**Office of**
**The City Attorney**
**City of San Diego**

**MEMORANDUM**

**533-5800**

**DATE:** August 14, 2008

**TO:** Councilmember Donna Frye

**FROM:** Tom Zeleny, Chief Deputy City Attorney

**SUBJECT:** Prior Contract Claim of Emerson Process Management

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At the meeting of the Natural Resources and Culture Committee [NR&C] on July 23, 2008, City staff was asked whether the City was previously involved in litigation with Emerson Process Management [Emerson]. Emerson has been selected to perform a control systems upgrade at the Metropolitan Biosolids Center, subject to City Council approval. In 1998, Emerson (then Westinghouse Process Control) did submit a claim with the City for additional compensation associated with construction delays at the Metropolitan Biosolids Center [MBC], but the matter was settled without litigation.

In the 1990's, the City was engaged in a massive upgrade of its sewage treatment facilities. MBC, a new facility, was built to replace the City's sludge drying operations on Fiesta Island. Emerson was awarded what ended up being a $120 million contract to design and install a wastewater operations management network [COMNET] to integrate the monitoring and control of all treatment, storage, metering and pumping facilities in the wastewater system, including MBC. Delays occurred during construction of MBC, which resulted in claims being filed by construction contractors including Nielsen Dillingham Builders, C. E. Wylie Construction, and APC-T&K.

Emerson filed a claim, pursuant to the terms of its contract with the City, alleging that construction delays at MBC caused it to incur additional costs and time to complete its work. The claim was revised and certified in 1999, requesting an additional $3,332,199 for itself and four of Emerson's subcontractors. The City reviewed the claim, and after a series of meetings determined that Emerson was not responsible for the construction delays, and therefore was entitled to additional compensation.

The City, however, contested the amount of compensation requested by Emerson. The City audited the financial records and project documents of Emerson and its subcontractors, and determined much of the cost overruns were not due to the construction delays. Emerson agreed,

and the claim was settled for $1,150,657 without the need to proceed to mediation. The settlement was approved in closed session on June 5, 2001, and ratified in open session in Resolution No. R-295090. Emerson also agreed to defend and indemnify the City against the claims of its subcontractors, which were still outstanding.

I was personally involved in the settlement negotiations with Emerson. Throughout the process they were amicable and cooperative. I did not witness any behavior that would cause me concern over awarding them the contract recommended by City staff.

Please call me if you have any questions.

Sincerely,

MICHAEL J. AGUIRRE, City Attorney

By

Thomas C. Zeleny
Chief Deputy City Attorney

cc: NR&C Committee Members
Jim Barrett, Public Utilities Director
Ann Sasaki, MWWD Deputy Director

000645

CITY OF SAN DIEGO

# MEMORANDUM

**DATE:** June 5, 2007

**TO:** Lance Wade, Director, Purchasing and Contracting Department

**FROM:** *Timothy C. Bertch, Ph.D, Director, Metropolitan Wastewater, MS 901*

**SUBJECT:** Request For Proposal (RFP) for Sole Source Procurement, Facilities Control Systems Upgrade at Metro Biosolids Center (MBC)

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This letter serves as a request to the Purchasing and Contracting Department to formally begin the RFP process for a Sole Source procurement of Facilities Control Systems upgrade at MBC. Please see attached the Sole source procurement approval letter. The proposed contract value is $6,000,000 and the term is two years.

Timothy C. Bertch, Ph.D
Metropolitan Wastewater Department Director

APPROVED: _____ Date: 6-13-07
R.F. Haas, Deputy Chief of Public Works

APPROVED: _____ Date: 6/18/07
Rick Reynolds, Assistant Chief Operating Officer

Attachments:
1. Sole source procurement authorization memo

cc: Robert Ferrier, Assistant Director, MWWD, MS 901
Lori Vereker, Deputy Director, MWWD, MS 901
Ann Sasaki, Deputy Director, MWWD, MS901
Chandra Reddy, Sr. Electrical Engineer, MS901

000647

CITY OF SAN DIEGO
**MEMORANDUM**

DATE: December 26, 2006

TO: Scott Tulloch, Metropolitan Wastewater Director

FROM: Tammy Rimes, Purchasing Agent

SUBJECT: Sole Source Request for Sole Source Procurement Authorizatoin for Emerson Process Management Power and Water Solutions, Inc. to provide Control Systems Upgrade

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Your Sole Source Request for the above subject with Emerson Process Management Power and Water Solutions, Inc. was approved and is valid through 12/31/2015. In order for a Purchase Order to be issued, your department has to submit a purchase requisition. In the internal header notes of the requisition, please reference Sole Source Case Number 1476. For questions, please contact Patrick Kelleher at x66214.

Tammy Rimes
Purchasing Agent

TR/mw

cc: Robert Ferrier, Assistant Director, MWWD, MS 901
Lori Vereker, Deputy Director, MWWD, MS 901
Ann Sasaki, Deputy Director, MWWD, MS 901

| DOCKET SUPPORTING INFORMATION<br>000649 CITY OF SAN DIEGO<br>**EQUAL OPPORTUNITY CONTRACTING PROGRAM EVALUATION** | DATE:<br>July 17, 2008 | 330<br>09/16 |
|---|---|---|

SUBJECT: Awarding of Design Build – Metro Facilities Control System Upgrade at Metro Biosolids Center

## GENERAL CONTRACT INFORMATION

Recommended Consultant: Emerson Process Management Power and Water Solutions, Inc.
Amount of this Action: $7,000,000.00
Contract Amount: $6,342,799.00
Funding Source: City

## SUBCONSULTANT PARTICIPATION

| | | |
|---|---|---|
| Altas Integrated Systems, Inc. (Other) | $187,641.00 | 2.95% |
| The StockDesk, Inc. (Other) | $ 24,000.00 | 0.37% |
| **Total Certified Subcontractor Participation** | **$ 0.00** | **0.00%** |
| **Total Other Participation** | **$211,641.00** | **3.32%** |
| **Total Subcontractor Participation** | **$211,641.00** | **3.32%** |

## EQUAL EMPLOYMENT OPPORTUNITY COMPLIANCE

Equal Opportunity: Required

Emerson Process Management Power and Water Solutions, Inc. submitted a Work Force Report for their San Diego County employees dated June 5, 2008, with a total of 21 employees. The firm's Work Force Analysis reflects under representations in the following categories:

Hispanics in A&E, Science, Computer
Females in A&E, Science, Computer

Emerson Process Management Power and Water Solutions, Inc. has demonstrated efforts to diversify their workforce which precludes the need to request an Equal Opportunity Plan.

## ADDITIONAL COMMENTS

The Work Force Analysis is attached.

This agreement is subject to the City's Equal Opportunity Contracting (San Diego Ordinance No. 18173, Section 22.2701 through 22.2702) and Non-Discrimination in Contracting Ordinance (San Diego Municipal Code Sections 22.3501 through 22.3517)

This is a Sole Source procurement approved as Sole Source Case Number 1476.

JLR

000650

File: Admin WOFO 2000

Date WOFO Submitted: 6/5/2008
Input by: kh

Goals reflect statistical labor force availability for the following: 2000 CLFA
San Diego, CA

*City of San Diego/Equal Opportunity Contracting*

# WORK FORCE ANALYSIS REPORT

FOR

Company: *Emerson Process Management Power and Water Solutions, Inc.*

I. TOTAL WORK FORCE:

| | CLFA Goals | Black M | Black F | CLFA Goals | Hispanic M | Hispanic F | CLFA Goals | Asian M | Asian F | CLFA Goals | American Indian M | American Indian F | CLFA Goals | Filipino M | Filipino F | White M | White F | Other M | Other F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mgmt & Financial | 3.3% | 0 | 0 | 11.9% | 0 | 0 | 6.2% | 0 | 0 | 0.4% | 0 | 0 | 6.2% | 0 | 0 | 2 | 0 | 0 | 0 |
| Professional | 4.0% | 0 | 0 | 12.6% | 0 | 0 | 6.5% | 0 | 0 | 0.5% | 0 | 0 | 6.5% | 0 | 0 | 0 | 0 | 0 | 0 |
| A&E, Science, Computer | 2.6% | 2 | 0 | 7.3% | 0 | 0 | 16.2% | 1 | 0 | 0.3% | 0 | 0 | 16.2% | 2 | 0 | 10 | 1 | 0 | 0 |
| Technical | 6.6% | 0 | 0 | 14.8% | 0 | 0 | 17.2% | 0 | 0 | 0.4% | 0 | 0 | 17.2% | 0 | 0 | 1 | 0 | 0 | 0 |
| Sales | 3.9% | 0 | 0 | 19.5% | 0 | 0 | 6.8% | 0 | 0 | 0.6% | 0 | 0 | 6.8% | 0 | 0 | 0 | 0 | 0 | 0 |
| Administrative Support | 7.0% | 0 | 0 | 20.8% | 0 | 0 | 8.8% | 0 | 0 | 0.6% | 0 | 0 | 8.8% | 0 | 0 | 0 | 1 | 0 | 0 |
| Services | 5.5% | 0 | 0 | 36.9% | 0 | 0 | 9.7% | 0 | 0 | 0.6% | 0 | 0 | 9.7% | 0 | 0 | 0 | 0 | 0 | 0 |
| Crafts | 4.5% | 0 | 0 | 25.8% | 0 | 0 | 9.1% | 0 | 0 | 0.7% | 0 | 0 | 9.1% | 0 | 0 | 0 | 0 | 0 | 0 |
| Operative Workers | 4.3% | 0 | 0 | 38.8% | 0 | 0 | 20.8% | 0 | 0 | 0.3% | 0 | 0 | 20.8% | 0 | 0 | 0 | 0 | 0 | 0 |
| Transportation | 8.1% | 0 | 0 | 32.1% | 0 | 0 | 4.5% | 0 | 0 | 0.5% | 0 | 0 | 4.5% | 0 | 0 | 0 | 0 | 0 | 0 |
| Laborers | 4.4% | 0 | 0 | 54.0% | 0 | 0 | 4.1% | 0 | 0 | 0.5% | 0 | 0 | 4.1% | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | | 2 | 0 | | 0 | 0 | | 1 | 1 | | 0 | 0 | | 2 | 0 | 13 | 2 | 0 | 0 |

**HOW TO READ TOTAL WORK FORCE SECTION:**

The information blocks in Section 1 (Total Work Force) identify the absolute number of the firm's employees. Each employee is listed in their respective ethnic/gender and employment category. The percentages listed under the heading of "CLFA Goals" are the County Labor Force Availability goals for each employment and ethnic/gender category.

| | TOTAL EMPLOYEES ALL | TOTAL EMPLOYEES M | TOTAL EMPLOYEES F | Female Goals |
|---|---|---|---|---|
| Mgmt & Financial | 2 | 2 | 0 | 39.8% |
| Professional | 0 | 0 | 0 | 59.5% |
| A&E, Science, Computer | 17 | 15 | 2 | 22.3% |
| Technical | 1 | 1 | 0 | 49.0% |
| Sales | 0 | 0 | 0 | 49.4% |
| Administrative Support | 1 | 0 | 1 | 73.2% |
| Services | 0 | 0 | 0 | 62.3% |
| Crafts | 0 | 0 | 0 | 8.6% |
| Operative Workers | 0 | 0 | 0 | 36.7% |
| Transportation | 0 | 0 | 0 | 15.2% |
| Laborers | 0 | 0 | 0 | 11.1% |
| TOTAL | 21 | 18 | 3 | |

**HOW TO READ EMPLOYMENT ANALYSIS SECTION:**

The percentages listed in the goals column are calculated by multiplying the CLFA goals by the number of employees in that job category. The number in that column represents the percentage of each protected group that should be employed by the firm to meet the CLFA goal. A negative number will be shown in the discrepancy column for each underrepresented goal of at least 1.00 position.

II. EMPLOYMENT ANALYSIS

| | Black Goals | Black Actual | Black Discrepanc | Hispanic Goals | Hispanic Actual | Hispanic Discrepanc | Asian Goals | Asian Actual | Asian Discrepanc | American Indian Goals | American Indian Actual | American Indian Discrepanc | Filipino Goals | Filipino Actual | Filipino Discrepan | Female Goals | Female Actual | Female Discrepancy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mgmt & Financial | 0.07 | 0 | N/A | 0.24 | 0 | N/A | 0.12 | 0 | N/A | 0.01 | 0 | N/A | 0.12 | 0 | N/A | 0.80 | 0 | N/A |
| Professional | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| A&E, Science, Computer | 0.48 | 2 | 1.52 | 1.24 | 0 | (1.24) | 2.75 | 2 | N/A | 0.05 | 0 | N/A | 2.75 | 2 | N/A | 3.79 | 2 | (1.79) |
| Technical | 0.07 | 0 | N/A | 0.15 | 0 | N/A | 0.17 | 0 | N/A | 0.00 | 0 | N/A | 0.17 | 0 | N/A | 0.49 | 0 | N/A |
| Sales | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| Administrative Support | 0.07 | 0 | N/A | 0.21 | 0 | N/A | 0.09 | 0 | N/A | 0.01 | 0 | N/A | 0.09 | 0 | N/A | 0.73 | 1 | N/A |
| Services | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| Crafts | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| Operative Workers | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| Transportation | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |
| Laborers | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 |

**Goals are set by job categories for each protected group. An underrepresentation is indicated by a negative number, but if the DISCREPANCY is less than -1.00 position, a N/A will be displayed to show there is no underrepresentation.**

WSD 09-001

000651

# REQUEST FOR COUNCIL ACTION
CITY OF SAN DIEGO

1. CERTIFICATE NUMBER (FOR AUDITOR'S USE ONI): 2900134 330 09/16

| TO: | 2. FROM (ORIGINATING DEPARTMENT): | 3. DATE: |
|---|---|---|
| CITY ATTORNEY | ENGINEERING AND CAPITAL PROJECTS | 6/16/08 |

4. SUBJECT:
Awarding of Design Build – Metro Facilities Control System Upgrade at Metropolitan Biosolid Center

| 5. PRIMARY CONTACT (NAME, PHONE & MAIL STA.) | 6. SECONDARY CONTACT (NAME, PHONE & MAIL STA.) | 7. CHECK BOX IF REPORT TO COUNCIL IS ATTACHED |
|---|---|---|
| Darren Greenhalgh (619)533-6600 MS 908A | Hossein Azar (619)533-4102 MS 908A | ☐ |

8.COMPLETE FOR ACCOUNTING PURPOSES

| | | | | | |
|---|---|---|---|---|---|
| FUND | 41509 | 41509 | | | |
| DEPT. | 779 | 779 | | | |
| ORGANIZATION | N/A | N/A | | | |
| OBJECT ACCOUNT | 4279 | 4909 | | | |
| JOB ORDER | 141190 | 465020 | | | |
| C.I.P. NUMBER | 45-966.0 | 46-502.0 | | | |
| AMOUNT | $6,942,799 | $57,201 | | | |

9. ADDITIONAL INFORMATION / ESTIMATED COST:

| | |
|---|---|
| Construction | $ 6,342,799 |
| Contingency | 57,201 |
| Project Admin | 50,000 |
| Const Admin | 550,000 |
| Total Request | $ 7,000,000 |

10. ROUTING AND APPROVALS

| ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED | ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED |
|---|---|---|---|---|---|---|---|
| 1 | DEPARTMENT DIRECTOR | | 7/15/08 | 9 | COO | | 8/20/08 |
| 2 | MWWD | APPROVAL | | 10 | P&C | | 8/29/08 |
| 3 | EOCP | SIGNATURES | | 11 | CITY ATTORNEY | | 9/2/08 |
| 4 | E.A.S | ON FILE | | 12 | ORIGINATING DEPARTMENT | | 9/2/08 |
| 5 | LIAISON OFFICE | | 7/16/08 | 13 | | | |
| 6 | FM | | 8/13/08 | | DOCKET COORD: | COUNCIL LIAISON: | |
| 7 | COMPTROLLER | | 8/18/08 | ✓ | COUNCIL PRESIDENT | ☐ SPOB ☐ CONSENT ☒ ADOPTION | |
| 8 | DEPUTY CHIEF | | 8/20/08 | | | ☐ REFER TO: | COUNCIL DATE: 9/16/08 |

11. PREPARATION OF: ☒ RESOLUTION(S) ☐ ORDINANCE(S) ☐ AGREEMENT(S) ☐ DEED(S)

1. Awarding a contract for design and construction of the Metro Facilities Control System Upgrade at the Metropolitan Biosolid Center to Emerson Process Management Power & Water Solutions, Inc in an amount not to exceed $6,342,799; and

(Continued on next page)

11A. STAFF RECOMMENDATIONS:
Adopt the Resolutions

12. SPECIAL CONDITIONS:

COUNCIL DISTRICT(S): 7 (Madaffer)

COMMUNITY AREA(S): Not Applicable since the facility is on Military Land

ENVIRONMENTAL IMPACT: This activity is categorically exempt from CEQA pursuant to State CEQA Guidelines Section 15301

HOUSING IMPACT: None

CITY CLERK INSTRUCTION: Please return two (2) copies of the 1472, Resolutions and Agreement to Joanne Ferrer (619)533-6672 MS 908A

ATTACHMENTS: Agreement, Project Cost Estimate, Environmental Exemption, Sole Source Memo dated June 5, 2007, Sole Source Procurement Authorization Memo, Ownership Information Form, Determination Form, Consultant Award Tracking Form and Location Map

EXPANSION/REPLACEMENT: Expansion 0%; Replacement 100%

EQP-9001

WSD 09-001

# REQUEST FOR COUNCIL ACTION
CITY OF SAN DIEGO

000652

1. CERTIFICATE NUMBER (FOR AUDITOR'S USE ONLY)

| TO: | 2. FROM (ORIGINATING DEPARTMENT): | 3. DATE: |
|---|---|---|
| CITY ATTORNEY | ENGINEERING AND CAPITAL PROJECTS | 6/16/08 |

4. SUBJECT:
Awarding of Design Build – Metro Facilities Control System Upgrade at Metropolitan Biosolid Center

| 5. PRIMARY CONTACT (NAME, PHONE & MAIL STA.) | 6. SECONDARY CONTACT (NAME, PHONE & MAIL STA.) | 7. CHECK BOX IF REPORT TO COUNCIL IS ATTACHED |
|---|---|---|
| Darren Greenhalgh (619)533-6600 MS 908A | Hossein Azar (619)533-4102 MS 908A | ☐ |

## 8.COMPLETE FOR ACCOUNTING PURPOSES

| | | | | |
|---|---|---|---|---|
| FUND | 41509 | 41509 | | |
| DEPT. | 779 | 779 | | |
| ORGANIZATION | N/A | N/A | | |
| OBJECT ACCOUNT | 4279 | 4909 | | |
| JOB ORDER | 141190 | 465020 | | |
| C.I.P. NUMBER* | 45-966.0 | 46-502.0 | | |
| AMOUNT | $6,942,799 | $57,201 | | |

9. ADDITIONAL INFORMATION / ESTIMATED COST:

| | |
|---|---|
| Construction | $ 6,342,799 |
| Contingency | 57,201 |
| Project Admin | 50,000 |
| Const Admin | 550,000 |
| Total Request | $ 7,000,000 |

## 10. ROUTING AND APPROVALS

| ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED | ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED |
|---|---|---|---|---|---|---|---|
| 1 | DEPARTMENT DIRECTOR | DC | 7/15/08 | 9 | COO | | |
| 2 | MWWD | | 7/25/08 | 10 | P&C | | |
| 3 | EOCP | | | 11 | CITY ATTORNEY | | |
| 4 | E.A.S | | | 12 | ORIGINATING DEPARTMENT | | |
| 5 | LIAISON OFFICE | | | 13 | | | |
| 6 | FM | | | ✓ | DOCKET COORD: _____ COUNCIL LIAISON: _____ | | |
| 7 | COMPTROLLER | | | | COUNCIL PRESIDENT ☐ SPOB ☐ CONSENT ☐ ADOPTION | | |
| 8 | DEPUTY CHIEF | | | | _____ ☐ REFER TO: _____ COUNCIL DATE: _____ | | |

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(Continued on next page)

11A. STAFF RECOMMENDATIONS:
Adopt the Resolutions

12. SPECIAL CONDITIONS:

COUNCIL DISTRICT(S): 7 (Madaffer)

COMMUNITY AREA(S): Not Applicable since the facility is on Military Land

ENVIRONMENTAL IMPACT: This activity is categorically exempt from CEQA pursuant to State CEQA Guidelines Section 15301

HOUSING IMPACT: None

CITY CLERK INSTRUCTION: Please return two (2) copies of the 1472, Resolutions and Agreement to Joanne Ferrer (619)533-6672 MS 908A

