under Maintenance Service Contracts	Campbell (a)	536
	MOSCAD (b)	<u>164</u>
Total Active Sites Serviced Under Contract		700
Active Sites Serviced In-House	Campbell	245
	MOSCAD	109
	RACU (c)	<u>93</u>
Total Active Sites Serviced In-House		447
Total Active SCADA Sites		1147
Inactive SCADA Sites (2)		
Inactive Sites Under Contracts	Campbell	13
	MOSCAD	<u>0</u>
Total Inactive Sites Under Contracts		13
Inactive Sites Serviced In-House	Campbell	11
	MOSCAD	1
	RACU	<u>0</u>
Total Inactive Sites Serviced In-House		12
Total Inactive SCADA Sites		25
TOTAL SCADA SITES		1172

(1) Site Families:

- a) Campbell Scientific data logger (CR-10) is primarily used for measurement and control functions. The data logger can remotely measure hydrologic, meteorological, and water quality information, with on-site data storage capacity, and it can transmit the data to the control center. The system includes a power supply, weatherproof enclosure, sensors, programming and communications software, and communications peripherals.
- b) MOSCAD (Motorola Supervisory Control and Data remote terminal unit (RTU) is a microprocessor controlled electronic device which interfaces mechanical devices such as flood control gates, pumps, etc. to the SCADA system by transmitting telemetry data to and from the system. The RTU enables, for instance, the ability to remotely open or close flood gates, or turn on or off pumps. It also has the capability of performing sensor functions and providing continuous monitoring, although it is not primarily used for those purposes.
- c) RACU (Remote Acquisition Control Unit) is in the process of being phased out and replaced with MOSCADS. While it has the capability of remotely collecting data and controlling mechanical devices, it has no data storage capacity and has an obsolete operating system.

(2) Inactive Sites:

Inactive Sites are sites which have been damaged or vandalized and are no longer functional. They are inactivated and no longer maintained. The electronic parts are removed to prevent further damage or loss until funds become available to refurbish and reactivate the site.

SCADA & Implementation - Warehouse Management

Three full time equivalent (FTE) employees are responsible for the parts inventory and warehouse operation. The warehouse section maintains an inventory of parts, which are used in the installation and maintenance of the SCADA equipment. The warehouse deals with two broad categories of parts; rotables (defined as: spare parts which can be restored close to new condition), and consumables (items which are used up, expendable, or non-refurbishable). Currently, the warehouse keeps two separate inventories, one for the installation group, and one for the maintenance group.

Rotables are entered into SAP inventory records when received, and must be “asset tagged” within three days of receipt. Contractors no longer provide any rotatable or most consumable materials except for miscellaneous supplies for installations or repairs, but rather, all such items are to be supplied by the District warehouse, as reflected in the Statements of Work. The reason being 1) equipment installations and repairs can remain standardized if all the parts and components are from a single source, and 2) consumable items can be better controlled and accounted for, and there is less likelihood of a contractor over - billing for parts.



District Parts Warehouse

SCADA Engineering

The SCADA Engineering section consists of six FTE’s, whose primary responsibilities are managing the installation projects. Outside contractors perform most of the installation work, with the equivalent of 29 contract employees.

New Sites Under Construction		
	Site Family	Number of Sites
	Campbell	28
	MOSCAD	17
Total SCADA Sites Under Construction		45

There are several contractors which the District uses to perform site upgrades and installations. There are eight contracts totaling \$2,201,907, relating to installation and

upgrades of CR10 sites. Multi-Year Campbell Scientific Installation Services funding is as follows:

Fiscal Year	Funding Amount
October 1, 2007 – September 30, 2008	\$733,969
October 1, 2008 – September 30, 2009	\$733,969
October 1, 2009 – September 30, 2010	\$733,969
Total	\$2,201,907

There are five contracts totaling \$2,750,000 relating to MOSCAD sites. Multi-Year MOSCAD Installation Services funding is as follows:

Fiscal Year	Funding Amount
October 1, 2008 – September 30, 2009	\$900,000
October 1, 2009 – September 30, 2010	\$925,000
October 1, 2010 – September 30, 2011	\$925,000
Total	\$2,750,000

Specific work orders are awarded to approved contractors for new installations on a rotating basis in accordance with a contract tracking methodology developed by the SCADA Engineering section. This methodology takes into consideration past contractor performance (including quality and timeliness of project completion), amount of contract remaining, and status of previously awarded work.