ATTACHMENTS: Agreement, Project Cost Estimate, Environmental Exemption, Sole Source Memo dated June 5, 2007, Sole Source Procurement Authorization Memo, Ownership Information Form, Determination Form, Consultant Award Tracking Form and Location Map

EXPANSION/REPLACEMENT: Expansion 0%; Replacement 100%

**FINAL COPY Requested:**
**MWWD: Routing Team**
**MS# 901A**

# REQUEST FOR COUNCIL ACTION
CITY OF SAN DIEGO

000653

1. CERTIFICATE NUMBER (FOR AUDITOR'S USE ONLY)

| TO: | 2. FROM (ORIGINATING DEPARTMENT): | 3. DATE: |
|---|---|---|
| CITY ATTORNEY | ENGINEERING AND CAPITAL PROJECTS | 6/16/08 |

4. SUBJECT:
Awarding of Design Build – Metro Facilities Control System Upgrade at Metropolitan Biosolid Center

| 5. PRIMARY CONTACT (NAME, PHONE & MAIL STA.) | 6. SECONDARY CONTACT (NAME, PHONE & MAIL STA.) | 7. CHECK BOX IF REPORT TO COUNCIL IS ATTACHED |
|---|---|---|
| Darren Greenhalgh (619)533-6600 MS 908A | Hossein Azar (619)533-4102 MS 908A | ☐ |

**8.COMPLETE FOR ACCOUNTING PURPOSES**

| | | | | |
|---|---|---|---|---|
| FUND | 41509 | 41509 | | |
| DEPT. | 779 | 779 | | |
| ORGANIZATION | N/A | N/A | | |
| OBJECT ACCOUNT | 4279 | 4909 | | |
| JOB ORDER | 141190 | 465020 | | |
| C.I.P. NUMBER | 45-966.0 | 46-502.0 | | |
| AMOUNT | $6,942,799 | $57,201 | | |

9. ADDITIONAL INFORMATION / ESTIMATED COST:

| | |
|---|---|
| Construction | $ 6,342,799 |
| Contingency | 57,201 |
| Project Admin | 50,000 |
| Const Admin | 550,000 |
| Total Request | $ 7,000,000 |

**10. ROUTING AND APPROVALS**

| ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED | ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED |
|---|---|---|---|---|---|---|---|
| 1 | DEPARTMENT DIRECTOR | DC | 7/15/08 | 9 | COO | | |
| 2 | MWWD | | | 10 | P&C | | |
| 3 | EOCP | Bruce B. Rupp | 7/17/08 | 11 | CITY ATTORNEY | | |
| 4 | E.A.S. | | | 12 | ORIGINATING DEPARTMENT | | |
| 5 | LIAISON OFFICE | | | 13 | | | |
| 6 | FM | | | ✓ | DOCKET COORD: _____ COUNCIL LIAISON: _____ | | |
| 7 | COMPTROLLER | | | | COUNCIL PRESIDENT ☐ SPOB ☐ CONSENT ☐ ADOPTION | | |
| 8 | DEPUTY CHIEF | | | | _____ ☐ REFER TO: _____ COUNCIL DATE: _____ | | |

11. PREPARATION OF: ☒ RESOLUTION(S) ☐ ORDINANCE(S) ☐ AGREEMENT(S) ☐ DEED(S)

1. Awarding a contract for design and construction of the Metro Facilities Control System Upgrade at the Metropolitan Biosolid Center to Emerson Process Management Power & Water Solutions, Inc in an amount not to exceed $6,342,799; and

(Continued on next page)

11A. STAFF RECOMMENDATIONS:
Adopt the Resolutions

12. SPECIAL CONDITIONS:

COUNCIL DISTRICT(S): 7 (Madaffer)

COMMUNITY AREA(S): Not Applicable since the facility is on Military Land

ENVIRONMENTAL IMPACT: This activity is categorically exempt from CEQA pursuant to State CEQA Guidelines Section 15301

HOUSING IMPACT: None

CITY CLERK INSTRUCTION: Please return two (2) copies of the 1472, Resolutions and Agreement to Joanne Ferrer (619)533-6672 MS 908A

ATTACHMENTS: Agreement, Project Cost Estimate, Environmental Exemption, Sole Source Memo dated June 5, 2007, Sole Source Procurement Authorization Memo, Ownership Information Form, Determination Form, Consultant Award Tracking Form and Location Map

EXPANSION/REPLACEMENT: Expansion 0%; Replacement 100%

# REQUEST FOR COUNCIL ACTION
CITY OF SAN DIEGO

000655

1. CERTIFICATE NUMBER (FOR AUDITOR'S USE ONLY)

| TO: | 2. FROM (ORIGINATING DEPARTMENT): | 3. DATE: |
|---|---|---|
| CITY ATTORNEY | ENGINEERING AND CAPITAL PROJECTS | 6/16/08 |

4. SUBJECT:
Awarding of Design Build – Metro Facilities Control System Upgrade at Metropolitan Biosolid Center

| 5. PRIMARY CONTACT (NAME, PHONE & MAIL STA.) | 6. SECONDARY CONTACT (NAME, PHONE & MAIL STA.) | 7. CHECK BOX IF REPORT TO COUNCIL IS ATTACHED |
|---|---|---|
| Darren Greenhalgh (619)533-6600 MS 908A | Hossein Azar (619)533-4102 MS 908A | ☐ |

## 8.COMPLETE FOR ACCOUNTING PURPOSES

| | | | | |
|---|---|---|---|---|
| FUND | 41509 | 41509 | | |
| DEPT. | 779 | 779 | | |
| ORGANIZATION | N/A | N/A | | |
| OBJECT ACCOUNT | 4279 | 4909 | | |
| JOB ORDER | 141190 | 465020 | | |
| C.I.P. NUMBER* | 45-966.0 | 46-502.0 | | |
| AMOUNT | $6,942,799 | $57,201 | | |

9. ADDITIONAL INFORMATION / ESTIMATED COST:

| | |
|---|---|
| Construction | $ 6,342,799 |
| Contingency | 57,201 |
| Project Admin | 50,000 |
| Const Admin | 550,000 |
| Total Request | $ 7,000,000 |

## 10. ROUTING AND APPROVALS

| ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED | ROUTE (#) | APPROVING AUTHORITY | APPROVAL SIGNATURE | DATE SIGNED |
|---|---|---|---|---|---|---|---|
| 1 | DEPARTMENT DIRECTOR | DC | 7/15/08 | 9 | COO | | |
| 2 | MWWD | | | 10 | P&C | | |
| 3 | EOCP | | | 11 | CITY ATTORNEY | | |
| 4 | E.A.S | | 7/16/08 | 12 | ORIGINATING DEPARTMENT | | |
| 5 | LIAISON OFFICE | | | 13 | | | |
| 6 | FM | | | ✓ | DOCKET COORD: _____ COUNCIL LIAISON: _____ | | |
| 7 | COMPTROLLER | | | | COUNCIL PRESIDENT ☐ SPOB ☐ CONSENT ☐ ADOPTION | | |
| 8 | DEPUTY CHIEF | | | | _____ ☐ REFER TO: _____ COUNCIL DATE: _____ | | |

11. PREPARATION OF: ☒ RESOLUTION(S) ☐ ORDINANCE(S) ☐ AGREEMENT(S) ☐ DEED(S)

1. Awarding a contract for design and construction of the Metro Facilities Control System Upgrade at the Metropolitan Biosolid Center to Emerson Process Management Power & Water Solutions, Inc in an amount not to exceed $6,342,799; and

(Continued on next page)

11A. STAFF RECOMMENDATIONS:
Adopt the Resolutions

12. SPECIAL CONDITIONS:

COUNCIL DISTRICT(S): 7 (Madaffer)

COMMUNITY AREA(S): Not Applicable since the facility is on Military Land

ENVIRONMENTAL IMPACT: This activity is categorically exempt from CEQA pursuant to State CEQA Guidelines Section 15301

HOUSING IMPACT: None

CITY CLERK INSTRUCTION: Please return two (2) copies of the 1472, Resolutions and Agreement to Joanne Ferrer (619)533-6672 MS 908A

ATTACHMENTS: Agreement, Project Cost Estimate, Environmental Exemption, Sole Source Memo dated June 5, 2007, Sole Source Procurement Authorization Memo, Ownership Information Form, Determination Form, Consultant Award Tracking Form and Location Map

EXPANSION/REPLACEMENT: Expansion 0%; Replacement 100%

SECTION 11 – PREPARATION OF: RESOLUTIONS, ORDINANCES, ETC. (CONTINUED):

000656

2. Authorizing the expenditure of $7,000,000 of which $6,942,799 is from CIP 45-966.0, Metro Facilities Control System Upgrade, Fund 41509, Sewer, for the purpose of providing funds for this project's construction and related costs, and $57,201 is from CIP 46-502.0 Annual Allocation – Clean Water Program Pooled Contingencies, Fund 41509, Sewer, for the purpose of providing funds for this project's contingency, contingent upon the City Comptroller furnishing a certificate certifying that funds necessary for expenditure are, or will be, on deposit with the City Treasurer; and

3. Authorizing the City Comptroller, upon the advice from the administering department, to return excess budgeted funds, if any, to the appropriate reserves.

000657

# EXECUTIVE SUMMARY SHEET
CITY OF SAN DIEGO

DATE ISSUED:
ATTENTION: Council President and City Council
ORIGINATING DEPARTMENT: Engineering & Capital Projects, Architectural Engineering and Parks Division
SUBJECT: Awarding of Design Build-Metro Facilities Control System Upgrade at Metropolitan Biosolid Center
COUNCIL DISTRICT(S): 7 (Madaffer)
CONTACT/PHONE NUMBER: Darren Greenhalgh (619)533-6600
Hossein Azar (619) 533-4102
Chisti Dadachanji (619)533-4648

REQUESTED ACTION: Approve the execution of a sole source contract with Emerson Process Management Power & Water Solutions, Inc, to design and provide the Metro Facilities Control System Upgrade at the Metropolitan Biosolid Center (MBC) .

STAFF RECOMMENDATION: Adopt the Resolutions.

EXECUTIVE SUMMARY: The existing Distributed Control System (DCS) at MBC was installed ten years ago. Since the installation, the facility has added more processes and Capital Improvement Projects (CIP) utilizing most of the spare capacity of the system. There are future critical CIP projects that will have to be incorporated and controlled by the DCS system at MBC. In addition, the control system installed at MBC has reached the end of its life cycle system support. A thorough Business Case Evaluation (BCE) was conducted. The alternative selected to do this project was to use the original vendor now known as Emerson Process Management Power & Water Solutions, Inc. as a Design/Build Contractor to design and upgrade the hardware and software. Emerson is the only qualified vendor that has the knowledge to understand the existing custom system configuration and how any software, hardware, or third party changes affect each other. The immediate benefits would be gaining a larger system capacity for future CIP upgrades planned for the plant and training for the operation staff will be minimal since the existing control strategies and graphics to operate the plant will be exactly the same. See attached Sole Source Request and approved memo dated June 5, 2007.

EQUAL OPPROTUNITY CONTRACTING:

| | | |
|---|---|---|
| Funding Agency : | City of San Diego | |
| Goals: | 15% Voluntary (MBE/WBE/DBE/DVBE/OBE) | |
| Subconsultant Participation: | $ 187,641 | 2.95% |
| | $ 24,000 | 0.37% |
| Other: | Workforce Report Submitted. Staff will monitor plan and adherence to Nondiscrimination Ordinance. | |

000658

FISCAL CONSIDERATIONS:
The total cost of this project is $ 7,000,000. Funding of $6,642,800 will be available from the Enterprise Fund in CIP 45-966.0, Metro Facilities Control System Upgrade, Fund 41509, Sewer, and $337,200 will be available from the Enterprise Fund in CIP 46-502.0, Annual Allocation – Clean Water Program Pooled Contingencies, Fund 41509, Sewer, for this purpose. The funds for this request are included in the ten year financing plan.

The project cost for the Sewer portion of $ 7,000,000 may be reimbursed approximately 80% by current or future debt financing.

PREVIOUS COUNCIL and/or COMMITTEE ACTION:
Metro TAC Committee (4/16/08), IROC (5/12/08) and Metro Commission (5/29/08). The Committee on Natural Resources and Culture on July 23, 2008, made no recommendation and directed staff to provide background information regarding any previous litigation with Emerson Process Management Power and Water Solutions, Inc. See attached Memo dated 8/14/08.

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:
Not applicable

KEY STAKEHOLDERS AND PROJECTED IMPACTS:
The key stakeholders are the City of San Diego Metropolitan Wastewater Department, Engineering and Capital Projects Department and Emerson Process Management Inc.

Patti Boekamp, Director
Engineering and Capital Projects Department

David Jarrell
Deputy Chief of Public Works

000659

**The City of San Diego**
**CERTIFICATE OF CITY AUDITOR AND COMPTROLLER**

**CERTIFICATE OF UNALLOTTED BALANCE**

AC (ORIGINATING DEPT. NO.): 2900134 / 779

I HEREBY CERTIFY that the money required for the allotment of funds for the purpose set forth in the foregoing resolution is available in the Treasury, or is anticipated to come into the Treasury, and is otherwise unallotted.

Amount: $657,201.00 Fund: 41509

Purpose: Authorizing the expenditure of funds for the construction of the Metro Facilities Control System Upgrade at the Metropolitan Biosolids Center.

Date: August 19, 2008 By: Van Nguyen
AUDITOR AND COMPTROLLER'S DEPARTMENT

| ACCOUNTING DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCTG. LINE | CY PY | FUND | DEPT | ORG. | ACCOUNT | JOB ORDER | OPERATION ACCOUNT | BENF/ | EQUIP | FACILITY | AMOUNT |
| 1 | 0 | 41509 | 779 | | 4278 | 141190 | | | | | 600,000.00 |
| 2 | 0 | 41509 | 779 | | 4278 | 465020 | | | | | 57,201.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | TOTAL AMOUNT | | $657,201.00 |

FUND OVERRIDE ☐

**CERTIFICATION OF UNENCUMBERED BALANCE**

I HEREBY CERTIFY that the indebtedness and obligation to be incurred by the contract or agreement authorized by the hereto attached resolution, can be incurred without the violation of any of the provisions of the Charter of the City of San Diego; and I do hereby further certify, in conformity with the requirements of the Charter of the City of San Diego, that sufficient moneys have been appropriated for the purpose of said contract, that sufficient moneys to meet the obligations of said contract are actually in the Treasury, or are anticipated to come into the Treasury, to the credit of the appropriation from which the same are to be drawn, and that the said money now actually in the Treasury, together with the moneys anticipated to come into the Treasury, to the credit of said appropriation, are otherwise unencumbered.

Not to Exceed: $6,342,799.00

Vendor: Emerson Process Management Power & Water Solutions, Inc.

Purpose: Authorizing the expenditure of funds for the construction of the Metro Facilities Control System Upgrade at the Metropolitan Biosolids Center.

Date: August 19, 2008 By: Van Nguyen
AUDITOR AND COMPTROLLER'S DEPARTMENT

| ACCOUNTING DATA | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCTG. LINE | CY PY | FUND | DEPT | ORG. | ACCOUNT | JOB ORDER | OPERATION ACCOUNT | BENF/ | EQUIP | FACILITY | AMOUNT |
| 1 | 0 | 41509 | 779 | | 4124 | 141194 | | | | | $6,342,799.00 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | TOTAL AMOUNT | | $6,342,799.00 |

AC-361 (REV 2-92)

FUND OVERRIDE ☐

AC 2900134

000661

# PROJECT COST ESTIMATE

Facilities Control System Upgrade Project at MBC
(Project Title)

Agreement
Advertise
Award X

Prepared by: Chisti Dadachanji
Date: 16-Jun-08
W.O. No. 141190

| ACTIVITY | % OF E | CIP NO. OR OTHER SOURCE OF FUNDS 45-966.0 Current | This Request | TOTAL | TOTALS | % OF E |
|---|---|---|---|---|---|---|
| A. **Planning/Design/Administration** | | | | | | |
| 4114 Preliminary Engineering | 0.71% | | 50,000.00 | 50,000.00 | | |
| 4115 Outside Engir | 0.00% | | 0.00 | 0.00 | | |
| 4116 Construction Engineering | 7.86% | | 550,000.00 | 550,000.00 | | |
| 4118 Engineering Design | 0.00% | | 0.00 | 0.00 | | |
| 41181 Engineering Design #2 | 0.00% | | 0.00 | 0.00 | | |
| 4119 Environ. Impact Studies | 0.00% | | 0.00 | 0.00 | | |
| 4151 Professional Services | 0.00% | | 0.00 | 0.00 | | |
| 4159 Construction Management | 0.00% | | 0.00 | 0.00 | | |
| 4240 Reimbursement Agreements | 0.00% | | | 0.00 | | |
| **Total Planning/Design/Administration** | | 0.00 | 600,000.00 | 600,000.00 | 600,000.00 | 8.57% |
| B. **Construction** | | | | | | |
| 4150 Safety | 0.00% | | 0.00 | 0.00 | | |
| 4220 Prime Construction Contract | 90.61% | | 6,342,799.00 | 6,342,799.00 | | |
| 42201 Construction Contract #2 | 0.00% | | 0.00 | 0.00 | | |
| 42220 JOC | 0.00% | | 0.00 | 0.00 | | |
| 4226 City Forces Work | 0.00% | | 0.00 | 0.00 | | |
| 4810 OCIP / Professional Liability | 0.00% | | 0.00 | 0.00 | | |
| 4981 SDDPC Support | 0.00% | | 0.00 | 0.00 | | |
| **Total Construction** | | 0.00 | 6,342,799.00 | 6,342,799.00 | 6,342,799.00 | 90.61% |
| C **Equipment and Furnishings** | | | | | | |
| 3316 Pipe Fittings | 0.00% | | 0.00 | 0.00 | | |
| 4922 Construction Related | 0.00% | | 0.00 | 0.00 | | |
| **Total Equipment and Furnishings** | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00% |
| D **Contingencies** | | | | | | |
| 4905 Contingencies | 0.00% | | | | | |
| 4909 Pooled Contingencies | 0.82% | | 57,201.00 | 57,201.00 | | |
| **Total Contingencies** | | 0.00 | 57,201.00 | 57,201.00 | 57,201.00 | 0.82% |
| E **SUBTOTAL** | | 0.00 | 7,000,000.00 | 7,000,000.00 | 7,000,000.00 | 100.00% |
| F **Equipment & Furninshings** | | | | | | |
| 4922 Equipment & Furnishings | | | | 0.00 | 0.00 | |
| G **Land Aquisition** | | | | | | |
| 4638 Land Acquisition | | | | 0.00 | 0.00 | |
| **TOTAL PRO.** | | 0.00 | 7,000,000.00 | 7,000,000.00 | 7,000,000.00 | |

(When Applicable)
SAVINGS BY USE OF CITY FORCES

| | City Forces | Contract |
|---|---|---|
| Labor | | |
| Material | | |
| Equip. | | |
| Profit | | |
| TOTAL | 0 | 0 |

Prev. Auth. Res. #
Prev. Auth. Res. #
Prev. Auth. Res. #
Prev. Auth. Res. #
Prev. Auth. Res. #
Prev. Auth. Res. #
Total Previous Authorized

ADDITIONAL AUTH. REQUIRED

| | | | |
|---|---|---|---|
| FUNDING: | 41509 | 41509 | |
| CIP NO. | 45-966.0 | 46-502.0 | |
| THIS REQUEST | 6,942,799.00 | 57,201.00 | 7,000,000.00 |

COMMENTS:

Form Rev. 11/30/00

000663

**Facilities Control System Upgrades - MBC**
**Price Proposal Form**

**BASE CONTRACT - LUMP SUM PRICING** — EXHIBIT C (Page 1 c

| | EMERSON (MFR) SUPPLIED EQUIPMENT - I | | | | |
|---|---|---|---|---|---|
| | | | | UNIT PRICE/ | |
| ITEM | DESCRIPTION | | QTY | LIST | EXT. PRICE |
| 1 | Ovation Hardware | | 1 Lot | | $1,442,410 |
| | WDPF to Ovation Migration Kits | | 41 | | |
| | HART Modules w/cables | | 48 | | |
| 2 | Network Hardware | | 1 Lot | | $117,380 |
| | Ethernet Switches | | 21 | | |
| | Copper to Fiber Media Converter | | 56 | | |
| | Rack Mount Media Converter Kits | | 10 | | |
| | Redundant Power for Rack Mount Media Converter | | 10 | | |
| 3 | Workstations w/Software | | 1 Lot | | $709,380 |
| | Ultra 25, Single Hard Drives | | 14 | | |
| | Ultra 25, Dual Hard Drives | | 3 | | |
| | AMS-Workstaiton | | 1 | | |
| | Monitors - 19" | | 11 | | |
| | RAID | | 3 | | |
| 4 | Spare Parts | | 1 Lot | | $99,470 |
| | HART Analog Input EM | | 2 | | |
| | HART Cables (Pre-fab Cables - 20') | | 3 | | |
| | 13/24V DAPS | | 3 | | |
| | WDPF-to-Ovation Migration Kit for O-Line (OCR -400) | | 2 | | |
| | Root Ethernet Switch | | 2 | | |
| | Media Converter | | 4 | | |
| | Media Converter Rack Power Supply | | 3 | | |
| | Sun XVR 100 Graphic Card | | 1 | | |
| | RAID | | 1 | | |
| | 128MB Flash Memory Card | | 8 | | |
| | | | | | |
| | 1-yr Warranty | | | | $128,220 |
| | | | | | |
| | Sub Total | | | | $2,496,860 |
| | Sales Tax | | | | See Below |
| | Total | | | TOTAL MFR, I | $2,496,860 |

| | THIRD PARTY (OEM) SUPPLIED EQUIPMENT - II | | | |
|---|---|---|---|---|
| ITEM | DESCRIPTION | QTY | UNIT PRICE | EXT. PRICE |
| 1 | AMS Software | 1 | $10,160.00 | $10,160 |
| 2 | Server Switches | 1 | $8,282.00 | $8,282 |
| | | | | |
| | | | | |
| | Sub Total | | | $18,442 |
| | Sales Tax | | | See Below |
| | Markup 15% | | | $2,766 |
| | Total | | TOTAL OEM, II | $21,208 |

| | EPM LABOR - III | | | | |
|---|---|---|---|---|---|
| | | Days | Hours | | |
| ITEM | DESCRIPTION | | QTY | UNIT PRICE, $/HR | EXT. PRICE |
| 1 | Project Management and Meeetings | 235 | | | $181,831 |
| 2 | Configuration and Testing | 540 | | | $417,825 |
| 3 | Staging (Factory Labor) | | | | $231,818 |
| 4 | Cutover | 62 | | | $47,973 |
| 5 | Submittals (Hardware, Software & Graphics) | 62 | | | $47,973 |
| 6 | Factory Acceptance Test (100 days) | 300 | | | $232,125 |
| 7 | 30 Day Acceptance Test | 5 | | | $3,869 |
| 8 | O&M Manual Updates | 22 | | | $17,023 |
| 9 | Graphic Conversion | 462 | | | $357,473 |
| 10 | Software Conversion | 740 | | | $572,575 |
| 11 | Fast Ethernet Submittal -System Layout | 12 | | | $9,285 |
| 12 | Safety/Security | 5 | | | $3,869 |
| 13 | Training (2 sessions for 2 wks w/5 training units & 2 instructors) | | | | $116,719 |
| 14 | Startup Assistance | 565 | | | $522,060 |
| 15 | Travel & Living Expenses | | | | $305,507 |
| | | | | | |
| | | | | TOTAL EPM LABOR, III | $3,067,923 |

| | SOFTWARE CHANGES - IV | | | |
|---|---|---|---|---|
| ITEM | DESCRIPTION | QTY | UNIT PRICE | EXT. PRICE |
| 1 | Add an AI | NA | $289 | $0 |
| 2 | Add an AO | NA | $288 | $0 |
| 3 | Add a DI | NA | $285 | $0 |
| 4 | Add a DO | NA | $285 | $0 |
| 5 | Add an ITM interface | NA | $289 | $0 |
| 6 | Add a FDIM Interface | NA | $289 | $0 |
| | | | | |
| | | | TOTAL SW CHANGES, IV | $0 |

| | ATTACHMENT A - 3RD PARTY SERVICES - LABOR, V | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | VENDOR | QTY | UNIT PRICE, $/HR | EXT. PRICE |
| 1 | UL Listing | UL Inc. | 1 | $15,888 | $15,888 |
| 2 | Microstation Drawings - Network Layout & HART Loops | C. Hackney | 1 | $24,000 | $24,000 |
| | | | | | |
| | | | | | |
| | | Sub Total | | | $39,888 |
| | | Markup | 15% | | $5,983 |
| | | Total | | TOTAL 3RD PARTY LABOR, V | $45,871 |

| | ATTACHMENT B - 3RD PARTY SERVICES - MATERIAL/EQUIPMENT, VI | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | VENDOR | QTY | UNIT PRICE | EXT. PRICE |
| 1 | Fiber Optic Cable Installation, Patch Panels, & Ethernet Cabling | Atlas Fiber | 1 | $187,641 | $187,641 |
| | | | | | |
| | | | | | |
| | | Sub Total | | | $187,641 |
| | | Markup | 15% | | $28,146 |
| | | Total | | TOTAL 3RD PARTY EQUIP, VI | $215,787 |

| | TOTALS | |
|---|---|---|
| | EPM SUPPLIED EQUIPMENT (MFR), I | $2,496,860 |
| | EPM SUPPLIED 3RD PARTY EQUIPMENT (OEM), II | $21,208 |
| | EPM LABOR, III | $3,067,923 |
| | SOFTARE CHANGES, IV | $0 |
| | ATTACHMENT A - 3RD PARTY SERVICES - LABOR, V | $45,871 |
| | ATTACHMENT B - 3RD PARTY SERVICES - MATERIAL/EQUIPMENT, VI | $215,787 |
| | TOTAL | $5,847,649 |
| | SALES TAX (Item I & II) - "not included in TOTAL above" | $195,150 |

000665

## ADDITIONAL SERVICES - TIME & MATERIAL (Page 2 of 2)

Emerson manufactured items that may be required for the performance of any modification to this Agreement shall be billed with a 45% discount off list price as set forth in the Emerson "List Price Book", OEM items (manufactured by others) shall be billed at current list price; third party services and equipment shall be procured only after approval of the City's Project Manager, and billed at third party invoice plus 15%.

The hourly labor rate for labor (including maintenance, engineering, software updates/modifications, etc.) shall be billed as follows and shall include actual work, approved standby time, and travel time of one-hour per day for planned work.

1) Engineer Rate $ 185.00 per hour
2) Technician Rate $ 102.00 per hour

Pricing for future labor added under Additional Services after date of execution will be adjusted in accordance with the Bureau of Labor (BLS) Employment Cost Index (ECI) "Table 5. Compensation (Not Seasonally Adjusted): Employment Cost Index for total compensation, for private industry workers, by occupational group and industry" or shall be revised upon mutually agreeable indexes. The above stated hourly labor rates are indexed to the December 2007 BLS ECI and shall be adjusted annually from that date.

# DETERMINATION OF: ENVIRONMENTAL EXEMPTION

## Pursuant to The California Environmental Quality Act (CEQA) and State CEQA Guidelines

To: Development Services Department, Environmental Analysis Section (EAS)
From: Metropolitan Wastewater Department (MWWD), Engineering and Program Management Division
Subject: 00667 Request for Determination of Environmental Exemption

Similar to forms 1472, 1544 and PA700, this form is being routed to your section in request for concurrence that the below-referenced project is exempt from the CEQA. MWWD would like to complete this project using a contractor, which constitutes a discretionary action subject to CEQA. MWWD herby represents that there are no biological or historic resources within the area of potential impact and believes that no other discretionary actions by the City would be required to proceed with the project. If EAS concurs that the project is exempt, please check the appropriate boxes, sign this form and return it via fax to Stephanie Bracci at MWWD, (858) 292-6310. If the project is not exempt or there are any questions about the project description, please call Stephanie Bracci at (858) 292-6409. Thank you.

Agency: CITY OF SAN DIEGO LDR NO.: DATE: 09/11/2007

Action/Permit(s): CEQA Determination Permit No. N/A

Description of Activity: **Facilities Control System Upgrade-MBC**: Project proposes to upgrade the existing Distributed control systems at the Metropolitan Biosolids Center (MBC). This includes upgrading/installing new control software; convert all existing controls into the new system and test controls; provide/install field interface and control room hardware required to communicate with the upgraded system,; provide/install all fiber optic network replacing existing network; provide/install all operator interface and server hardware; install all hardware required for upgrade; provide all documentation required; and provide engineering and technical services with same for implementation of upgrade. All work will occur within existing facilities. No vegetation or soil disturbance (i.e. grading or excavating) is proposed as part of this project.

Location of Activity: The project is located at the Metropolitan Biosolids Center in the MCAS-Miramar Community Planning Areas of San Diego, California.

1. [ ] This activity is **EXEMPT FROM CEQA** pursuant to:
   - [ ] Section 15061(b)(1) of the State CEQA Guidelines (the activity is not a project as defined in Section 15378).
   - [ ] Section 15061(b)(3) of the State CEQA Guidelines ("General Rule").
2. [X] This project is EXEMPT FROM CEQA pursuant to State CEQA Guidelines Section checked below:

**ARTICLE 19 of GUIDELINES**
**CATEGORICAL EXEMPTIONS**
(Incomplete list)

| Sec. | | Short Name |
|---|---|---|
| [X] | 15301 1 | Existing Facilities |
| [ ] | 15302 2 | Replacement or Reconstruction |
| [ ] | 15303 (b) | New Construction or Conversion of Small Structures |
| [ ] | 15304 (h) | Minor Alterations to Land |
| [ ] | 15305 5 | Minor Alterations in Land Use Limitations |
| [ ] | 15306 6 | Information Collection |
| [ ] | 15311 11 | Accessory Structures |
| [ ] | 15312 12 | Surplus Government Property Sales |
| [ ] | 15315 15 | Minor Land Divisions |
| [ ] | 15317 17 | Open Space Contracts or Easements |
| [ ] | 15319 19 | Annexation of Existing Facilities and Lots for Exempt Facilities |
| [ ] | 15332 32 | In-Fill Development Projects |
| [ ] Other | | |

**ARTICLE 18 of GUIDELINES**
**STATUTORY EXEMPTIONS**
(Incomplete list)

| Sec. | Short Name |
|---|---|
| [ ] 15261 | Ongoing Project |
| [ ] 15262 | Feasibility and Planning Studies |
| [ ] 15265 | Adoption of Coastal Plans and Programs |
| [ ] 15268 | Ministerial Projects |
| [ ] 15269 | Emergency Projects |
| [ ] Other | |

It is hereby certified that the City of San Diego has determined the above activity to be exempt:

Environmental Analysis Section

9/12/07
Date

Distribution: EAS File
Stephanie Bracci, MWWD/EPM
Chandra Reddy, MWWD

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## OWNERSHIP INFORMATION

SUBJECT: Sole Source Agreement for the Facilities Control System Upgrade at MBC

| Subject | Name of Firm | Ownership Information |
|---|---|---|
| Sole Source Agreement for the Facilities Control System Upgrade at the *Metropolitan Biosolid Center* | Emerson Process Management Power and *Water Solutions Inc.* | Yaeger Robert, President |

Emerson Process Management Power & Water Solutions Inc. is a privately held wholly owned subsidiary of Emerson Electric Co. Emerson Electric Co. is a publicly traded corporation

000671

# DETERMINATION FORM

## CONFLICT OF INTEREST CODE: DETERMINATION OF APPLICABILITY TO CONSULTANT

Name of Consultant & Company: Emerson Process Management Power and Water Solutions Inc.

200 Beta Drive,
Pittsburg, PA 15238

Consultant Duties: (Have not received the Contract Number) Work includes hardware and software upgrade at the Metropolitan Biosolid Center

Disclosure determination:

__X__ Consultant will not be "making a government decision" or "serving in a staff capacity" as defined in Sections A and B attached. No disclosure required.

____ Consultant will be "making a government decision" or "serving in a staff capacity"as defined in Sections A and B attached. Consultant is required to file a Statement of Economic Interests with the City Clerk of the City of San Diego in a timely manner as required by law.

____ Disclosure required to the broadest level.

____ Disclosure required to a limited extent:

_____
_____
_____
_____
_____

Chisti Dadachanji, Project Manager
Engineering and Capital Projects

7/7/08

*Forward a copy of this form to the Consultant to notify them of the determination.
*Forward a copy of this form to the City Clerk's office to go on file for reporting purposes.

# DETERMINATION FORM

## ATTACHMENT TO DETERMINATION FORM - DEFINITION OF "CONSULTANT"

A "consultant" is an individual who, pursuant to a contract with a state or local government agency:

(A) Makes a governmental decision whether to:

1. Approve a rate, rule or regulation;
2. Adopt or enforce a law;
3. Issue, deny, suspend, or revoke any permit, license, application, certificate, approval, order, or similar authorization or entitlement;
4. Authorize the City to enter into, modify, or renew a contract provided it is the type of contract that requires City approval;
5. Grant City approval to a contract that requires City approval and to which the City is a party, or to the specifications for such a contract;
6. Grant City approval to a plan, design, report, study, or similar item;
7. Adopt, or grant City approval of, policies, standards, or guidelines for the City, or for any subdivision thereof; or

(B) Serves in a staff capacity with the City and in that capacity participates in making a governmental decision as defined in Regulation 18702.2 or performs the same or substantially all the same duties for the City that would otherwise be performed by an individual holding a position specified in the City's Conflict of Interest Code.

An individual "serves in a staff capacity" if he or she performs substantially all the same tasks that normally would be performed by staff member of a governmental entity. In most cases, individuals who work on only one project or a limited range of projects for an agency are not considered to be working in a "staff capacity." The length of the individual's service to the agency is relevant. Also, the tasks over the relevant period of time must be substantially the same as a position that is or should be specified in the City's conflict of interest code.

An individual "participates in making a governmental decision" if he or she: (1) negotiates, without substantive review, with a governmental entity or private person regarding the decision; or (2) advises or makes recommendations to the decision-maker, by conducting research or an investigation, preparing or presenting a report, analysis or opinion which requires the exercise of judgment on the part of the individual and the individual is attempting to influence the decision.

006673

# ACORD TM CERTIFICATE OF LIABILITY INSURANCE

7/1/2009

DATE (MM/DD/YYYY) 7/21/2008

PRODUCER
Lockton Companies,LLC-1 St. Louis
Three City Place Drive, Suite 900
St. Louis 63141-7081
(314) 432-0500

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURED
1071355
Emerson Electric Co.
and all Subsidiary Companies
8000 West Florissant Avenue
P. O. Box 4100
St. Louis MO 63136

| INSURERS AFFORDING COVERAGE | NAIC # |
|---|---|
| INSURER A: National Union Fire Ins Co Pittsburgh PA (17) | 19445 |
| INSURER B: | |
| INSURER C: | |
| INSURER D: | |
| INSURER E: | |

COVERAGES EMEEL01 20

THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER AND THE CERTIFICATE HOLDER.

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| INSR LTR | ADD'L INSRD | TYPE OF INSURANCE | POLICY NUMBER | POLICY EFFECTIVE DATE (MM/DD/YY) | POLICY EXPIRATION DATE (MM/DD/YY) | LIMITS | |
|---|---|---|---|---|---|---|---|
| | | GENERAL LIABILITY | | | | | |
| | | ☐ COMMERCIAL GENERAL LIABILITY | NOT APPLICABLE | | | EACH OCCURRENCE | $ XXXXXXX |
| | | ☐ CLAIMS MADE ☐ OCCUR | | | | DAMAGE TO RENTED PREMISES (Ea occurence) | $ XXXXXXX |
| | | | | | | MED EXP (Any one person) | $ XXXXXXX |
| | | | | | | PERSONAL & ADV INJURY | $ XXXXXXX |
| | | GEN'L AGGREGATE LIMIT APPLIES PER: | | | | GENERAL AGGREGATE | $ XXXXXXX |
| | | ☐ POLICY ☐ PRO-JECT ☐ LOC | | | | PRODUCTS - COMP/OP AGG | $ XXXXXXX |
| | | AUTOMOBILE LIABILITY | | | | | |
| | | ☐ ANY AUTO | NOT APPLICABLE | | | COMBINED SINGLE LIMIT (Ea accident) | $ XXXXXXX |
| | | ☐ ALL OWNED AUTOS | | | | BODILY INJURY (Per person) | $ XXXXXXX |
| | | ☐ SCHEDULED AUTOS | | | | BODILY INJURY (Per accident) | $ XXXXXXX |
| | | ☐ HIRED AUTOS | | | | PROPERTY DAMAGE (Per accident) | $ XXXXXXX |
| | | ☐ NON-OWNED AUTOS | | | | | |
| | | GARAGE LIABILITY | | | | AUTO ONLY - EA ACCIDENT | $ XXXXXXX |
| | | ☐ ANY AUTO | NOT APPLICABLE | | | OTHER THAN AUTO ONLY: EA ACC | $ XXXXXXX |
| | | | | | | AGG | $ XXXXXXX |
| A | | EXCESS/UMBRELLA LIABILITY | | | | EACH OCCURRENCE | $ 4,000,000 |
| | | ☒ OCCUR ☐ CLAIMS MADE | 5443205 | 7/1/2008 | 7/1/2009 | AGGREGATE | $ 4,000,000 |
| | | ☐ DEDUCTIBLE ☒ UMBRELLA FORM | | | | | $ XXXXXXX |
| | | ☐ RETENTION $ | | | | | $ XXXXXXX |
| | | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY | | | | | $ XXXXXXX |
| | | ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? | NOT APPLICABLE | | | ☐ WC STATU-TORY LIMITS ☐ OTH-ER | |
| | | If yes, describe under SPECIAL PROVISIONS below | | | | E.L. EACH ACCIDENT | $ XXXXXXX |
| | | | | | | E.L. DISEASE - EA EMPLOYEE | $ XXXXXXX |
| | | | | | | E.L. DISEASE - POLICY LIMIT | $ XXXXXXX |
| | | OTHER | | | | | |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

THE CERTIFICATE HOLDER IS INCLUDED AS AN ADDITIONAL INSURED FOR UMBRELLA LIABILITY BUT ONLY IN RESPECTS TO THEIR INTEREST IN THE OPERATIONS OF THE NAMED INSURED BUT ONLY TO THE EXTENT OF THE NAMED INSURED'S NEGLIGENCE, AND ONLY FOR SUCH TERMS AND LIMITS WHICH ARE THE LESSER OF THE POLICY HEREON OR THE WRITTEN REQUIREDMENTS BETWEEN THE NAMED INSUERD AND CERTIFICATE HOLDER.

CERTIFICATE HOLDER

3726536

CITY OF SAN DIEGO, PURCHASING DIVISION
ATTN: INSURANCE COORDINATOR
1200 THIRD AVENUE, SUITE 200
SAN DIEGO CA 92101-4195

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUT

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# Best's Key Rating Guide® Presentation Report

August 27, 2008
An A.M. Best Publication:

*This A.M. Best report is provided compliments of:*

**City of San Diego, Purchasing & Contract**
*1200 Third Avenue, Suite 200*
San Diego, CA 92101

**Contact: Glenn Meyer**
*Administrator*
619.533-4510
GMEYER@SANDIEGO.GOV

## National Union Fire Ins Co Pittsburgh PA AMB# 02351


**Best's Rating**
**A+**
05/28/2008

**National Union Fire Ins Co Pittsburgh PA**, an insurance company domiciled in **Pennsylvania,** is rated **A+ (Superior)** by the A.M. Best Company. The rating outlook is **Negative**.

**Five Year Rating History**

| | |
|---|---|
| 05/28/08 | A+ |
| 02/14/08 | A+ u |
| 06/13/07 | A+ |
| 06/13/06 | A+ |
| 05/04/05 | A+ u |
| 03/15/05 | A++ u |
| 06/29/04 | A++ |
| 06/24/03 | A++ |

**Rating Explanation**: **A+ (Superior)**: This rating is assigned to companies that have, in our opinion, a superior ability to meet their ongoing obligations to policyholders.

**Financial Size Category: XV ($2 billion or more)**: The Financial Size Category is an indicator of the size of an insurer, and is based on reported Policyholders' Surplus plus conditional or technical reserve funds, such as the asset valuation reserve, other investment and operating contingency funds and/or miscellaneous voluntary reserves reported as liabilities.

**History**: National Union Fire Ins Co Pittsburgh PA began business in **1901.**

**Organization Type:** *Stock*

**Identification Numbers**: National Union Fire Ins Co Pittsburgh PA's A.M. Best number is **02351**, its NAIC number is **19445,** and its FEIN number is **25-0687550**.

**Group Membership**: National Union Fire Ins Co Pittsburgh PA is a member of the **American International Group Inc** group of companies, which has an A.M. Best group number of **018540**.

**Company Leadership and Location**:

- Senior Executive: John Q. Doyle , President
- Address: 70 Pine Street, New York, NY 10270
- Phone: 212-770-7000

**States & Territories Licensed**: The company is licensed in the District of Columbia, Guam, Puerto Rico and all states.