There are three contracts totaling \$8,416,656 relating to Data Logger Area Recorder Maintenance. Multi-Year Data Logger Maintenance funding is as follows:

Fiscal Year	Funding Amount
October 1, 2007 – September 30, 2008	\$953,462
October 1, 2008 – September 30, 2009	\$3,365,489
October 1, 2009 – September 30, 2010	\$3,365,489
October 1, 2010 – September 30, 2011	\$732,216
Total	\$8,416,656

The Field Infrastructure Components of the SCADA sites consist of the following systems:

- Sensors – environmental, structure monitoring
- Actuators – pump, gate control
- Remote Terminal Units (RTUs) - RACUs, MOSCADS, CR1000s
- Data acquisition, test, maintenance, problem-tracking systems



CR 10 Data Logger

The SCADA components support and maintain the following types of hydrologic, meteorological, and water quality monitoring sites:

Type of Monitoring Site	Approximate Number of Sites
Groundwater Well Sites	503
Rainfall Sites	312
Flow Sites	575
Water Level Sites	843
Weather Sites	58
Water Quality Monitoring:	
Fish, Birds, and Other	103
Groundwater	176
Sediment	117
Surface Water Grab Stations	1268
Auto Samplers	266
Total Sites	4,221



Monitoring Station on Lake Okeechobee

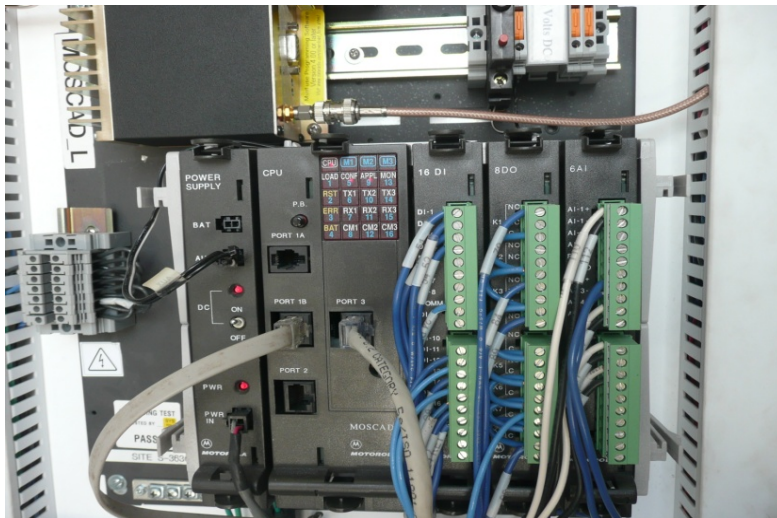
Telemetry Spec & Support

The Telemetry Spec & Support section employs approximately six FTE's who are responsible for programming and setting up the electronic equipment used for SCADA including the CR1000, MOSCAD, and telemetry systems. Specifically, the

section's Systems Engineering Analysts design and implement interfaces between systems, networks, middleware, databases, and programmable remote terminal units. The section is also responsible for configuring the system and installed devices to allow for remote control and system performance monitoring. They develop, maintain and upgrade the process control computer system, including database management, networking, programming, and configuring programmable logic control systems and distributed control units.

The section is also involved in the development of the telemetry infrastructure, as well as the management, operation, and maintenance of the SCADA telemetry system. The District has one of the largest water control systems in the country which spans

nearly 5,000 square miles with over 200 major water control sites which utilize microwave telemetry and other electronic communication and data acquisition systems.