**Marketing Type:** Broker

**Specialty Lines of Business**: Commercial Lines

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| Principal states or territories | | Principal lines of business | |
|---|---|---|---|
| CA | 12.7% | Workers' Comp | 30.4% |
| FL | 6.2% | Oth Liab Occur | 19.3% |
| NY | 6.2% | Oth Liab Cl-Made | 15.3% |
| DE | 4.9% | All Other | 7.1% |
| NJ | 4.2% | Group A & H | 6.8% |

## Key Financial Data *(Annual Reporting)*

## Balance Sheet

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Cash & Short Term Invest: (%)** | -0.2 | -0.1 | 0.8 | 0.9 | 1.2 |
| This field represents cash and all unaffiliated investments whose maturities (or repurchase dates under repurchase agreements) at the time of acquisition were one year or less, as a percentage of total admitted assets. | | | | | |
| **Stocks and Bonds: (%)** | 72.8 | 73.1 | 67.3 | 67.8 | 68.4 |
| This field represents investments in common stocks, preferred stocks and bonds as a percentage of Total Admitted Assets. | | | | | |
| **All other Assets: (%)** | 27.4 | 27.0 | 31.9 | 31.3 | 30.5 |
| This field represents total assets excluding cash, short-term investments, and stocks and bonds as a percentage of total admitted assets. | | | | | |
| **Total Admitted Assets: ($000)** | 34,575,351 | 31,667,494 | 28,761,725 | 25,702,189 | 20,810,822 |
| This field represents the sum of all admitted assets. These assets are valued in accordance with state laws and regulations, as reported by the company in its financial statements filed with state insurance regulatory authorities. This item is reported net as to encumbrances on real estate (the amount of any encumbrances on real estate is deducted from the value of the real estate), and net as to amounts recoverable from reinsurers (which are deducted from the corresponding liabilities for unpaid losses and unearned premiums). | | | | | |
| **Loss Reserves: (%)** | 61.8 | 60.7 | 57.1 | 53.5 | 48.1 |
| This field represents the total unpaid losses and loss adjustment expenses (including reserves for incurred but not reported losses, if any), and supplemental reserves established by the company that are reported in the annual statement for the year indicated to total liabilities expressed as a percent. It is the total for all lines of business and all accident years, and is the amount of reserves as originally reported in each year shown. | | | | | |
| **Unearned Premiums: (%)** | 20.1 | 20.7 | 20.8 | 22.6 | 24.6 |
| This ratio measures the calculated aggregate net amount, after deducting reinsurance credits, which an insurance company would be obliged to tender to its policyholders as return premiums for unexpired terms, should it cancel every policy in force as a percentage of total liabilities. | | | | | |
| **All Other Liabilities: (%)** | 18.1 | 18.6 | 22.1 | 23.9 | 27.3 |
| This field represents total liabilities excluding loss reserves and unearned premiums as a percentage of total liabilities. | | | | | |
| **Total Liabilities: ($000)** | 22,418,357 | 21,247,283 | 20,641,561 | 18,325,367 | 13,911,566 |
| This field represents the sum of all liabilities of the company valued in accordance with state laws and regulations, as reported by the company in its financial statements filed with state insurance regulatory authorities. | | | | | |
| **Policyholders' Surplus: ($000)** | 12,156,994 | 10,420,212 | 8,120,164 | 7,376,822 | 6,899,256 |
| This field represents the sum of paid in capital, paid in and contributed surplus, and net earned surplus, including voluntary contingency reserves. It can also be described as the difference between Total Admitted Assets and Total Liabilities. | | | | | |

## Operations

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Direct Premiums Written: ($000)** | 5,450,523 | 5,405,358 | 5,588,284 | 6,361,956 | 5,727,403 |
| This field represents the aggregate amount of recorded originated premiums, other than reinsurance, written during the year whether collected or not at the close of the year (plus retrospective audit premium collections), after deducting all return premiums. | | | | | |
| **Net Premiums Written: ($000)** | 7,776,582 | 7,813,847 | 7,086,979 | 7,029,299 | 6,113,824 |
| This field represents gross premiums written, direct and reinsurance assumed, less reinsurance ceded. | | | | | |

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| | | | | | |
|---|---|---|---|---|---|
| **Business Net Retention: (%)** | 86.0 | 86.6 | 84.6 | 83.4 | 78.4 |

This field represents the percentage of a company's gross writings that are retained for its own account. Gross writings are the sum of direct writings and assumed writings. This measure excludes affiliated writings.

| | | | | | |
|---|---|---|---|---|---|
| **Net Underwriting Income: ($000)** | 648,185 | 479,511 | -711,181 | -475,722 | 53,319 |

This field represents premiums earned less incurred losses, loss adjustment expenses, underwriting expenses incurred, and dividends to policyholders.

| | | | | | |
|---|---|---|---|---|---|
| **Net Investment Income: ($000)** | 1,182,291 | 757,517 | 747,551 | 826,487 | 517,086 |

This field represents investment income earned during the year less investment expenses and depreciation on real estate. Investment expenses are the expenses related to generating investment income and capital gains excluding income taxes.

| | | | | | |
|---|---|---|---|---|---|
| **Pretax Operating Income: ($000)** | 1,836,372 | 1,254,058 | -20,692 | 382,335 | 528,522 |

This field represents pretax operating earnings, before any capital gains, generated from underwriting, investment, and other miscellaneous operating sources.

| | | | | | |
|---|---|---|---|---|---|
| **Net Income: ($000)** | 1,284,907 | 1,120,855 | 131,915 | 326,390 | 292,374 |

This field represents the total after-tax earnings generated from operations and realized capital gains.

## Profitability Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Loss Ratio: (X)** | 69.6 | 71.1 | 90.2 | 86.4 | 80.2 |

The ratio of incurred losses and loss adjustment expenses to net premiums earned, expressed as a percent. This ratio measures the company's underlying profitability, or loss experience on its total book of business.

| | | | | | |
|---|---|---|---|---|---|
| **Expense Ratio: (X)** | 21.7 | 22.4 | 19.8 | 19.5 | 16.5 |

The ratio of underwriting expenses (including commissions) to Net Premiums Written, expressed as a percent. This ratio measures the company's operational efficiency in underwriting its book of business.

| | | | | | |
|---|---|---|---|---|---|
| **Combined Ratio After Policyholder Dividends: (X)** | 91.2 | 93.4 | 110.0 | 105.9 | 96.8 |

measures the company's overall underwriting profitability. It is the sum of the Loss Ratio,Expense Ratio and Policyholder Dividend Ratio (policyholder dividends to net premium earned). This ratio does not reflect investment income or income taxes. A Combined Ratio of less than 100 indicates the company has reported an underwriting profit. Generally, the acceptable range for this test for property insurers is from 95 to 105 and for casualty insurers is from 100 to 110.

| | | | | | |
|---|---|---|---|---|---|
| **Operating Ratio: (X)** | 75.8 | 83.6 | 99.3 | 93.4 | 87.1 |

measures a company's overall operating profitability from underwriting and investment activity. This ratio does not reflect other operating income/expense, capital gains or income taxes. The normal range for this test for all types of insurers is from 85 to 95. An Operating Ratio of more than 100 indicates a company is unable to generate profits from its underwriting and investment activities.

| | | | | | |
|---|---|---|---|---|---|
| **Pretax Return on Revenue: (%)** | 24.0 | 16.3 | -0.3 | 5.8 | 9.8 |

measures a company's operating profitability and is calculated as pretax operating income divided by net premiums earned. This return measure is before capital gains/losses and income taxes. The normal range for this test for all types of insurers is from 3% to 10%.

| | | | | | |
|---|---|---|---|---|---|
| **Yield on Invested Assets: (%)** | 4.6 | 3.3 | 3.8 | 4.9 | 4.0 |

measures the average return on a company's invested assets by dividing annual net investment income, after expenses by the mean of net invested assets. This return measure is before capital gains/losses and income taxes. The normal range for this test for all types of insurers is from 4% to 6%.

| | | | | | |
|---|---|---|---|---|---|
| **Return on PHS: (%)** | 23.3 | 27.0 | 10.7 | 12.6 | 16.3 |

measures a company's overall after-tax profitability from underwriting and investment activity, divided by the mean of prior and current year-end surplus. This measure is calculated after income taxes and includes capital gains/losses. The normal range for this test is from 5% to 15%.

## Leverage Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Change in NPW: (%)** | -0.5 | 10.3 | 0.8 | 15.0 | 31.8 |

measures the annual percentage change in net premiums written. A company should demonstrate its ability to support controlled

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business growth with quality surplus growth from strong internal capital generation. The normal range for this test is from 3% to 10%, however, this will vary based on market conditions.

**NPW to PHS: (X)** 0.6 0.7 0.9 1.0 0.9
measures the company's net retained premium writings, after reinsurance assumed and ceded,in relation to its surplus. This ratio measures the company's net exposure to pricing errors in its current book of business. Generally, the acceptable range for this test for all types of insurers is below 2.0.

**Best's Capital Adequacy Ratio: (X)** 206.0
This absolute measure compares an insurer's economic surplus position relative to the required capital necessary to support its business risks. Companies deemed to have "adequate" capital strength normally generate a BCAR score of over 100 and will usually carry a Secure Best's Rating.

**Net Leverage: (X)** 2.5 2.7 3.3 3.3 2.8
represents the sum of a company's Net Premiums Written and Net Liability Ratios. This ratio measures the combination of a company's exposure to pricing errors and errors of estimation in its liabilities, after reinsurance, in relation to policyholders' surplus. Generally, the acceptable range for this test is below 4.0 for property carriers and below 6.0 for long-tailed casualty carriers.

**Gross Leverage: (X)** 3.1 3.5 4.4 4.3 4.2
represents the sum of Net Leverage and Ceded Reinsurance Leverage (reinsurance recoverables, ceded balances payable and ceded premiums written, less funds held divided by policyholders' surplus) Ratios. This ratio measures a company's gross exposure to pricing errors in the current book of business, errors of estimating its liabilities, and exposure to its reinsurers. Generally, the acceptable range for this test is below 5.0 for property insurers and below 7.0 for long-tailed liability insurers.

**Reinsurance Recoverables to PHS: (%)** 45.9 55.6 81.1 68.6 95.5
Measures a company's dependence upon its reinsurers and the potential exposure to reinsurance collectibility problems. This ratio represents total ceded reinsurance recoverables due from non-affiliated reinsurers expressed as a percentage of surplus. Total ceded reinsurance recoverables is calculated as the sum of non-affiliated ceded paid losses, ceded unpaid losses, ceded IBNR losses, ceded unearned premiums and ceded commissions, less funds held from reinsurers. The normal range for this test is 50% to 150% for all types of insurers.

## Liquidity Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|

**Quick Liquidity: (%)** 3.6 3.1 4.6 5.9 5.3
is an indicator of a company's short term liquidity and measures the proportion of net liabilities covered by cash and investments which can be quickly converted to cash. This ratio may indicate a company's ability to settle its liabilities without prematurely selling long-term investments or to borrow money. It represents quick assets divided by net liabilities, plus ceded reinsurance balances payable, expressed as a percent. The normal range for this test is from 30% to 50% for property insurers and from 20% to 30% for long-tailed liability insurers.

**Current Liquidity: (%)** 80.0 77.8 68.4 66.9 63.3
represents current assets divided by net liabilities plus ceded reinsurance balances payable, expressed as a percent. This ratio measures the proportion of liabilities covered by unencumbered cash and unaffiliated investments. If this ratio is less than 100, the company's overall liquidity is dependent on the collectibility or marketability of premium balances and investments in affiliates. The normal range for this test is 120% to 140% for property insurers and 100% to 120% for long-tailed liability insurers.

**Overall Liquidity: (%)** 155.1 150.0 140.7 142.9 153.8
represents total admitted assets divided by total liabilities less conditional reserves, expressed as a percent. This ratio indicates a company's ability to cover net liabilities with total assets. The ratio does not address the quality and marketability of premium balances, affiliated investments and other uninvested assets. The normal range is from 140% to 180% for property insurers and 110% to 150% for long-tailed liability insurers.

**Operating Cash Flow: ($000)** 2,534,253 2,620,438 1,414,536 5,351,000 2,359,932
represents funds generated from insurance operations, which includes the change in cash and invested assets attributable to underwriting activities, net investment income and federal income taxes. Negative amounts may indicate unprofitable underwriting results or lowyielding assets.

**Class 3-6 Bonds(% of PHS): (%)** 0.2 0.9 3.9 3.8 3.8
Measures exposure to non-investment grade bonds as a percentage of surplus. Generally, non-investment grade bonds carry higher default and illiquidity risks. The designation of Class 3 through 6 bonds as non-investment grade utilizes the NAIC bond quality classifications that coincide with different bond ratings assigned by major credit rating agencies.

## Loss Reserve Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|

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| | | | | | |
|---|---|---|---|---|---|
| **Development to PHS: (%)** | ... | -0.5 | 4.2 | 31.8 | 60.9 |

measures reserve deficiency or redundancy in relation to surplus and reflects the degree to which year-end surplus was either understated (-) or overstated (+) in each of the past several years, if the original reserves had been restated to reflect subsequent development through the current year. The normal range for this test is from 0% to -25%.

| | | | | | |
|---|---|---|---|---|---|
| **Loss and LAE Reserves to PHS: (%)** | 113.9 | 123.8 | 145.1 | 133.0 | 96.9 |

measures the trend and magnitude of a company's total loss reserves to surplus. The higher the multiple of loss reserves to surplus, the more critical is a company's solvency dependent upon having and maintaining reserve adequacy. The normal range for this test is from 50% to 100% for property insurers and from 200% to 300% for long-tailed liability insurers.

000681

# MARSH

# CERTIFICATE OF INSURANCE

CERTIFICATE NUMBER
CHI-001899513-02

**PRODUCER**

Marsh USA Inc.
701 Market Street, Suite 1100
St. Louis, MO 63101-1830

EMERS -.--08-09 PWS

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER OTHER THAN THOSE PROVIDED IN THE POLICY. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES DESCRIBED HEREIN.

**INSURED**

Emerson Electric Co.
and all Subsidiary Companies
8000 West Florissant Avenue
P. O. Box 4100
St. Louis, MO 63136-8506

**COMPANIES AFFORDING COVERAGE**

COMPANY A: Old Republic Insurance Co
COMPANY B:
COMPANY C:
COMPANY D:

**COVERAGES**

This certificate supersedes and replaces any previously issued certificate for the policy period noted below. 4

THIS IS TO CERTIFY THAT POLICIES OF INSURANCE DESCRIBED HEREIN HAVE BEEN ISSUED TO THE INSURED NAMED HEREIN FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THE CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, CONDITIONS AND EXCLUSIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| CO LTR | TYPE OF INSURANCE | POLICY NUMBER | POLICY EFFECTIVE DATE (MM/DD/YY) | POLICY EXPIRATION DATE (MM/DD/YY) | LIMITS | |
|---|---|---|---|---|---|---|
| A | GENERAL LIABILITY | MWZY57265 | 07/01/08 | 07/01/09 | GENERAL AGGREGATE | $ 6,000,000 |
| | [X] COMMERCIAL GENERAL LIABILITY | | | | PRODUCTS - COMP/OP AGG | $ *** |
| | [ ] CLAIMS MADE [X] OCCUR | | | | PERSONAL & ADV INJURY | $ 5,000,000 |
| | OWNER'S & CONTRACTOR'S PROT | | | | EACH OCCURRENCE | $ 5,000,000 |
| | | | | | FIRE DAMAGE (Any one fire) | $ 5,000,000 |
| | | | | | MED EXP (Any one person) | $ --- |
| A | AUTOMOBILE LIABILITY | MWTB19617 | 07/01/08 | 07/01/09 | COMBINED SINGLE LIMIT | $ 2,000,000 |
| | [X] ANY AUTO | | | | BODILY INJURY (Per person) | $ |
| | [ ] ALL OWNED AUTOS | | | | BODILY INJURY (Per accident) | $ |
| | [ ] SCHEDULED AUTOS | | | | PROPERTY DAMAGE | $ |
| | [ ] HIRED AUTOS | | | | | |
| | [ ] NON-OWNED AUTOS | | | | | |
| | GARAGE LIABILITY | | | | AUTO ONLY - EA ACCIDENT | $ |
| | [ ] ANY AUTO | | | | OTHER THAN AUTO ONLY: | |
| | | | | | EACH ACCIDENT | $ |
| | | | | | AGGREGATE | $ |
| | EXCESS LIABILITY | | | | EACH OCCURRENCE | $ |
| | [ ] UMBRELLA FORM | | | | AGGREGATE | $ |
| | [ ] OTHER THAN UMBRELLA FORM | | | | | $ |
| A | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY | MWC11186602 | 07/01/08 | 07/01/09 | [X] WC STATUTORY LIMITS [ ] OTHER | |
| | THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: [ ] INCL [ ] EXCL | | | | EL EACH ACCIDENT | $ 1,000,000 |
| | | | | | EL DISEASE-POLICY LIMIT | $ 1,000,000 |
| | | | | | EL DISEASE-EACH EMPLOYEE | $ 1,000,000 |
| | OTHER | | | | | |

**DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS**

***General Liability - Claims arising out of Products/Completed Operations are Excluded. Primary Products/Completed Operations Self Insured. Claims Administered by Emerson Electric Co.
Automobile - Auto Physical Damage Self Insured for Comprehensive and Collision with NIL Deductible. Administered by Crawford & Company.
See reverse/attached

**CERTIFICATE HOLDER**

City of San Diego, Purchasing Division
Attn. Insurance Coordinator
1200 Third Avenue, Suite 200
San Diego, CA 92101-4195

**CANCELLATION**

SHOULD ANY OF THE POLICIES DESCRIBED HEREIN BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE INSURER AFFORDING COVERAGE WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED HEREIN, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER AFFORDING COVERAGE, ITS AGENTS OR REPRESENTATIVES, OR THE ISSUER OF THIS CERTIFICATE.

AUTHORIZED REPRESENTATIVE
of Marsh USA Inc.
BY: Alfred A. Peterfeso

Alfred A. Peterfeso

MM1(3/02)

VALID AS OF: 07/21/08

000683

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# Best's Key Rating Guide® Presentation Report

August 27, 2008
An A.M. Best Publication

*This A.M. Best report is provided compliments of:*

**City of San Diego, Purchasing & Contract**
*1200 Third Avenue, Suite 200*
San Diego, CA 92101

**Contact: Glenn Meyer**
Administrator
619.533-4510
GMEYER@SANDIEGO.GOV

## Old Republic Insurance Company AMB# 00733


**Best's Rating**
A+
06/24/2008

**Old Republic Insurance Company**, an insurance company domiciled in **Pennsylvania,** is rated **A+ (Superior)** by the A.M. Best Company. The rating outlook is **Negative.**

**Five Year Rating History**
06/24/08 A+
06/07/07 A+
06/23/06 A+
06/20/05 A+
03/05/04 A+

**Rating Explanation: A+ (Superior)**: This rating is assigned to companies that have, in our opinion, a superior ability to meet their ongoing obligations to policyholders.

**Financial Size Category: XI ($750 million to $1 billion)**: The Financial Size Category is an indicator of the size of an insurer, and is based on reported Policyholders' Surplus plus conditional or technical reserve funds, such as the asset valuation reserve, other investment and operating contingency funds and/or miscellaneous voluntary reserves reported as liabilities.

**History**: Old Republic Insurance Company began business in **1935.**

**Organization Type:** Stock

**Identification Numbers**: Old Republic Insurance Company's A.M. Best number is **00733**, its NAIC number is **24147,** and its FEIN number is **25-0410420**.

**Group Membership**: Old Republic Insurance Company is a member of the **Old Republic Insurance Group** which has an A.M. Best group number of **000734**.

**Company Leadership and Location**:

- Senior Executive: Aldo C. Zucaro , Chairman & CEO
- Address: P.O. Box 789, Greensburg, PA 15601-0789
- Phone: 724-834-5000

**States & Territories Licensed**: The company is licensed in the District of Columbia, Guam, Puerto Rico, U.S. Virgin Islands and all states.