MOSCAD Electronics Panel

SCADA Analysis

Approximately eight FTE's are responsible for providing support in the Emergency Operations Controls Center, which monitors and controls over 200 major water control sites via microwave and other electronic data acquisition systems on a 24/7 basis.

Additionally, the section is responsible for:

- Operating the District's regional water control system's extensive network of canals, levees, pumps, gates and spillways,
- Communicating and coordinating water control equipment status, readiness, and required maintenance with Field Operations staff and other governments, and
- Serving as the 24 hour State Warning Point for the Emergency Satellite Communications System.



Gate Structure on C-44

AUDIT RESULTS

Extensive Use of Contract Workers Increases Cost

The SCADA, Instrumentation & Telemetry Department in Fiscal Year 2008 prepared an extensive and comprehensive analysis of the cost effectiveness of using in-house full time equivalent employees (FTE's) rather than outsourcing the work to contractors to perform maintenance and installations of SCADA sites and equipment. The analysis was reviewed and the assumptions were validated as part of the audit procedures. (See Appendix A for details of the analysis.)

The analysis is based on the following assumptions:

- Estimated 15 FTE's were needed for installations versus 29 estimated contractors due to efficiencies in process control and volume of work.
- Estimated 10 FTE's were needed for maintenance and repair versus 10 estimated contractors. (A comparable number of FTE's was needed for maintenance and repairs because of the geographical dispersion of site locations).

- Twenty vehicles (pick up trucks, trailers, airboat, etc.) are needed. These costs are amortized over eight years.
- Twenty five computers are needed @ \$1500 each, amortized over three years.
- Tool kits, uniforms, etc. - 25 @ \$200 each, amortized over three years
- Tools and equipment needed for installations \$20,000 per year.
- Average annual contract increase estimated at 4%.
- Average salary increase estimated at 3%

The summary analysis extends from Fiscal Year 2008 through Fiscal Year 2014, and indicated potential savings of \$9.3 million through the period, or potential savings of \$1.0 million to \$1.8 million per year.

	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Cost to Perform In-house		\$1,919,240	\$1,604,573	\$1,649,733	\$1,696,247	\$1,744,156	\$1,793,503
Cost to Continue Contracts	\$2,850,131	\$2,964,136	\$3,082,702	\$3,206,010	\$3,334,250	\$3,467,620	\$3,606,325
Estimated Savings	\$0.00	\$1,044,896	\$1,478,129	\$1,556,277	\$1,638,003	\$1,723,464	\$1,812,822
ACCUMULATED SAVINGS		\$1,044,896	\$2,523,025	\$4,079,302	\$5,717,305	\$7,440,769	\$9,253,591
							6 Years
					Average Annual Savings		\$1,542,325

Recommendation

- 1. Consider hiring full time employees to perform SCADA work that is considered permanent and ongoing.**

Management Response:

Management concurs with recommendation. SCADA staff developed a staffing analysis that showed a need for 25 FTEs to replace site installation contractors with a cost savings of \$1 million per year once implemented. The FY09 budget included authorization to hire 10 staff to replace contractors. This was part one of a multi-year proposed replacement of contractors with FTEs for long-term ongoing core work efforts. No new positions were included in the FY10 budget. Staff is reviewing the contractor transition plan and will propose additional FTEs in FY11. Until the transition is complete, the District will have to continue to rely

upon some level of contracting to provide SCADA installation and maintenance/repair services.

Responsible Department:

Operations Control and Hydro Data Management Department

Estimated Completion:

Ongoing

Work Order Pricing Could be More Competitive

The nine contractors currently used for SCADA installation, maintenance, and repairs, were all selected resulting from Requests for Proposals submitted in May 2007. Only one of the respondents was not awarded a contract because they did not meet the reference check requirement and was therefore deemed non-responsive.