**Marketing Type:** Independent Agency

**Specialty Lines of Business**: Workers' Comp, Commercial Lines

| Principal states or territories | | Principal lines of business | |
|---|---|---|---|
| CA | 11.9% | Workers' Comp | 23.4% |
| NY | 10.8% | Auto Warranty | 19.9% |
| PA | 9.4% | Credit | 18.7% |

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| | | | |
|---|---|---|---|
| TX | 6.3% | Other A & H | 13.6% |
| FL | 5.9% | Oth Liab Cl-Made | 9.2% |

## Key Financial Data *(Annual Reporting)*

### Balance Sheet

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Cash & Short Term Invest: (%)** | 4.3 | 4.0 | 2.4 | 6.6 | 6.7 |
| This field represents cash and all unaffiliated investments whose maturities (or repurchase dates under repurchase agreements) at the time of acquisition were one year or less, as a percentage of total admitted assets. | | | | | |
| **Stocks and Bonds: (%)** | 75.4 | 73.2 | 76.6 | 75.2 | 73.7 |
| This field represents investments in common stocks, preferred stocks and bonds as a percentage of Total Admitted Assets. | | | | | |
| **All other Assets: (%)** | 20.3 | 22.9 | 21.0 | 18.2 | 19.6 |
| This field represents total assets excluding cash, short-term investments, and stocks and bonds as a percentage of total admitted assets. | | | | | |
| **Total Admitted Assets: ($000)** | 2,427,803 | 2,266,580 | 2,081,950 | 1,847,752 | 1,658,531 |
| This field represents the sum of all admitted assets. These assets are valued in accordance with state laws and regulations, as reported by the company in its financial statements filed with state insurance regulatory authorities. This item is reported net as to encumbrances on real estate (the amount of any encumbrances on real estate is deducted from the value of the real estate), and net as to amounts recoverable from reinsurers (which are deducted from the corresponding liabilities for unpaid losses and unearned premiums). | | | | | |
| **Loss Reserves: (%)** | 49.1 | 57.1 | 54.7 | 58.2 | 59.0 |
| This field represents the total unpaid losses and loss adjustment expenses (including reserves for incurred but not reported losses, if any), and supplemental reserves established by the company that are reported in the annual statement for the year indicated to total liabilities expressed as a percent. It is the total for all lines of business and all accident years, and is the amount of reserves as originally reported in each year shown. | | | | | |
| ***Unearned Premiums: (%)*** | 17.2 | 11.1 | 11.6 | 12.8 | 14.2 |
| This ratio measures the calculated aggregate net amount, after deducting reinsurance credits, which an insurance company would be obliged to tender to its policyholders as return premiums for unexpired terms, should it cancel every policy in force as a percentage of total liabilities. | | | | | |
| **All Other Liabilities: (%)** | 33.7 | 31.8 | 33.6 | 29.0 | 26.7 |
| This field represents total liabilities excluding loss reserves and unearned premiums as a percentage of total liabilities. | | | | | |
| **Total Liabilities: ($000)** | 1,554,917 | 1,422,441 | 1,298,266 | 1,171,005 | 1,048,545 |
| This field represents the sum of all liabilities of the company valued in accordance with state laws and regulations, as reported by the company in its financial statements filed with state insurance regulatory authorities. | | | | | |
| **Policyholders' Surplus: ($000)** | 872,885 | 844,139 | 783,684 | 676,747 | 609,985 |
| This field represents the sum of paid in capital, paid in and contributed surplus, and net earned surplus, including voluntary contingency reserves. It can also be described as the difference between Total Admitted Assets and Total Liabilities. | | | | | |

### Operations

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Direct Premiums Written: ($000)** | 1,102,611 | 928,235 | 980,634 | 928,006 | 776,942 |
| This field represents the aggregate amount of recorded originated premiums, other than reinsurance, written during the year whether collected or not at the close of the year (plus retrospective audit premium collections), after deducting all return premiums. | | | | | |
| **Net Premiums Written: ($000)** | 482,343 | 339,234 | 321,738 | 348,921 | 333,306 |
| This field represents gross premiums written, direct and reinsurance assumed, less reinsurance ceded. | | | | | |
| **Business Net Retention: (%)** | 42.8 | 36.0 | 32.3 | 37.1 | 42.5 |
| This field represents the percentage of a company's gross writings that are retained for its own account. Gross writings are the sum of direct writings and assumed writings. This measure excludes affiliated writings. | | | | | |

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| | | | | | |
|---|---|---|---|---|---|
| **Net Underwriting Income: ($000)** | 81,975 | 78,371 | 49,836 | 70,910 | 43,802 |

This field represents premiums earned less incurred losses, loss adjustment expenses, underwriting expenses incurred, and dividends to policyholders.

| | | | | | |
|---|---|---|---|---|---|
| **Net Investment Income: ($000)** | 81,200 | 75,641 | 66,943 | 61,164 | 60,515 |

This field represents investment income earned during the year less investment expenses and depreciation on real estate. *Investment expenses are the expenses related to generating investment income and capital gains excluding income taxes.*

| | | | | | |
|---|---|---|---|---|---|
| **Pretax Operating Income: ($000)** | 164,265 | 154,946 | 117,949 | 132,946 | 105,269 |

This field represents pretax operating earnings, before any capital gains, generated from underwriting, investment, and other miscellaneous operating sources.

| | | | | | |
|---|---|---|---|---|---|
| **Net Income: ($000)** | 128,532 | 120,371 | 146,515 | 94,220 | 81,114 |

This field represents the total after-tax earnings generated from operations and realized capital gains.

## Profitability Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Loss Ratio: (X)** | 45.6 | 46.5 | 53.3 | 52.3 | 51.6 |

*The ratio of incurred losses and loss adjustment expenses to net premiums earned, expressed as a percent. This ratio measures* the company's underlying profitability, or loss experience on its total book of business.

| | | | | | |
|---|---|---|---|---|---|
| **Expense Ratio: (X)** | 25.1 | 29.6 | 31.2 | 28.1 | 28.9 |

The ratio of underwriting expenses (including commissions) to Net Premiums Written, expressed as a percent. This ratio measures the company's operational efficiency in underwriting its book of business.

| | | | | | |
|---|---|---|---|---|---|
| **Combined Ratio After Policyholder Dividends: (X)** | 71.1 | 75.8 | 84.1 | 80.0 | 84.2 |

measures the company's overall underwriting profitability. It is the sum of the Loss Ratio,Expense Ratio and Policyholder Dividend Ratio (policyholder dividends to net premium earned). This ratio does not reflect investment income or income taxes. A Combined Ratio of less than 100 indicates the company has reported an underwriting profit. Generally, the acceptable range for this test for property insurers is from 95 to 105 and for casualty insurers is from 100 to 110.

| | | | | | |
|---|---|---|---|---|---|
| **Operating Ratio: (X)** | 49.5 | 53.0 | 63.1 | 62.6 | 64.9 |

measures a company's overall operating profitability from underwriting and investment activity. This ratio does not reflect other operating income/expense, capital gains or income taxes. The normal range for this test for all types of insurers is from 85 to 95. An Operating Ratio of more than 100 indicates a company is unable to generate profits from its underwriting and investment activities.

| | | | | | |
|---|---|---|---|---|---|
| **Pretax Return on Revenue: (%)** | 43.7 | 46.6 | 37.0 | 37.8 | 33.6 |

measures a company's operating profitability and is calculated as pretax operating income divided by net premiums earned. This return measure is before capital gains/losses and income taxes. The normal range for this test for all types of insurers is from 3% to 10%.

| | | | | | |
|---|---|---|---|---|---|
| **Yield on Invested Assets: (%)** | 4.2 | 4.3 | 4.0 | 4.1 | 4.4 |

measures the average return on a company's invested assets by dividing annual net investment income, after expenses by the mean of net invested assets. This return measure is before capital gains/losses and income taxes. The normal range for this test for all types of insurers is from 4% to 6%.

| | | | | | |
|---|---|---|---|---|---|
| **Return on PHS: (%)** | 11.4 | 16.3 | 18.7 | 16.0 | 17.3 |

measures a company's overall after-tax profitability from underwriting and investment activity, divided by the mean of prior and current year-end surplus. This measure is calculated after income taxes and includes capital gains/losses. The normal range for this test is from 5% to 15%.

## Leverage Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|
| **Change in NPW: (%)** | 42.2 | 5.4 | -7.8 | 4.7 | 17.9 |

measures the annual percentage change in net premiums written. A company should demonstrate its ability to support controlled business growth with quality surplus growth from strong internal capital generation. The normal range for this test is from 3% to 10%, however, this will vary based on market conditions.

| | | | | | |
|---|---|---|---|---|---|
| **NPW to PHS: (X)** | 0.6 | 0.4 | 0.4 | 0.5 | 0.5 |

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measures the company's net retained premium writings, after reinsurance assumed and ceded,in relation to its surplus. This ratio measures the company's net exposure to pricing errors in its current book of business. Generally, the acceptable range for this test for all types of insurers is below 2.0.

**Best's Capital Adequacy Ratio: (X)** 212.5
This absolute measure compares an insurer's economic surplus position relative to the required capital necessary to support its business risks. Companies deemed to have "adequate" capital strength normally generate a BCAR score of over 100 and will usually carry a Secure Best's Rating.

**Net Leverage: (X)** 2.3 2.1 2.0 2.2 2.2
represents the sum of a company's Net Premiums Written and Net Liability Ratios. This ratio measures the combination of a company's exposure to pricing errors and errors of estimation in its liabilities, after reinsurance, in relation to policyholders' surplus. Generally, the acceptable range for this test is below 4.0 for property carriers and below 6.0 for long-tailed casualty carriers.

**Gross Leverage: (X)** 5.0 4.8 5.0 5.2 5.2
represents the sum of Net Leverage and Ceded Reinsurance Leverage (reinsurance recoverables, ceded balances payable and ceded premiums written, less funds held divided by policyholders' surplus) Ratios. This ratio measures a company's gross exposure to pricing errors in the current book of business, errors of estimating its liabilities, and exposure to its reinsurers. Generally, the acceptable range for this test is below 5.0 for property insurers and below 7.0 for long-tailed liability insurers.

**Reinsurance Recoverables to PHS: (%)** 209.5 229.0 237.7 236.3 237.0
Measures a company's dependence upon its reinsurers and the potential exposure to reinsurance collectibility problems. This ratio represents total ceded reinsurance recoverables due from non-affiliated reinsurers expressed as a percentage of surplus. Total ceded reinsurance recoverables is calculated as the sum of non-affiliated ceded paid losses, ceded unpaid losses, ceded IBNR losses, ceded unearned premiums and ceded commissions, less funds held from reinsurers. The normal range for this test is 50% to 150% for all types of insurers.

## Liquidity Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|

**Quick Liquidity: (%)** 34.6 31.3 26.5 42.6 41.8
is an indicator of a company's short term liquidity and measures the proportion of net liabilities covered by cash and investments which can be quickly converted to cash. This ratio may indicate a company's ability to settle its liabilities without prematurely selling long-term investments or to borrow money. It represents quick assets divided by net liabilities, plus ceded reinsurance balances payable, expressed as a percent. The normal range for this test is from 30% to 50% for property insurers and from 20% to 30% for long-tailed liability insurers.

**Current Liquidity: (%)** 136.0 133.9 140.6 146.9 141.9
represents current assets divided by net liabilities plus ceded reinsurance balances payable, expressed as a percent. This ratio measures the proportion of liabilities covered by unencumbered cash and unaffiliated investments. If this ratio is less than 100, the company's overall liquidity is dependent on the collectibility or marketability of premium balances and investments in affiliates. The normal range for this test is 120% to 140% for property insurers and 100% to 120% for long-tailed liability insurers.

**Overall Liquidity: (%)** 158.0 161.7 165.1 164.0 163.9
represents total admitted assets divided by total liabilities less conditional reserves, expressed as a percent. This ratio indicates a company's ability to cover net liabilities with total assets. The ratio does not address the quality and marketability of premium balances, affiliated investments and other uninvested assets. The normal range is from 140% to 180% for property insurers and 110% to 150% for long-tailed liability insurers.

**Operating Cash Flow: ($000)** 172,507 150,786 167,508 197,615 48,811
represents funds generated from insurance operations, which includes the change in cash and invested assets attributable to underwriting activities, net investment income and federal income taxes. Negative amounts may indicate unprofitable underwriting results or lowyielding assets.

**Class 3-6 Bonds(% of PHS): (%)** 3.3 2.4 1.5 0.9 1.2
Measures exposure to non-investment grade bonds as a percentage of surplus. Generally, non-investment grade bonds carry higher default and illiquidity risks. The designation of Class 3 through 6 bonds as non-investment grade utilizes the NAIC bond quality classifications that coincide with different bond ratings assigned by major credit rating agencies.

## Loss Reserve Tests

| | 2007 | 2006 | 2005 | 2004 | 2003 |
|---|---|---|---|---|---|

**Development to PHS: (%)** ... -4.8 -6.6 -6.5 -5.0
measures reserve deficiency or redundancy in relation to surplus and reflects the degree to which year-end surplus was either understated (-) or overstated (+) in each of the past several years, if the original reserves had been restated to reflect subsequent

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development through the current year. The normal range for this test is from 0% to -25%.

**Loss and LAE Reserves to PHS: (%)** 87.4 96.2 90.6 100.7 101.5
measures the trend and magnitude of a company's total loss reserves to surplus. The higher the multiple of loss reserves to surplus, the more critical is a company's solvency dependent upon having and maintaining reserve adequacy. The normal range for this test is from 50% to 100% for property insurers and from 200% to 300% for long-tailed liability insurers.

# ADDITIONAL INFORMATION

DATE (MM/DD/YY)
CHI-001899513-02 07/21/08

**PRODUCER**

Marsh USA Inc.
701 Market Street, Suite 1100
St. Louis, MO 63101-1830

000689

EMERS -.--08-09 PWS

**INSURED**

Emerson Electric Co.
and all Subsidiary Companies
8000 West Florissant Avenue
P. O. Box 4100
St. Louis, MO 63136-8506

**COMPANIES AFFORDING COVERAGE**

COMPANY E

COMPANY F

COMPANY G

COMPANY H

**TEXT**

ADDITIONAL INSURED WORDING - GENERAL LIABILITY

The Certificate Holder is included as an Additional Insured on the General Liability but only in respect to their interest in the operations of the Named Insured and only for such terms and limits which are the lesser of the policies hereon or the written requirements between the Named Insured and Certificate Holder.

ADDITIONAL INSURED WORDING - AUTOMOBILE LIABILITY

The Certificate Holder is included as an Additional Insured on the Automobile Liability but only in respect to their interest in the use of owned or leased vehicles by the Named Insured and only for such terms and limits which are the lesser of the Policies hereon or the written requirements between the Named Insured and Certificate Holder.

CROSS LIABILITY ENDORSEMENT

In the event of claims being made by reason of Bodily Injury suffered by an employee or employees of one insured herein for which another insured therein is or may be liable, then this policy shall cover such insured against whom a claim is made or may be made in the same manner as if separate policies had been issued to each insured herein.

Nothing contained herein shall operate to increase our limit of insurance as set forth elsewhere in this policy beyond the amount or amounts for which we would have been liable if only one person or interest had been named as insured.

AMENDMENT OF OTHER INSURANCE CONDITION ENDORSEMENT - GENERAL/AUTOMOBILE LIABILITY COVERAGE

It is hereby agreed and understood that the Other Insurance condition of this policy is amended; only with respect to additional insureds, and only when agreed to in writing prior to any loss; to afford coverage as if it were primary insurance. The inclusion of coverage hereunder for additional insureds does not modify any other items, conditions or exclusions of this contract.

WAIVER OF SUBROGATION

It is understood and agreed that the Company, in the event of any payment under this policy, waives its right of recovery to the extent of the Named Insured's negligence, where the Named Insured has waived its right of recovery prior to loss.

Emerson Process Management/Power & Water Solutions division of Emerson Electric
City of San Diego Metropolitan Department Agreement for Ovation Upgrade for Wastewater Operations Management (COMNET) at Metropolitan Biosolids Center (MBC) between The City of San Diego and Emerson Process Management Power and Water Solutions, Inc.

**CERTIFICATE HOLDER**

City of San Diego, Purchasing Division
Attn. Insurance Coordinator
1200 Third Avenue, Suite 200
San Diego, CA 92101-4195

**AUTHORIZED REPRESENTATIVE**
of Marsh USA Inc.
BY: Alfred A. Peterfeso Alfred A. Peterfeso

000691

Print Form

THE CITY OF SAN DIEGO

# CONSULTANT AWARD TRACKING FORM

Consultant Award Tracking Form: The purpose of this form is to track the cumulative amount of money awarded to both architectural and engineering (A&E) firms and non-A&E firms; and to ensure that the cumulative amount of money awarded to consultant does not exceed $250,000 in a fiscal year including this contract. If this cumulative award limit is exceeded, inclusive of this contract award, Council approval is required.

A copy of this form must be attached to Forms PA-700, PA-2159, CM-1544, 1472, DP's and PO's for processing. In addition to this, a copy is to be sent to the Consultant Services Coordinator.

## THIS SECTION TO BE COMPLETED BY CITY STAFF

Date: 7/7/2008 Department Name: Engineering and Capital Projects

City Project Manager: Chisti Dadachanji Phone: 619-533-4648

Name of Firm: Emerson Process Management Power & Water Solutions, Inc.

Project Name: Metro Facilities Control System Upgrade Contract Amount: $6,342,799

**Appropriate approval authority:**

☐ Department Approval: See Section 5 of A.R. 25.60, and Section 5.2 of AR 25.70 for non-A&E firms
☐ City Manager: See Section 6 of AR 25.60 and Section 6 of AR 25.70 for non-A&E firms
☒ City Council: See Section 7 of AR 25.60

## THIS SECTION TO BE COMPLETED AND REVIEWED BY CONSULTANT (*Prior to the Interview process*)

*The City reserves the right to disqualify any Consultant from the interview process if this tracking form is not completely and accurately executed prior to the consultant's contract award.*

*If it is determined subsequent to the contract award that this tracking form was not accurately executed, the underlying contract will be illegal and deemed void pursuant to Municipal Code Section 22.0226. In such an instance, the City shall not be responsible for any losses or damages which may result from the void contract and reserves the right in its sole discretion to award the contract to another Consultant.*

Dollar Amount Awarded by the City of San Diego this fiscal year (July 1 through June 30)

**Including this contract:** $6,342,799

*I hereby certify that I am an authorized representative of:*

Emerson Process Management Power & Water Solutions, Inc.

*(Name of Firm)*

*and that I have read and understand this form this* 7th *(Day)* *day of* July *(Month)*, 2008 *(Year)*

By Ronald W. Buchholz
*(Typed Name of Authorized Representative)*

*(Signature of Authorized Representative)*

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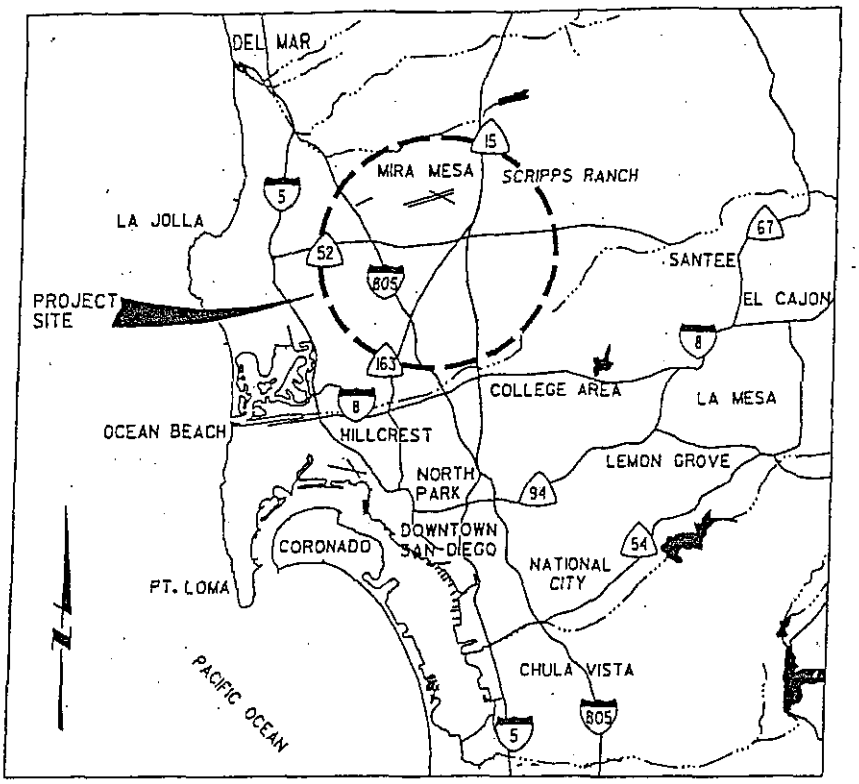
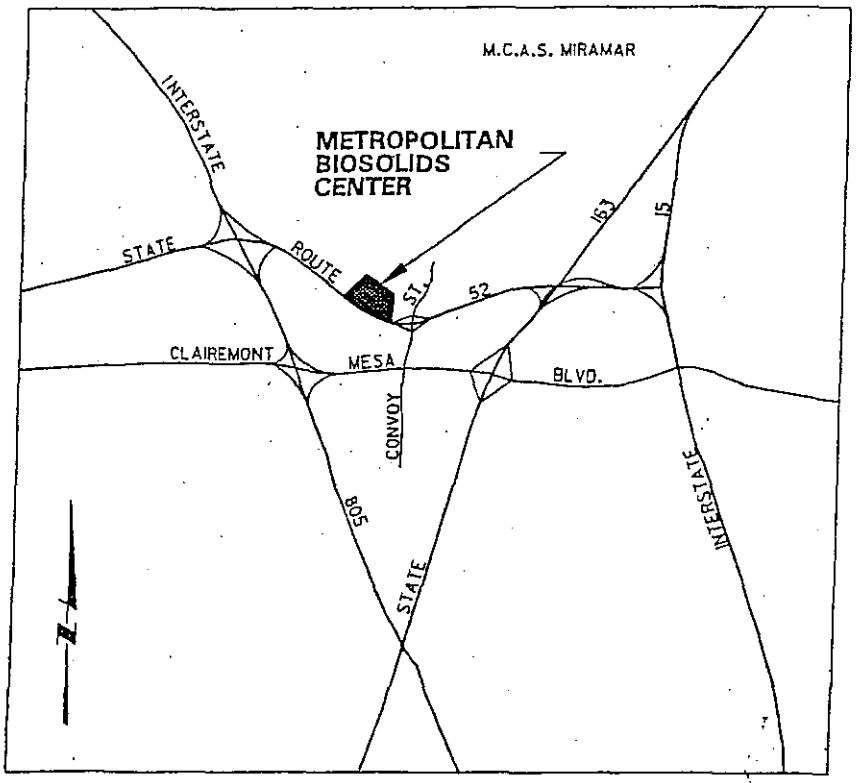



VICINITY MAP




LOCATION MAP

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(R-2009-246)

RESOLUTION NUMBER R-_____

DATE OF FINAL PASSAGE _____

A RESOLUTION OF THE CITY COUNCIL AUTHORIZING A SOLE-SOURCE CONTRACT WITH EMERSON PROCESS MANAGEMENT FOR UPGRADES TO THE METRO FACILITIES CONTROL SYSTEM AT THE METROPOLITAN BIOSOLIDS CENTER; AND AUTHORIZING THE EXPENDITURE OF FUNDS FOR SUCH CONTRACT.

WHEREAS, the Metro Facilities Control System at the City's Metro Biosolids Center was installed in 1998 by Emerson Process Management and is in need of upgrades; and

WHEREAS, Emerson is the only vendor qualified to provide the upgrades; NOW, THEREFORE,

BE IT RESOLVED, by the Council of the City of San Diego, that the Mayor or his designee is authorized to execute a sole-source contract with Emerson Process Management Power & Water Solutions, Inc. for design and construction of Metro Facilities Control System Upgrades at the Metropolitan Biosolids Center in an amount not to exceed $6,342,799 and under the terms and conditions set forth in the agreement on file in the office of the City Clerk as Document No. RR-_____.

BE IT FURTHER RESOLVED, that the expenditure of an amount not to exceed $7,000,000 is authorized, solely and exclusively to provide funds for the above contract, contingency, and related costs, to be expended as follows: $6,942,799 from Sewer Fund No. 41509, CIP 45-966.0 Metro Facilities Control System Upgrade; and $57,201 from Sewer Fund No. 41509, CIP 46-502.0, Annual Allocation – Clean Water Program Pooled Contingencies; and provided that the City Comptroller furnishes one or more certificates demonstrating that the funds necessary for this expenditure are, or will be, on deposit with the City Treasurer.

BE IT FURTHER RESOLVED, that the above activity is categorically exempt from the California Environmental Quality Act pursuant to CEQA Guidelines section 15301 as the repair or maintenance of existing facilities.

APPROVED: MICHAEL J. AGUIRRE, City Attorney

By _____
James W. Lancaster
Deputy City Attorney

JWL:mb
09/02/08
Aud.Cert: 2900134
Or.Dept:Eng&CP
WSD-09-001
R-2009-246

I hereby certify that the foregoing Resolution was passed by the Council of the City of Diego, at its meeting of _____.

ELIZABETH S. MALAND, City Clerk

By _____
Deputy City Clerk

Approved: _____ _____
(date) JERRY SANDERS, Mayor

Vetoed: _____ _____
(date) JERRY SANDERS, Mayor

ORIGINAL

000697

CITY OF SAN DIEGO
METROPOLITAN WASTEWATER DEPARTMENT
AGREEMENT
FOR
OVATION UPGRADE
FOR
WASTEWATER OPERATIONS MANAGEMENT NETWORK – (COMNET)
AT METROPOLITAN BIOSOLIDS CENTER (MBC)
BETWEEN
THE CITY OF SAN DIEGO
AND
EMERSON PROCESS MANAGEMENT POWER AND WATER SOLUTIONS, INC.

This Agreement entered into as of this _____day of _____, 2008, between Emerson Process Management Power and Water Solutions, Inc., a Delaware Corporation, with offices located at 200 Beta Drive, Pittsburgh, PA 15238 (hereinafter referred to as "Emerson") and the City of San Diego, a municipal corporation, with its principal place of business located at the City Administration Building, 202 "C" Street, San Diego, CA 92101, (hereinafter referred to as the "City").

## RECITALS

WHEREAS, the City requires an upgrade to Emerson Ovation equipment for the Metro Biosolids Center ("MBC"); and

WHEREAS, Emerson is the sole provider of the Ovation equipment;

NOW, THEREFORE, the City and Emerson agree as follows:

## AGREEMENT

1. Definitions. Wherever used in this Agreement, the following terms have the meanings indicated which are applicable to both the singular and plural thereof.

   Lump Sum Work. Work to be paid on the basis of lump sum prices.

   Subconsultant/Subcontractor. An individual, partnership, corporation, joint venture or other legal entity having a direct contract with Emerson or with any other Subcontractor for the performance of a part of the Work.

   Work. The entire completed services, installation, equipment and documentation required to be furnished under this Agreement.

ORIGINAL

2. Exhibits. This Agreement includes the following exhibits.

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| Exhibits | Title |
|---|---|
| A | Scope of Work |
| B. | Schedule of Work |
| C. | Price Schedule |
| D. | Technical Specifications<br>• 01310, Progress Schedule<br>• 01521, Section 21, Confined Space Entry<br>• 13400, Distributed Control System<br>• 16050, Basic Electrical Materials and Methods |
| E. | EOCP Consultant Requirement |
| F. | Emerson's Software License Agreement |
| G. | Performance/Payment Bonds |
| H. | Consultant Performance Evaluation |
| I. | Certification for Drug-Free Workplace |
| J. | City Council Policy 100-04 (ADA) |
| K. | Addendum No. 1 |

3. Scope of Work. EMERSON will provide and install Ovation equipment for the MBC as set forth in Exhibit A, Scope of Work and in accordance with Exhibit K, Addendum No. 1.

4. Contract Price. Total compensation paid to Emerson by the City for all work performed under this Agreement and its Exhibits, including Additional Services, shall not exceed Six Million, Three Hundred Forty-two Thousand, Seven Hundred Ninety-nine Dollars ($6,342,799) unless this amount is modified in writing by an Amendment to this Agreement signed by both parties. This not-to-exceed amount includes any Federal, State, or Local sales taxes, and any other taxes applicable to the Work. This not-to-exceed amount is divided into the following two components:

   4.1 Not-to-Exceed Amount. A Not-to Exceed Amount of Six Million, Forty-two Thousand, Seven Hundred Ninety-nine Dollars ($6,042,799) as full compensation for all work described in this Agreement and its Exhibits, except for Additional Services.

   4.2 Additional Services. A not-to-exceed amount of Three Hundred Thousand Dollars ($300,000) for additional services may be authorized at the sole discretion of the City under Section 23 of this Agreement.

5. Reserved

6. Invoices and Payment. The City will pay Emerson the specified percentage in accordance with completion of the following Milestone Schedule contained in Exhibit B. All milestones must be reviewed and approved by the City prior to payment. Emerson will submit an invoice for the approved and completed milestones and the City will pay Emerson within thirty (30) calendar days.

   6.1 Reimbursement of Additional Services

All task authorizations issued for expenditure of additional services will be billed separately with supporting documentation and will be reimbursed on a time and material basis. Emerson shall formally notify the City with a separate written letter when 75% of the authorized funds have been expended. The data required with invoices shall include, but not limited to:

6.1.1 Task Authorization Number
6.2.1 Personnel man-hours worked on the Project and their charges per task;
6.3.1 Break down of Other Direct Costs;
6.4.1 Subconsultant charges;
6.5.1 Total charges billed at this time and to date for each task authorization;
6.6.1 Total payments received to date for each task authorization.

In the event task authorizations provide for the direct reimbursement of travel expenditures, those travel expenditures shall be in accordance with the City Administrative Regulations 45.10 and 90.30, "Employee Transportation Authorization" and "Out-Of-Town Travel Procedure", respectively, during the prosecution of this Agreement.

However, if required by the terms of State or Federal grants and/or loan funding, State or Federal regulations shall take precedent over the City's Administrative Regulations 45.10 and 90.30.

6.2 Retention. A retention of ten (10) percent of each approved progress payment will be withheld until the work is 50 percent complete. After 50 percent of the work is complete, the City may, at its option, release that portion of the retention held by the City that is in excess of five (5) percent of the total of the work completed to date and thereafter continue to retain five (5) percent of the value of all approved progress payment requests subsequently submitted. The City may reinstate up to ten (10) percent retention of the total of the work completed if the City determines, at its discretion, that Emerson is not performing the work satisfactorily or if there is other specific cause for such withholding. At substantial completion, the City may, at its option, refund any portion of the remaining retention.

Emerson may elect to receive 100 percent of payments due under the contract documents, without retention of any portion of the payment by the City, by depositing securities of equivalent value with the City in accordance with the provisions of Section 22300 of the Public Contract Code. Such securities, if deposited by Emerson, shall be valued by the City, whose decision on valuation of the securities shall be final. Securities eligible for investment under this provision shall be limited to those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Emerson and the City.

7. Term of Agreement. The duration of this Agreement is for thirty (30) months commencing with the date of the City's written Notice to Proceed.

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7.1 Termination for Convenience. Prior to the expiration of the term of this Agreement, the Agreement may be terminated for convenience by the City only by written notice and upon payment of reasonable value of the work performed and equipment supplied that have not yet been invoiced by Emerson. In this event, a reasonable fee will be paid to Emerson for the cost of demobilization, prorated in direct proportion to the percentage of Work remaining in this Agreement at the time of termination, (i.e. the less Work remaining, the less paid for demobilization). In no case however, shall the total amount paid under this Agreement exceed the maximum price specified in Sections 4.

7.2 Termination for Breach. In the event the City or Emerson commits a material breach of its undertaking so as to prevent completion of this Agreement and thereafter fails on not less than thirty (30) days written notice to take steps to remedy such breach, the other party may, by written notice, terminate this Agreement and recoveries of the City and Emerson shall be determined by mutual agreement.

7.3 Suspension of Work by the City. The City may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than 90 days by notice in writing to Emerson. Emerson shall resume the Work upon written notice from the City. Emerson may submit a request for change in the Contract Price or Contract Time, or both, directly attributable to the suspension.

8. Delivery, Title, and Risk of Loss. Delivery to the City within the United States of America (USA) shall be Freight-On-Board (F.O.B.) factory freight prepaid and included in the price. Material returned to Emerson by the City shall be F.O.B. City's shipping point freight prepaid and included.

9. Force Majeure. Neither party is responsible for failure or delay in performance other than in the payment of money due hereunder, resulting from any cause beyond its reasonable control for acts of God, war, terrorist attack, closure of City Facilities mandated by State and Federal agencies, the act or failure to act by the City, City's customer, or other contractors In the event of such delay, the time for performance and delivery will be extended by a period of time reasonably necessary to overcome the effect of the delay. Such an extension of time will be non-compensable to Emerson unless the cause of the delay was in the control of the City or the City's contractors.

10. Warranties. Emerson's performance will be covered by the following warranties. These warranties are exclusive and in lieu of all other warranties whether statutory, express or implied (including all warranties of merchantability and fitness for purpose and all warranties arising from course of dealings or usage of trade). The remedies set forth below, for the time and in the manner provided below, shall be the City's exclusive remedies for failure of Emerson to meet its warranty obligations, whether based in contract, in tort (including negligence or strict liability) or otherwise.

Equipment Software and Service Warranty. For equipment, software and services provided under this Agreement, Emerson warrants that the equipment will be free of defects in material, workmanship and title; that the software will be free from errors which materially affect its utility; and that the services provided will reflect competent knowledge and judgment. Emerson's representative will notify the City, in writing, when the Work is complete and within thirty (30) days the City will either accept the

Work, or reject it in writing. The warranty for equipment and system software provided directly by Emerson shall expire twelve (12) months after the Work is accepted by the City. The warranty for services provided directly by Emerson shall expire two (2) years after the Work is accepted by the City. Absent a written rejection from the City, the Work shall be deemed accepted thirty (30) days following Emerson's written notification. The warranty and services for equipment provided by a subcontractor to Emerson will be on a "pass through" basis. That is, the warranty secured by Emerson from its subcontractor or supplier. The City reserves the option to purchase an extended warranty for third party equipment, on terms mutually agreeable to Emerson and the City.

Warranty of Title. Emerson warrants and guarantees that title (subject to Section 13, Software and Firmware License) to all work, materials, and equipment covered by an Emerson invoice will pass to the City at the time of payment, free and clear of all liens.

Remedies. In the case of a nonconformity in these warranties and if Emerson is notified in writing of such nonconformity during the applicable warranty period, is shall be corrected by, 1) in the case of equipment, replacement or repair (at Emerson's discretion) of defective part(s) F.O.B.'s shipping point; 2) in the case of title, defense against claims of title defects; 3) in the case of software, correction, in the medium originally supplied or provision of a procedure to correct material errors; or 4) in the case of service, re-performance of the non-conforming portion of the service. If such remedies are impracticable, Emerson may refund the purchase price for the non-conforming equipment, software, or service. Any warranty specified herein is conditioned upon: a)proper handling, installation and maintenance; b) not having been subject to accident, alteration, abuse or misuse; and c) the City providing necessary access and assistance for Emerson to fulfill its warranty obligations. Unless stated otherwise herein, third party software/equipment shall be warranted and remedied on a pass through basis.

11. Limitation of Liability. The remedies provided herein are exclusive and in no case, except as specified herein in this Section or otherwise insured under Sections 19.1.2 and 19.1.3 of this Agreement, shall Emerson be liable to the City for an aggregate sum exceeding the greater of $100,000 or the total price paid to Emerson under this Agreement during the duration of this contract. Similarly, in no case shall the City be liable to Emerson for an aggregate sum exceeding the greater of $100,000 or the total price remaining to be paid under this Agreement. These limitations of liability are subject to the following additional conditions:

Limitation of Indirect, Incidental or Consequential Damages. Except as otherwise insured under Sections 19.1.2 and 19.1.3 of this Agreement, under no theory of recovery, whether based in contract, tort (including negligence and strict liability), under warranty or otherwise will either Emerson or its suppliers of any tier be liable to the City for any indirect, incidental or consequential damage whatsoever, including loss of revenue, plant and equipment.

Tort Liability. Personal injury or property damage suffered by third parties resulting from intentional or negligent conduct by Emerson or from any tortuous conduct by the City are not subject to the limitation of liability. Emerson conduct resulting in strict liability

is included in this limitation of liability, provided such conduct arises from Emerson's obligations under this Agreement.

City's Duty to Indemnify. The City will indemnify and hold Emerson harmless from any and all fees, penalties, or assessments imposed for alleged violation(s) of California or Federal discharge permits.

Emerson's Duty to Indemnify. Emerson will indemnify and hold the City and the Construction Manager harmless from any and all fees, penalties or assessments imposed for alleged violation(s) by Emerson of OSHA or California labor laws as set forth in Section 17 of this Agreement. Emerson will indemnify and hold the City, its officers and employees, harmless from any and all claims, lawsuits, judgments and damages related to patent infringement, as set forth in Section 14 of this Agreement.

12. Proprietary Information. Specifications, drawings, data, software and other information transmitted by Emerson to the City in connection with this Agreement are the property of Emerson. Emerson retains for itself all of its intellectual property rights in and to any Emerson product and supporting documentation furnished hereunder. Information marked proprietary shall be disclosed in confidence on a "need to know" basis on the condition that it is not to be reproduced, copied or used for any other purpose that the purpose for which it is provided and shall not be disclosed to third parties without the prior written permission of Emerson. The provisions of this section shall not apply to information which: i) becomes generally available to the public through no act or fault of the City; ii) is, prior to disclosure hereunder, already in the possession of the City and was not received from Emerson; iii) is hereafter rightfully received from a third party who did not receive the same from Emerson; or iv) is required by law or governmental agency to be disclosed, after the City notifies Emerson of the disclosure requirements and affords Emerson an opportunity to object to and minimize such disclosure.

13. Software and Firmware License. Notwithstanding any other provisions herein to the contrary, Emerson or applicable third party owner shall retain all exclusive rights, interests, and title to its respective software and firmware. The City's use of the software and firmware shall be governed exclusively by Emerson's and/or third party owner's applicable license terms. Emerson shall provide the City with copies of third party license agreements. The Emerson License Agreement is included in Exhibit F, except that Sections 10 and 11 of this Agreement supersede Exhibit F paragraphs on Warranty, Remedies, and Limitations of Remedies.

14. Patents. Emerson shall defend any action brought against the City to the extent based on a claim that any item furnished by it infringes any U.S. patent or copyright and, if notified promptly in writing and given authority and assistance for the defense of same, Emerson shall pay the damages and cost awarded therein against the City. If the use of the item is enjoined, Emerson shall, at its expense and option, either procure for the City the right to continue using it, replace it with a non-infringing item, modify it so it becomes non-infringing, or remove it and refund the purchase price. These provisions do not apply if (1) the item is furnished in accordance with designs supplied by the City that specified the allegedly infringing article, or (2) to the extent any item furnished hereunder is modified or combined by the City or others with items not furnished hereunder and such modification or combination is the basis of the alleged patent or copyright infringement. If a suit or

proceeding is brought against Emerson arising out of such design, modification or combination, then the City shall protect Emerson to the same extent that Emerson has agreed to protect the City herein. This is an exclusive statement relating to intellectual property rights and all the remedies of the parties relating thereto.

15. Emerson Personnel. Emerson shall assign only qualified personnel to perform work under this Agreement. The minimum qualifications of Emerson Engineers assigned to this project will include having a working knowledge of WDPF-II and Ovation. Emerson shall obtain from the City's primary contact person written approval prior to assigning, re-assigning, removing or substituting personnel. Any person employed by Emerson who is found to be incompetent, intemperate, troublesome, disorderly or otherwise objectionable (based upon non-discriminatory criteria), or who fails or refuses to perform work properly and acceptably, shall be immediately removed from the project by Emerson and not be re-employed on the project. Emerson shall maintain good discipline and will not permit the use or consumption of drugs (illegal substances) or alcoholic beverages on City premises. Costs associated with such removal, including but not limited to transfer, travel, or remedial labor performed subsequent to the date of the City's direction for removal of the individual, shall be borne by Emerson.

    15.1 Project Managers. Emerson and the City will each designate a person as their Project Manager for this project. The Project Managers will serve as the primary liaisons between the parties, and will be authorized to make changes to the scope of this project. Emerson must coordinate all activities with the City's Project Manager to minimize disruptions to City facilities.

16. Notices. Every notice or written communication required or permitted under this Agreement shall be signed by a duly authorized representative of the party initiating such notice or communication and shall either be delivered to an officer or authorized representative of the part to whom it is directed, or sent mail (postage prepaid) or telegram to the following address (which ,may be changed by written notice from the party in question):

For Emerson:
Project Manager for Ovation Upgrade - MBC
Emerson Process Management
5466 Complex Street Ste 203
San Diego, CA 92123

cc:
Contract Administrator for Wastewater Projects
Emerson Process Management
200 Beta Drive
Pittsburgh, PA 15238

For the City:
Project Manager for Ovation Upgrade – MBC
City of San Diego
Metropolitan Wastewater Department
9192 Topaz Way
San Diego, CA 92123

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17. Safety. Emerson shall take all precautions necessary and shall bear sole responsibility for the safety and adequacy of the methods and means it employs in performing the work, and the safety of all employees performing the work and all other persons who may be directly affected thereby.