Because of the volume of work to be done in this area, all responsive and responsible responders to the Request for Proposal were approved and individual contracts were negotiated. Under the contracts signed with each vendor, labor rates were negotiated at the time of contract execution. These labor rates vary significantly from firm to firm. Work orders are rotated among the selected firms as the District negotiates the price of the work order based on the statement of work and the contractual labor rates. Since hourly rates are already established when the contract is executed, each work order's price entails negotiating the number of hours and material costs. This process does not ensure the best price to the District. Allowing all eight qualified firms to competitively bid on each work order would help ensure the lowest cost to the District.

Recommendation

- 2. Allow all approved contractors the opportunity to bid on each work order, and select the lowest bidder to ensure the best possible price is obtained.**

Management Response:

Management concurs with recommendation. Operations Control and Hydro Data Management Department will work with the Procurement Department to develop a procedure where all contractors are invited to meet with staff at sites where installation or maintenance work will be available and submit bids for each work order. Management anticipates that implementing this process may reduce the contracted cost due to additional competition. It could also provide the additional benefit of reducing the amount of time required if the selected contractor cannot perform the work, because we will already have bids from other vendors and the opportunity to go to the next lowest bidder.

Responsible Department:

Operations Control and Hydro Data Management Department

Estimated Completion:

September, 2010

Project Costs are Not Capitalized

The Asset Master Record for SCADA projects was not always set up correctly in SAP. This is required to be set up for site installation and upgrade project costs to be properly capitalized. In addition, an incorrect type code is often used on the SAP Internal Order which causes the project cost to be expensed.

We noted that the project costs for six of ten projects sampled were expensed when they should have been capitalized, as illustrated in the following table:

Purchase Order	Purchase Requisition	Site(s)	Asset Setup	Delivery Date	Amount Expensed
9500002599	10048147	BF2, LABPW2	NO - Items Expensed	1/1/2009	\$30,560
9500002337	10048139	CORK2	NO - Items Expensed	9/11/2008	\$20,886
9500002499	10048177	COWCRK, PAIGE, PALM, STOR, S65ER	YES	7/31/2008	-0-
9500002583	10048304	TCWD	YES	1/5/2009	-0-
9500002586	10052916	LJOE, 3A11, G3A11, KEA846	YES	10/17/2008	-0-
9500002600	10054447	G354C, G393B	YES	10/28/2008	-0-
4100000101	EOC	S65A, S65E, S65D, S65DX2	NO - Items Expensed	1/5/2009	\$58,164
9500002652	10060215	MFH40	NO - Items Expensed	12/20/2008	\$11,980
9500002649	10060215	G254	NO - Items Expensed	10/31/2008	\$20,802
9500002784	10065359	LASPAL	NO - Items Expensed	12/31/2008	\$19,465
				Total Expensed	\$161,857

Also contributing to the condition is the observation that the wrong order type code is often used on the Internal Order (the SAP document used to initiate a project and determine how the costs will be charged, i.e., expensed or capitalized). Using the order type ZZIO on the Internal Order will cause the cost item to be accounted for as an operating expense. However, using the order type ZAUC on the Internal Order will cause the project costs to be properly coded as an asset under construction (populating the Asset Master Record), and allowing the costs to be transferred to the asset number set up when the project is completed.

All of the six projects were expensed because the type code ZZIO was used on the Internal Order, and no Asset Master Record was set up. It is likely that many, if not most of the new SCADA installations since conversion to the SAP system have been expensed rather than capitalized.

Recommendation

- 3. Research SCADA projects completed since the District's conversion to SAP to determine whether or not they were properly capitalized, and make corrections where necessary. In addition, written procedures for creating SAP Internal Orders and Asset Master Records should be communicated to appropriate parties to ensure future project costs are capitalized and not expensed.**

Management Response:

Management agrees that new SCADA site installations should be captured and capitalized as part of the District's fixed asset records. Internal orders have been created (order type ZAUC) in order to capture and capitalize new SCADA site installations.