    17.1 OSHA. Emerson shall at all times in the performance of the work comply with and provide the safeguards required by all applicable federal, state and local laws, rules and regulations concerning occupational safety and health, including, but not limited to, the Occupational Safety and Health Act of 1970 (OSHA) and all applicable state labor laws and the regulations and standards issued thereunder. Emerson warrants that any work performed in any location partially or entirely under Emerson's control shall be performed in accordance with OSHA requirements. Emerson further warrants that all materials and equipment furnished under the Agreement shall conform to and comply with all applicable provisions of OSHA and the regulations and standards issued thereunder. Emerson shall require these warranties of adherence to OSHA from each subcontractor and supplier it employs in the performance of this Agreement.

18. Examination of Records. The City's right to review documents shall be limited to work authorized by task authorization, amendment or other work done on a time and material basis. The review of Emerson's records to permit the City to verify that Emerson invoices are correct with respect to the number of hours worked and equipment and materials provided, loaned to, or purchased for the City. Such review will be conducted at Emerson's Managed Service Center in San Diego during normal working hours and the City agrees to give Emerson seven (7) days advance notice of this intent to perform such a review. During such a review, the City may verify: a) labor hours incurred under this Agreement by individuals including verification of the nature and amount of work performed by individual; b) individual expense account expenses which are charged to this Agreement; c) any applicable purchase orders issued by Emerson in performance of its obligations under this Agreement; d) transportation charges; e) equipment rental or use charges; f) units of Emerson manufactured equipment, computer and peripheral resources; and g) any applicable schedules and workforce reports prepared by Emerson. Emerson agrees to allow the City to inspect similar records prepared by or in possession of its named subcontractors performing work under this Agreement; and will include provisions in its subcontracts to accomplish that effect. Emerson shall maintain such project documents for three years after completion of the Work.

19. Insurance. Emerson shall not begin the Work under this Agreement until it has: (a) obtained, and provided to the City, insurance certificates and endorsements reflecting evidence of all insurance required in this Agreement; however, the City reserves the right to request, and Emerson shall allow, the City to review all commercial policies upon reasonable request by the City, at a time and a place to be determined by Emerson; (b) obtained City approval of each company or companies as required; and (c) confirmed that all policies contain the specific provisions required in below. Maintenance of specified insurance coverage is a material element of this Agreement and Emerson's failure to maintain or renew coverage or to provide evidence of renewal during the term of this Agreement may be treated as a material breach of contract by the City.

19.1 Types of Insurance

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19.1.1 Commercial General Liability. Commercial General Liability (CGL) Insurance written on an ISO Occurrence form CG 00 01 1204 or an equivalent form providing coverage at least as broad which shall cover liability arising from any and all personal injury or property damage in the amount of $5,000,000 per occurrence and subject to an annual aggregate of $10,000,000. There shall be no endorsement or modification of the CGL limiting the scope of coverage for either insured vs. insured claims or contractual liability, except for the limits otherwise stated in paragraphs 11 and 19 of this agreement. Emerson may self-insure for Commercial General Liability and Products/Completed operations provided Emerson defends and indemnifies the City against all losses and damages that would have been covered but for Emerson's decision to self insure.. In lieu of a certificate of insurance, Emerson will provide a letter acceptable to the City describing its self-insurance program.

19.1.2 Commercial Automobile Liability. For all of the Emerson's automobiles including owned, hired and non-owned automobiles, Emerson shall keep in full force and effect, automobile insurance written on an ISO form CA 00 01 1001 or an equivalent form providing coverage at least as broad for bodily injury and property damage for a combined single limit of $1 million per occurrence. Insurance certificate shall reflect coverage for any automobile (any auto).

19.1.3 Workers' Compensation. For all of the Emerson's employees who are subject to this Agreement and to the extent required by the applicable state or federal law, the Emerson shall keep in full force and effect, a Workers' Compensation policy. That policy shall provide $1 million of employers' liability coverage, and the Emerson shall provide an endorsement that the insurer waives the right of subrogation, against the City and its respective elected officials, officers, employees, agents and representatives.

19.1.4 Professional Liability Insurance. Emerson is self-insured for its Professional Liability exposures. In lieu of a certificate of insurance, Emerson will provide a letter acceptable to the City describing its self-insurance program.

19.1.5 Pollution Liability Insurance. Emerson is self-insured for its Pollution Liability exposures. In lieu of a certificate of insurance, Emerson will provide a letter acceptable to the City describing its self-insurance program.

19.2. Deductibles. To the extent of Emerson's negligence, deductibles on any policy shall be the responsibility of the Emerson and shall be disclosed to the City at the time the evidence of insurance is provided.

19.3 Acceptability of Insurers.

19.3.1 Except for the State Compensation Insurance Fund, all insurance required by this Contract shall only be carried by insurance companies with a rating of at

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least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State of California, and that have been approved by the City.

19.3.2 The City will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State of California and is included on the List of Eligible Surplus Lines Insurers (LESLI list). All policies of insurance carried by non-admitted carriers are subject to all of the requirements for policies of insurance provided by admitted carriers described herein.

19.4 Required Endorsements. The following endorsements to the policies of insurance are required to be provided to the City before any work is initiated under this Agreement.

19.4.1 Commercial General Liability Insurance Endorsements

ADDITIONAL INSURED. To the fullest extent allowed by law including but not limited to California Insurance Code Section 11580.04, the policy or policies must be endorsed with a blanket additional insured endorsement providing the City of San Diego and its respective elected officials, officers, employees, agents and representatives as additional insureds to the extent of Emerson's negligence with respect to liability arising out of (a) ongoing operations performed by you or on your behalf, (b) your products, (c) your work, including but not limited to your completed operations performed by you or on your behalf, or (d) premises owned, leased, controlled or used by you.

PRIMARY AND NON-CONTRIBUTORY COVERAGE. The policy or policies shall provide that the insurance afforded by the Commercial General Liability policy or policies is primary to the extent of Emerson's negligence to any insurance or self-insurance of the City of San Diego and its elected officials, officers, employees, agents and representatives as respects operations of the Emerson. Any insurance maintained by the City of San Diego and its elected officials, officers, employees, agents and representatives shall be in excess of Emerson's insurance obligations, and shall not contribute to it.

CANCELLATION. Except as provided for under California Law, the policy or policies shall provide that the City is entitled to thirty (30) days prior written notice (10 days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies. Such notice shall be addressed to the City at the address specified in Section 9.1 "Notices."

SEVERABILITY OF INTEREST. The policy or policies must provide that Emerson's insurance shall apply separately to each insured against whom claim is made or suit is bought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

19.4.2 Automobile Liability Insurance Endorsements

ADDITIONAL INSURED. To the fullest extent allowed by law including but not limited to California Insurance Code Section 11580.04 and to the extent of Emerson's negligence, the policy or policies must be endorsed to include as an Insured the City of San Diego and its respective elected officials, officers, employees, agents and representatives with respect to liability arising out of automobile owned, leased, hired or borrowed by or on behalf of the Emerson.

CANCELLATION. Except as provided for under California Law, the policy or policies shall provide that the City is entitled to thirty (30) days prior written notice (10 days for cancellation due to non-payments of premium) of cancellation or non-renewal of the policy or policies. Such notice shall be addressed to the City at the address specified in Section 9.1 "Notices."

SEVERABILITY OF INTEREST. The policy or policies shall provide that Emerson's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

19.4.3 Worker's Compensation and Employer's Liability Insurance Endorsements

CANCELLATION. Except as provided for under California law, the policy or policies shall provide that the City is entitled to thirty (30) days prior written notice (10 days for cancellation due to non-payment of premium) of cancellation or non-renewal of the policy or policies. Such notice shall be addressed to the City at the address specified in Section 9.1"Notices."

WAIVER OF SUBROGATION. The Worker's Compensation policy or policies must be endorsed to provide that the insurer will waive all rights of subrogation, against the City and its respective elected officials, officers, employees, agents and representatives for losses paid under the terms of this policy or these policies which arise from work performed by Emerson for the City.

19.5 Reservation of Rights. The City reserves the right, from time to time, to review the Emerson's insurance coverage, limits, deductible and self-insured retentions to determine if they are acceptable to the City.

19.6 Additional Insurance. The Emerson may obtain additional insurance not required by this Agreement.

19.7 Excess Insurance. All policies providing excess coverage to the City shall follow the form of the primary policy or policies including but not limited to all endorsements.

20. Bonds. Emerson shall furnish the City with a surety bond conditioned upon the performance of this Agreement. This may take the form of a bond executed by a surety company authorized to do business in California and approved by the City, an endorsed Certificate of Deposit, or a money order or certified check drawn on a solvent bank. The amount of the performance bond that Emerson shall be required to maintain on an ongoing

basis shall be equal to the current contract value, less the contract price attributable to work for which the warranties in Sections 10.1 and 10.2 of this Agreement have expired. Such bond or deposit shall be forfeited to the City in the event Emerson fails or refuses to fulfill the requirements of all terms and conditions of this Agreement, including modifications or amendments hereto. Emerson shall furnish a satisfactory payment bond in an amount equal to the value of the performance bond.

21. Construction Manager. The City may designate a Construction Manager to observe the progress, quantity, and quality of work performed, and otherwise act as the City's representative during the term of this Agreement. The Construction Manager is not authorized to supervise or direct Emerson personnel, or control the means and methods Emerson employs to complete the work. The Construction Manager has authority to accept work and to reject defective work on behalf of the City. Any questions or clarifications regarding the work performed under this Agreement should be directed to the Construction Manager for interpretation and response, if a Construction Manager is designated.

22. Submittals. Emerson will submit shop drawings and samples, which the City will review and approve. Preliminary submittals shall be provided to the Construction Manager in accordance with Exhibit A. The City's review and approval of all submittals is limited to whether the items covered by the submittals will, after installation or incorporation into the work, conform to the information given in this Agreement and the Exhibits, and be compatible with the design concept of the completed project as a whole. The City's review and approval do not extend to means, methods, techniques, sequence or procedures except where expressly called for by this Agreement and the Exhibits, or to safety precautions or programs incident thereto. The review and approval of a separate item does not indicate approval of the assembly in which the item functions. Emerson will make corrections required by the City, and shall resubmit shop drawings and samples for approval. Emerson shall direct specific attention, in writing, to revisions other than the corrections called for by the City on previous submittals.

23. Changes in the Work. The City may determine that work outside the scope of Exhibit A is warranted for improved operation or maintenance of MBC. All additional work will be authorized on a task authorization or on an amendment and will be funded by additional services. Emerson shall not undertake such additional services without an executed task authorization from the City.

    23.1 City's Modification. Without invalidating this Agreement and without notice to any surety, the City may, at any time, or from time to time, order additions, deletions, or revisions to the work. When the City requires such a change, a Request for Proposal (RFP) will be issued to Emerson. Emerson must respond within the time indicated in the RFP, or request additional time, in writing, with an explanation as to why additional time to respond is necessary. When the cost and time associated with the modification to the work is agreed to by the parties, such modification will be memorialized as a written amendment or task authorization to this Agreement.

    23.2 Emerson's Modification. If Emerson encounters conditions materially different than those disclosed in the plans and specifications, this Agreement and its Exhibits, of which Emerson was unaware when it entered into this Agreement, Emerson may

submit a Request for change (RFC) requesting additional time and cost. When the cost and time associated with the modification to the work is agreed to by the parties, such modification will be memorialized as a written amendment or task authorization to this Agreement.

23.3 Modification Pricing. All additional work authorized either on an amendment or on a task authorization will be based on a time and material basis. The hourly labor rate for labor (including maintenance, engineering, software updates/modifications, etc.) shall be billed per the rate structure provided in Exhibit C; the time shall include actual work, approved standby time, and travel time of one-hour per day for planned work.

23.4 Working Through Disputes. Emerson shall continue performance and adhere to the progress schedule during all disputes or disagreements with the City. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as Emerson and the City may otherwise agree in writing. If Emerson and the City are unable to reach agreement on disputed Work, the City may direct Emerson to proceed with the Work; with payment later determined in accordance with Section 28.

24. Reserved

25. Scheduling. Emerson shall provide all schedules and scheduling analysis in accordance with Section 01310, Exhibit D, to this Agreement. Emerson shall adhere to the progress schedule established in accordance with Section 01310, Exhibit D, as it may be adjusted from time to time as provided:

25.1 Non-Impacting Adjustments. Emerson shall submit to the Construction Manager for acceptance any proposed adjustments in the progress schedule that will not change the contract completion date or interim milestones. Such adjustments will conform generally to the progress schedule then in effect and additionally, will comply with any provisions of Section 01310, Exhibit D

25.2 Impacting Adjustments. Proposed revisions in the progress schedule that will effect the contract completion date or interim milestones shall be submitted in accordance with the requirements of Section 01310, Exhibit D. Such adjustments may only be made by written amendment to this Agreement in accordance with Section 01310, Exhibit D.

26. Liquidated Damages. The MBC facility is staffed as an automated facility. Failure to cutover the system within the time mutually agreed to in writing by the parties for each installation will result in damages to the City. This will include additional staff and overtime costs to operate systems in manual. Such damages are extremely difficult to ascertain or estimate. For each consecutive calendar day or part thereof in excess of the time mutually agreed upon shall result in assessment of liquidated damages as follows:

| System: | Cost: |
|---|---|
| Polymer | $321.73 per hour or $7,721.52 per day |
| Centrifuge | $321.73 per hour or $7,721.52 per day |

| | |
|---|---|
| Truck Load out | $221.34 per hour or $5,312.16 per day |
| Odor Control area 60 | $221.34 per hour or $5,312.16 per day |
| Centrate pumps | $221.34 per hour or $5,312.16 per day |

27. Standard of Performance. Emerson shall be responsible for the adequacy of its own work and that of all subcontractors under contract to Emerson for this Project. Where approval by the City, the COO, or other representatives of the City is indicated, it is understood to be conceptual approval only and does not relieve Emerson of responsibility for complying with all laws, codes, specifications, industry standards and liability for damages caused by errors, omission, non-compliance with industry standards, or negligence on the part of Emerson or its subcontractors. Emerson expressly declares the services to be provided under this Agreement shall be performed in accordance with the standards customarily provided by an experienced and competent professional organization rendering the same or similar services in accordance with industry standards. Emerson shall, without additional compensation, correct or revise any errors or deficiencies in its services in accordance with Section 10 of this Agreement regarding warranties.

28. Dispute Resolution. Should a dispute arise between the City and Emerson under this Agreement which remains unresolved after attempts at settlement, either party may initiate mediation by serving a "request for mediation" to the other party. Mediation shall be a prerequisite for either party to proceed to litigation.

28.1 Mediator. Mediation shall be conducted utilizing a mediator skilled in mediation and having, if possible, expertise in industrial automation control. However, if no such skilled mediator is available, then the mediator shall be skilled in mediation having expertise in construction, or if possible, instrumentation and control systems. The selection process shall be administered by the American Arbitration Association, or any other such neutral organization agreeable to both parties, hereinafter called the "Administrator".

28.1.1 Selection. When a party serves a request for mediation, at the same time, that party shall file with the Administrator the following: three (3) copies of the request for mediation, along with the appropriate filing fees; a copy of the list of mediators marked in preference order, after striking any mediators to which they have any factual objection; and a copy of the calendar form designating the initiating party's availability for the mediation hearing. Within ten (10) working days from receipt of the initiating party's request for mediation, the other party shall file the following: a copy of the list of the mediators in preference order, after striking any mediators to which they have any factual objection; and a copy of the calendar form designating their availability for the mediation hearing. The Administrator will appoint the highest, mutually preferred by mediator from the parties' list that is available to serve within the designated time frame.

28.2 Party Representatives. Mediation attendee must include the Director of the Metropolitan Wastewater Department and the Director of Projects of Emerson.

28.3 Confidentiality. All mediation proceedings, results, and documentation, by themselves, shall be non-binding and inadmissible for any purpose in any legal proceeding (pursuant to California Evidence Codes sections 1115 thru 1128), unless such admission is otherwise agreed upon in writing by both parties. Mediators shall not be subject to any subpoena or liability, and their actions shall not be subject to discovery.

28.4 Failure to Mediate. If mediation has not occurred within sixty (60) days of service of a request for mediation, either party may give written notice to terminate pursuant to Section 7 of this Agreement unless extension of the sixty (60) days is agreed to by both parties.

28.5 Concluding Mediation. Any resultant agreements from mediation shall be documented in writing by both parties and may be used as the basis for a change order or other directive, as appropriate. If after at least one mediation session, the dispute is still not resolved to the satisfaction of both parties, either party may end the mediation, terminate the contract pursuant to Section 7 of this Agreement (at their option), and/or proceed to litigation.

29. Mandatory Contract Clauses

29.1 Compliance with the City's Equal Opportunity Contracting Program. Pursuant to San Diego Municipal Code sections 22.3501 *et. seq.* and City of San Diego Council Policy Number 300-10, Emerson and each of its Subconsultants/ Subcontracors shall comply with the City's Equal Opportunity Contracting Program Consultant Requirements which is attached hereto as Exhibit E and incorporated herein by reference.

29.1.1 Approval of subconsultants/Subcontractors. Emerson's hiring of or retaining any third parties to perform services related to the Work is subject to prior approval by the City. Emerson shall list on the Subconsultants List (Exhibit E, Attachment "CC") all Subconsultants /Subcontractors known to Emerson at the time this Agreement is entered. If at any time after this Agreement is entered into Emerson identifies a need for additional Subconsultant/Subcontractor services, Emerson shall give written notice to the City of the need, at least forty-five days before entering into a contract for such subconsultant/subcontractor services. Emerson may request that the City reduce the forty-five day notice period. The City agrees to consider such requests in good faith. Copies of all subcontracts for Work performed under this Agreement with an estimated cost greater than $5,000 shall be submitted to the City upon request.

29.2 Product Endorsement. Emerson shall conform to City of San Diego Administrative Regulation 95.65 concerning product endorsement. Any advertisement referring to the City of San Diego as a user of a product or service will require written approval of the COO.

29.3 Americans with Disabilities Act. Emerson acknowledges and agrees that it is aware of and will comply with the City of San Diego Council Policy Number

100-04, which is attached hereto and incorporated as Exhibit J. Emerson and all its subcontractors are individually responsible for their own ADA program.

29.4 Drug-free Workplace. Emerson acknowledges and agrees that it is aware of and will comply with the City of San Diego Council policy Number 100-17, which is attached hereto and incorporated as Exhibit I. Emerson must submit a Certification for Drug-free Workplace in accordance with Exhibit I prior to commencing activities under this Agreement.

30. Local Employment and Business Promotion. Emerson acknowledges that the City seeks to promote employment and business opportunities for local residents and firms in all City contracts. Emerson will, to the extent legally possible, solicit applications for employment, and bids and proposals for subcontracts, for work associated with this Agreement from local residents and firms as opportunities occur. Emerson agrees to hire qualified local residents and firms whenever feasible.

31. No Assignment. The experience, skill and credit of Emerson are essential to this Agreement and Emerson shall not assign this Agreement as a whole or in part or any right or interest hereunder without the prior written consent of the City. An assignment or attempt to assign this Agreement or any assignment by operation of law shall immediately terminate this Agreement, at the option of the City. The City's consent to one assignment shall not be construed as approval of any subsequent assignment.

32. Survival Clause. Sections 10 thru 14 of this Agreement shall survive termination, expiration or cancellation of this Agreement or the purchase order to which these terms and conditions apply. No amendment, modification or alteration of these terms and conditions shall be binding unless the same shall be in writing and duly executed by the parties. If any term or condition is under any circumstances deemed invalid, the remaining terms and conditions shall be construed with the invalid provision(s) deleted.

33. Waiver. The failure of the City or Emerson to enforce a particular condition or provision of any Agreement awarded hereunder shall not constitute a waiver of the provision or condition or its enforceability by the City or Emerson.

34. Compliance with Laws. Emerson shall comply with Federal, State, and local laws, regulation and ordinances applicable to Agreement.

35. Governing Law and Venue. This Agreement shall be interpreted and governed by the laws of the State of California without regard to its choice or conflict of law. Venue with respect to any suit or proceeding brought under or in connection with this Agreement shall be the County of San Diego, State of California.

36. Integration Clause. This Agreement, including the documents incorporated by reference herein and attachments hereto constitutes the entire Agreement between the parties. The terms hereof may not be modified or amended except in writing signed by the authorized representative of both the City and Emerson.

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IN WITNESS WHEREOF, the Agreement is executed by the City of San Diego, acting by and through its Mayor or his designee, pursuant to Resolution No. R-_____ authorizing such execution, authorizing such execution, and by the Emerson pursuant to

_____.
(name of authorizing document authorizing contractor to sign)

EMERSON PROCESS MANAGEMENT
POWER AND WATER SOLUTIONS, INC.