District standards for creating SAP internal orders and asset master records are being incorporated into O&M's standard operating procedures and work process flows for new SCADA site installations, which includes a step to request an internal order for each new site to be installed.

However, management does not believe that there is a benefit to be derived from going back and posting adjustments to capitalize equipment costs that have been expensed in a prior year because 1) the costs are immaterial to the financial statements and 2) not having this equipment as part of our fixed asset records will in no way impede our ability to track and control this equipment because it is currently in service and collecting data.

Responsible Department:

Operations Control and Hydro Data Management Department and O&M Business Services staff

Estimated Completion:

September 2010

Perpetual Inventory of SCADA Electronic Parts not Fully Implemented

The SCADA & Implementation Warehouse section maintains an inventory of parts, which are used in the installation and maintenance of SCADA equipment. Deficiencies previously reported by the Office of Inspector General related to record keeping and control over the parts inventory are being addressed by implementing a perpetual inventory system through the SAP materials management module. A complete and accurate listing of SCADA parts, including location, part number, serial number, quantity, etc. did not previously exist. Commendably, staff is in the process of updating the asset inventory by verifying and correcting errors and omissions. According to staff, this process is approximately 90% complete.

When the asset inventory is complete, the District will be able to properly track and identify assets located at each SCADA field site, as well as the warehoused inventory parts. The record keeping system will be capable of tracking assets and parts by specific location, including field sites, warehouse, district vehicles, contractors vehicles, repair lab, etc.

In addition, it was observed that security has been increased by limiting warehouse access and establishing better physical control over parts reserved and set aside for contractor pick up. We noted during a tour of the facility that access to the facility is limited by a locked gate. In addition, it appeared that all of the parts stored in the warehouse exhibited a bar code tag, which will be used in conjunction with the SAP perpetual inventory system to record and track the location of the parts. Warehouse personnel and personnel in the field will be able to scan and update the part's location.

Recommendation

- 4. Complete the preparation and verification of an accurate and detailed list of all District owned SCADA parts installed at sites, located in the warehouse, or issued to in-house or contract installers.**

Management Response:

Management concurs with the need to have this information reflected in the asset records of each site, and are implementing changes to the current business process to capture this information going forward. The serialized asset data is reflected in the equipment master record for each piece of equipment installed in a functional location (field site) in SAP.

However, we do not have an inventory of equipment by serial number installed at each individual field site and have staffing and financial resource constraints that prevent us from doing so. We will capture and serialize parts from existing sites as part of SCADA’s ongoing maintenance process as equipment that needs repair is removed and booked back into inventory as rotatable items.

Responsible Department:

Operations Control and Hydro Data Management Department

Estimated Completion:

Completed as part of ongoing maintenance process

Internal Orders for Warehouse Materials are not Linked to Purchase Requisitions

There is no audit trail created in SAP for the linking of the list of District materials supplied to contractors to the specific project or work order. The District provided materials are recorded in SAP using an Internal Order which does not appear to

be linked to the Purchase Requisition or Purchase Order. As a result of this, warehouse personnel were unable to locate all of the documentation we requested related to materials provided by the District to contractors. Work Order (in addition to Purchase Order and Purchase Requisition) numbers for a sample of specific installation and upgrade projects were provided to warehouse personnel with a request for the documentation listing specific materials, parts with serial numbers, etc., which were issued to the contractors. The documentation that was provided was incomplete. Further, the documents that were provided were located with great difficulty because of the lack of linkage between the Internal Order for the parts and the Purchase Order.

Recommendation

- 5. Create a link in SAP tying the Internal Order number for the District provided materials to the Purchase Requisition number for the installation contract, to ensure the location of the parts is able to be tracked and appropriate responsibility is assigned and maintained.**

Management Response:

Management concurs with the recommendation. By including the practice of creating a separate internal order for each new site installation in the revised SCADA work flow process for new site installations, the costs of both the parts and the service contract will be captured via that site internal order.

Responsible Department:

Operations Control and Hydro Data Management Department

Estimated Completion:

September 2010

Procedures Needed to Prevent Unauthorized Release of Materials

As previously stated, District purchased parts and materials are provided to contractors for installation at SCADA sites. Representatives of the contractor pickup the materials at the District's warehouse and are required to sign for their receipt. Some

concern has been expressed over the lack of assurance or documentation that the person signing the receipt is authorized, since in many cases a subcontractor or other unfamiliar person picks up the materials. In one case, materials were released to individuals known to represent a firm other than the one awarded the job.

Recommendation

- 6. Develop procedures to provide warehouse personnel with a list of persons authorized to receive parts and materials released from the warehouse.**

Management Response:

Management concurs with the recommendation to set formal controls for who can receive District parts or materials. Staff will work with Procurement to add to each purchase/work order the name of the person or persons authorized to receive parts or materials on behalf of the contractor for that specific work order.

Warehouse staff will release parts or materials to only those persons designated by the vendor.

Responsible Department:

Operations Control and Hydro Data Management Department

Estimated Completion:

September, 2010

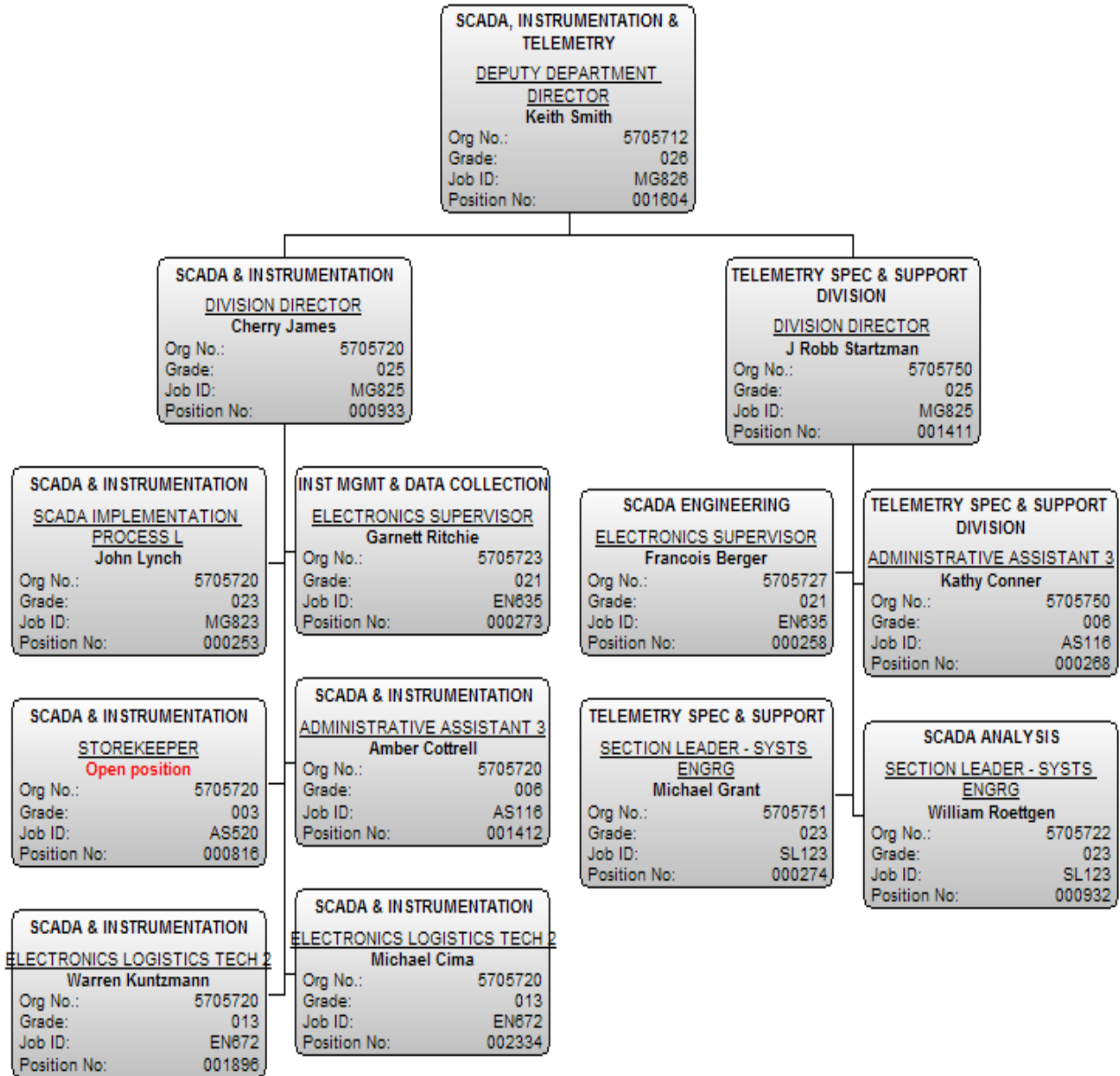
Analysis of Staff vs. Contractors

SIM Division Function	Qty	Current Costs	Initial Investment FY09	2010	2011	2012	2013	2014
Staffing Cost	10	\$0.00	\$ 594,983.23	\$ 612,832.73	\$ 631,217.71	\$ 650,154.24	\$ 669,658.87	\$ 689,748.64
Staffing Cost	15	\$0.00	\$0.00	\$ 892,474.85	\$ 919,249.09	\$ 946,826.57	\$ 975,231.36	\$ 1,004,488.30
Vehicles for New Installations	10	\$0.00	\$55,765.75	\$55,765.75	\$55,765.75	\$55,765.75	\$ 55,765.75	\$ 55,765.75
Computers	25	\$0.00	\$12,500.00	\$12,500.00	\$12,500.00	\$12,500.00	\$ 12,500.00	\$ 12,500.00
Tool Kits, Uniforms, etc.	22	\$0.00	\$11,000.00	\$11,000.00	\$11,000.00	\$11,000.00	\$ 11,000.00	\$ 11,000.00
Tools and Equipment needed for installations (rentals/purchases)		\$0.00	\$20,000.00	\$20,000.00	\$20,000.00	\$20,000.00	\$ 20,000.00	\$ 20,000.00
Loggernet/RACU/Legacy Equipment Upgrades contract		\$1,220,969.00	\$528,350.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Combined Maintenance/Repair Contracts		\$1,374,162.00	\$659,141.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Miscellaneous Projects		\$255,000.00	\$37,500.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Cost to perform work inhouse			\$1,919,240.48	\$1,604,573.33	\$1,649,732.55	\$1,696,246.56	\$1,744,155.98	\$1,793,502.69
Cost to continue contracts		\$2,850,131.00	\$2,964,136.24	\$3,082,701.69	\$3,206,009.76	\$3,334,250.15	\$3,467,620.15	\$3,606,324.96
Estimated Savings		\$0.00	\$1,044,895.76	\$1,478,128.36	\$1,556,277.20	\$1,638,003.59	\$1,723,464.17	\$1,812,822.27
ACCUMULATED SAVINGS			\$1,044,895.76	\$2,523,024.12	\$4,079,301.32	\$5,717,304.91	\$7,440,769.08	\$9,253,591.35

Average Annual Contract Increase estimated at 4%
 Average Salary Increase estimated at 3%
 Vehicle cost is amortized over 8 years
 Computer cost is amortized over 3 years.
 Tool kits, uniforms, etc. cost is amortized over 3 years.
 Tools and Equipment needed for installations costs are amortized over 5 years.

APPENDIX B

SCADA, INSTRUMENTATION & TELEMETRY



SFWMD SCADA SYSTEM SCHEMATIC