By: Robt L Yeager

Name: Robert Yeager
PRESIDENT

Date: 5/7/08

CITY OF SAN DIEGO

By: _____

Name: _____

Date: _____

I HEREBY APPROVE the form and legality of the foregoing Agreement this _____ day of _____, 2008.

MICHAEL J. AGUIRRE, City Attorney

By: _____
Deputy City Attorney

G:\contract\CONTRACT FILES - jd-tj\Consultants\Facilities Control System Upgrades-MBC\Latest - ovation upgrade draft agreement clean 04242008R1 final draft (2 - JD) (3).doc

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# EXHIBIT A

# SCOPE OF WORK

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# 1. Overview

The existing Facilities control system at Metro Biosolids Center (MBC) is an Emerson WDPF Distributed control system with three data highway network. This system was designed, programmed and installed by Emerson about ten years ago with an expected life cycle of about twelve years. This system had been maintained on an as needed basis by Emerson with a separate maintenance contract with the City of San Diego. The existing system is near capacity and may not accommodate future plant control system expansion and accommodate new CIP project requirements.

The intent of this project is to address the concerns discussed above. Emerson shall provide a complete system upgrade that shall be: functional, balanced, and equivalent.

- Functional – This facility is fully operational and after the installation of the upgraded system by Emerson, shall be fully operational and the control system shall be functioning in the same manner as before.
- Balanced – The current system is designed with three data highways. The upgraded system by Emerson shall have no more than two networks, closely balanced with near equal capacity for future expansion.
- Equivalent – The upgraded system shall have the same operator interface functionality and graphics, utilizing existing inputs and outputs to the field devices and with same number of controllers.

The scope of work herein defined does not include every detail or every hardware and software list that would makeup the functional system upgrade.
It is the responsibility of the supplier/provider (Emerson) to review thoroughly the intent of this scope and include all necessary items in their proposal. The scope of work described herein is the minimum.

The City/MWWD will provide to Emerson availability of system. The maximum amount of downtime allowed for installation cutover is 30 hours per network. The maximum time allowed to freeze existing system modifications shall be one year, the start of this freeze period will be determined mutually between the City and Emerson.

The reader is advised to refer to the assumptions and limitations stated in section 12.

## 2. Design development

This section identifies some of the tasks and legacy interface systems associated with this upgrade by Emerson

### 2.1 Tasks

- Detailed review of Controller Source Code
- Network Layout and Design including any new cable/fiber
- Detailed review of Controller Hardware to be Migrated
- Review of Historian Migration
- Workstation Hardware upgrades or replacements to be included

## 2.2 Legacy System to Interface with upgraded system

Emerson shall implement the interface of these legacy systems into the upgraded control system

- QST/QLC Migration Solutions for HART protocol
- Building Control Unit Interface Solution
- Valve Master Stations
- Fire Alarm Monitoring
- Closed Circuit Television
- Energy monitoring
- Interface with COMC via X-windows
- Interface with existing PC X-window sessions
- Data link server manager and associated data links
- View existing loop drawings
- predefined custom user menus including Solaris Answer book
- Electronic documentation
- Netscape
- Printers
- Octopus
- Global Trends
- Review of "Forced Points" and Operator Entered Values

## 3. Training

*Emerson shall provide the following training to the City staff during all shifts and before the* beginning of the system cut over at the plant.

- Similar to existing HMI, Two 2day Ovation operator training spread over a one week period.
- Two 1 day I & C training spread over a one week period.

## 4. Testing and Commissioning

Emerson shall thoroughly test the system prior to the Factory acceptance test by the City

- Factory Acceptance test
  - Hardware testing comparable to South Bay Water Reclamation project
  - Software testing comparable to MBC Original factory test.
- Cut over – The plant operations cannot be down for more than 30 hours, downtime allowed for installation cutover. There can be two downtimes with a two ( not to exceed three ) week break in between.
- startup assistance – Emerson shall provide experienced, qualified staff during the entire cut over, startup and commissioning.
- Substantial completion: Successful completion of the thirty (30) day performance test similar to the South Bay Water Reclamation plant project test.
- Commissioning requirements shall be per specification 13400 for any newly installed Ovation I/O modules

## 5. Maintenance and spare parts

5.1 MAINTENANCE REQUIREMENTS

A. **General:** Emerson, the Distributed Control System provider (DCSP) shall maintain in complete operation the DCS furnished under this contract for a period of one year

from the date of the successful completion of the final 30 day performance test. All hardware required in the first year of this maintenance contract shall be covered by system warranty provisions. Maintenance personnel provided by the DCSP shall instruct the OWNER's personnel in the operation, adjustment, calibration and repair of equipment being serviced.

B. Independent of this agreement, the DCSP shall maintain and permit OWNER utilization of various DCS components which have successfully completed 30 day performance tests until the entire DCS has been successfully tested and accepted with each component in service being applied to its respective full intended usage. During this interim period between component utilization and system acceptance, (i.e., from the time of the completion of the System overall DCS (test) the DCSP shall maintain the utilized components in conformance with the requirements herein.

C. Corrective hardware maintenance shall be performed by factory-trained service technician(s) specifically trained for the digital equipment to be serviced. Technician(s) possessing suitable training and experience shall be provided to perform corrective maintenance on all other equipment. The hardware service technician(s) shall be on-site within 4 hours after notification by the OWNER. The service technician(s) shall be available for call 8 hours per day, 7 days per week.

D. Corrective system software maintenance shall be performed for all software provided by the DCSP and incorporated into the system prior to system acceptance. Software service programmers shall be available for call 8 hours per day, 7 days per week and on-site within 12 hours after notification by the OWNER. All preventative and corrective maintenance activities shall be performed at no extra cost to the OWNER and shall be documented with service reports which identify the equipment (or program) being serviced, condition of the equipment, description of all work performed, listing of all materials used, and the name and signature of the OWNER's representative attesting to the accuracy of the report. A copy of all service reports shall be delivered to the OWNER on the day work is performed.

E. Preventative hardware and software maintenance shall be performed at scheduled intervals to provide a dependable and operational system. A copy of all service reports shall be delivered to the OWNER on the day the work was performed.

F. As part of the Maintenance Contract, the DCSP shall provide Remote Diagnostic Support Service for on-line system performance analysis. The DCSP shall provide all required hardware to electronically connect the DCS to the DCSP'S main factory and local service facility, herein referred to at the DCSP'S service facilities, to enable the DCSP'S service specialists to assist in diagnosing application and system malfunctions. A quarterly report detailing the performance of the system, generated by the DCSP'S Remote Diagnostic software, shall be delivered to the OWNER in conjunction with scheduled preventive maintenance visits.

G. RESERVED

1. RESERVED.

2. RESERVED

3. RESERVED

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H. OWNER may have the option of adding this work to the existing maintenance contract already in place after successful completion of the final 30 day performance test.

5.2 SPARE PARTS, TOOLS AND TEST EQUIPMENT

I. **General:** The DCSP shall furnish all spare parts, tools and test equipment required to repair and calibrate the DCS and maintain it in good operating condition.

J. RESERVED

K. The DCSP shall provide the following spare parts and supplies in a quantity sufficient enough to maintain the DCS for a period of 2 years. Actual spare part requirements shall be based on each component published MTBF. As a minimum, spare parts and supplies shall include:

1. Two Ovation controller kits.
2. Six flash memory cards.
3. Two Ovation Hart modules.
4. Four multimode fiber to CAT 5 converters.
5. Two Ethernet 10 / 100 MB switches.
6. Three of each type power supplies.

## 6. Proposal Cost details

- Hardware Costs
- Software / Licensing Costs
- Warranty / Maintenance Costs
- Added Features
- Cost schedules and discounts
- Spare parts

## 7. Project Deliverables

- MBC Control and Graphics including custom user menus
- Electronic O & M updates of Hardware and Network
- All existing Systems that currently interface with the DCS will function after the migration
- Final Design Work
- Work Plan and Cut-over sequence
- Ovation Controller migration kit hardware
- Highway Hardware for two networks
- Interface to devices using HART protocol using HART high performance analog input module
- AMS (Asset Management System)
- Historian with RAID
- Database Server
- SCADA Server

- All required Ovation Migration Software
- Controller Software Conversion
- Graphics Software Conversion
- Validation that Converted Control and Graphics are functionally equivalent to the starting point MBC Control and Graphics
- Installation and cut-over of Ovation Migration Hardware and Software
- New Software server for each network
- FAT by control strategy for each process

## 8. Coordination

- Coordinate scheduling, submittals, and work of the various sections with both MBC Plant Staff and City Project Management to assure an efficient and orderly sequence of installation
- Verify utility requirements and characteristics of operating equipment are compatible with building utilities.
- Coordinate space requirements and installation of mechanical and electrical work. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and repairs.
- Coordinate completion and clean up work.
- Coordinate access to site to minimize disruption of Owner's activities, and operations.
- Coordinate with other contractors working on site to avoid impacting their operations.

## 9. Meetings

A. Preconstruction Meeting

Prior to commencement of work, a preconstruction conference will be held at a mutually agreed time and place. The Contractor's project manager and subcontractors shall attend the preconstruction conference. Other attendees will be:

- Construction manager
- Representative of the owner
- Others as requested by the Contractor, Owner, or Construction Manager.

The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The contractor shall be prepared to discuss:

- Contractor's tentative schedule
- Transmittal, review, and distribution of contractor's submittals
- Maintaining record documents
- Critical work sequencing
- Field decisions and change orders
- Use of project site, office and storage areas. Security, housekeeping, and owner's needs.
- Major equipment deliveries and priorities
- Contractor assignments for safety and first aid.

B. Site Mobilization Meeting for Fast Ethernet

The construction manager will schedule a meeting at the project site prior to contractor occupancy.

Attendance Required:

- Owner
- Construction Manager

- *Contractor*
- Subcontractors

Agenda

- Use of premises by Contractor
- Owner's requirement's
- Survey and building layout
- Security and housekeeping procedures
- Schedules
- Procedures for testing
- *Procedures for maintaining record documents*
- Requirements for startup of equipment.

C. Progress Meeting

The construction manager shall schedule regular on site progress meetings at least monthly and then weekly as required by the progress of work. The Contractor shall attend and may also bring its subcontractors.

The purpose of these meetings will be to review the progress of the work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the contractor is required to present any issues which may impact their work with a view to resolve these issues expeditiously.

D. Pre-installation and cutover meeting

The construction manager will convene a meeting prior to installation and cutover.

Attendance Required:

- Owner
- Construction Manager
- Contractor
- Subcontractors

The contractor will prepare an agenda and will discuss all aspects of what is involved with preparation, installation, cutover, testing and startup.

Contractor shall provide two weeks written notice before scheduling this meeting.

## 10. Submittals

A. General

- All submittals by the contractor shall be submitted to the City.
- The contractor shall provide a list of submittals with scheduled submission dates.
- Electronic copies of all files that were part of a submittal and created with MS Word, MS Excel, or Bentley Microstation, shall be submitted in their original format before the close of the project.. All other documentation must be scanned and submitted in Adobe Acrobat PDF format.
- Review and acceptance of submittals by the City does not relieve Emerson their responsibility of delivering a complete functional upgraded system.
- Contractor shall furnish three hard copies of shop drawings for review.
- All shop drawing submittals shall be accompanied by the Construction manger's standard submittal transmittal form.
- Transmittal forms shall be sequentially numbered. Re-submittals shall have the original number with alphabetic suffix.
- Except as otherwise noted, the construction manager will return a submittal to the contractor with comments noted within 30 calendar days following their receipt by the construction manager. It is considered reasonable that the contractor shall make a

complete and acceptable submittal to the construction manager by the second submission of the item.

- If the submittal is returned to the Contractor marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.
- If the submittal is returned to the Contractor marked "MAKE CORRECTIONS NOTED," formal revision and re-submittal of said submittal is not required unless specifically required.
- If the submittal is returned to the Contractor marked "REJECTED-RESUBMIT," THE Contractor shall revise the submittal and resubmit the required number of copies of said revised submittal to the Construction manager.
- All contractor submittals shall be carefully reviewed by an authorized representative of the contractor, prior to submission to the City. Each submittal shall be dated, signed, and certified by the contractor, as being correct.
- The construction manager and owners review of the shop drawing submittal shall not relieve the contractor of the entire responsibility for the correctness or errors in the contractor's submittal.
- The construction manager may schedule a submittal conference to provide for a rapid review of a submittal, should the project schedule warrant such a review.

B. DCS submittals – contractor shall provide three copies each for review.

- DCS Hardware submittal

  The hardware and system layout submittal shall be a singular all inclusive submittal that shall include a complete set of system diagrams which depict:

  - Hardware devices
    - Process control modules
    - Workstations
    - Historian systems
    - Video devices
    - Printers
    - Network and communication devices
    - UPS
  - Power, ground and communication requirements
  - Separation requirements between power ground and communication conductors.

  - Technical data sheets for each component together with a technical projects brochure or bulletin which show
    - The component name as used on project drawings.
    - Manufacturer's model number or other identifying product designation
    - Project tag number
    - Requirements for electric power
    - Specifications for ambient operating condition.
  - Site specific arrangement and construction drawings for all DCS equipment, including dimensions and identification of components. All drawings shall be accurately scaled and show the position of the equipment in it s intended installation location. All drawings must show a scaled representation of the placement of all DCS equipment being provided under this contract and its spatial relationship to all other equipment (both new and existing) located in the abutting and adjoining areas. All acquired access and clearances associated with the DCS equipment and other equipment must be shown with a statement

of compliance to manufacturer's recommendation, NEC and other applicable codes.
- Complete and detailed bill of material.

- DCS Software submittal
  - The software submittal shall be a singular all inclusive submittal that shall include:
    - SAMA printout from converted DPU source code of all drops.
    - A complete set of module configuration sheets depicting each loop linkage.
    - A complete set of all available software algorithms
    - A complete listing of DCS data base listing for each data points relative parameters such as range, contact orientation, limits, incremental limits, I/O card type, I/O hardware address and assignment.

- DCS Graphics submittal
  - The graphics submittal shall be a singular all inclusive submittal that shall include:
    - Converted graphics source code.
    - One complete set of all workstation accessible displays at MBC.

C. Loop Diagram Submittal
  - Loop diagrams shall be provided in accordance with ISA 5.4 to verify the DCS interfaces with all instrumentation and devices being provided or installed under this project. The loop diagrams shall be modified to match all new interfaces with equipment provided by Emerson. The following three-sheet format is required:

    - Sheet 1: A device schedule developed from an electronic spreadsheet or database file, which will be submitted with the loop diagrams. The table will show the following.

      - Device tag number, with Prefix, Unit Process, ISA Tag Prefix, Tag No. (a three or four-digit number based on the loop number) and Tag suffix
      - Equipment Service
      - Device Type
      - Location
      - Device Manufacturer
      - Model No.
      - Spec. No.
      - Area Contractor (if applicable)
      - Submittal No.

- Calibrated Range/Remarks
- Data Sheet No.
- I/O Signal type (AI, AO, DI, or DO)
- Signal Level
- Device Range (full available instrument range)
- Engineering Units
- Process Set Point
- Loop Diagram No., reflecting the field instrument tag number.
- Loop diagram File Name
- Interconnect Drawing File Name

- Sheet 2: Loop diagram meeting the Requirements of ANSI/ISA S5.4, except that intermediate terminal junction boxes may omitted and be shown on Page 3 for ciarity. Butt spiices and wire nuts shall be shown on as-builts, with the corresponding termination housing (JB, LB, etc. shown on Sheet 3

- Sheet 3: (Expansion sheet - required if the number of intermediate devices or terminal junction boxes exceeds what can be legibly shown on Sheet 2). Abbreviated diagram showing instrument, wire and cable numbers, intermediate terminal junction boxes, and PCM terminations. Wire identification numbers will reflect the field instrument tag number, and not the DCS I/O number.

- DCS I/O tag numbers will generally reflect the device tag number. Each I/O tag number will be unique. The tag prefix will be based on ISA-5.4, with the following additional special acronyms:

| Acronym | Signal Use |
|---|---|
| YL | Ready Signals/ Motor Run |
| ZL | In Computer status |
| ZSO | Device Open |
| ZSC | Device Closed |
| YL | Motor Run |

D. Safety Plan

The contractor shall submit two copies of a specific safety and security plan to the construction manager. The plan shall include:

- Generally address safe work procedures for the activities within the scope of work.

- Include provisions to protect all of the Contractor's employees on the work and other person's and organizations who may be affected by the work from injury, damage or loss.
- Comply with OSHA, CAL / OSHA and locally accepted safety codes and regulations.
- Include a designation of an on-site qualified safety representative responsible for the enforcement of applicable statues and safety rules.
- Include emergency response plans.
- Address hazardous communications
- Include security provisions for the Contractor's work, tools, and equipment.
- Documentation of compliance with their plan and accident and investigation reports.
- Confine space.

*The contractor shall be fully responsible for safety during performance of its work.*

E. Fast Ethernet Network Submittal

The Fast Ethernet submittal shall include a Communications System block diagram, including cable routing, cable identification, and locations of pull boxes, splices, and patch panels.

## 11. Fast Ethernet / Fiber optic Material Specifications

General – (Information listed on multimode fiber only)

- Current Technology: All data communication equipment and materials shall be the most recent field-proven models currently available from their manufacturers at the time of submittal of the Shop Drawings unless otherwise required to match existing equipment.

- Transmission Media: All transmission media, including connectors, patch panels, shall include a manufacturer 10-year extended product warranty. Manufacturers shall be Lucent Technologies, Corning or equal.

- Environmental Requirements: Equipment to be utilized indoors shall be rated for continuous operation under ambient environmental conditions of 0 degrees C to 50 degrees C (32 degrees F to 122 degrees F) and 10 percent to 95 percent relative humidity, non condensing. Fiber optic cables to be utilized indoors shall be rated for continuous operation under ambient environmental conditions of minus 40 degrees C to 70 degrees C (minus 40 degrees F to 158 degrees F). Under this requirement, fiber cables shall be rated higher than electronics and other equipment to ensure the use of quality performing fibers with minimal performance variation due to temperature fluctuation.

Fiber-Optic Cable

- The fiber-optic cable shall contain twelve optical fibers. Cable fibers shall not be twisted but shall lay parallel to each other within the cable. The cable shall be jacketed with a PVC sheathing material. Aramid yarn strength members shall cover the fibers and fill the remaining cable space, without a central strength member and with no metallic elements, to preserve the intrinsic

strength of the glass. Cables may not contain ripcords that may potentially damage fibers. All cables shall be from the same manufacturer, of the same cable type, and of the same size. Each fiber shall be continuous with no factory splices.

- Multi-mode, all-dielectric, tight-buffer cable with 12 optical glass fibers encased in primary polymer buffer.
- Indoor/outdoor distribution cable, riser-rated.
- 62.5 microns core diameter.
- 125 microns cladding diameter.
- Primary buffer encased in a secondary hard elastomeric polymer buffer.
- Flame-retardant, fungus-resistant PVC jacket with dielectric strength members and ripcord.
- UL-listed riser-rated OFNR, meeting NEC sections 770-519(b) and 770-53(b) for use in vertical runs in building riser shafts.
- Maximum attenuation (dB/kM): 3.5 at 850 nm, 1.0 at 1300 nm.
- Maximum short-term tensile load rating of 1400 n. (315 lbs).
- Maximum bend radius during installation = 20 times outside diameter.
- Minimum bend radius during installation = 10 times outside diameter.
- Minimum crush resistance: 1800 N/cm.
- Maximum optical attenuation after installation: 4.5 dB/kM at 850nm and 1.5 dB/kM at 1300 nm.
- Type: Corning Cable Systems MIC Riser cables.

Fiber Optic Termination Patch Panels

- A patch panel shall be provided at each cabinet that requires fiber-optic cable connections. All fiber sub-cables within the cable shall be terminated with "ST compatible" connectors. The patch panel shall have a fiber capacity equal to the total number of fibers (connected and spare) for all cables to be connected. Patch panels shall be designed for either rack mounting on a standard equipment rack or housed in an enclosure for direct wall mounting. The patch panel shall contain "ST" type bayonet couplings. All unused couplings shall have protective dust covers. All panels shall be furnished with locking doors. Factory-terminated, tight-buffered, agamid-reinforced fiber optic jumper assemblies or interconnect cables, standard 3.0 mm O.D., shall connect the optical cable terminations to the patch panel couplings. Panels shall be equal to the following manufactured by Siecor:

| Mounting | Fiber Capacity | Model Number |
|---|---|---|
| Rack | 48 | C.H.-02U |
| Rack | 72 | C.H.-03U |
| Wall | 48 | AC-048L with lock |
| Wall | 72 | AC-072L with lock |

The patch panel shall be equipped with a suitable means for routing and securing of cables and shall provide a suitable means of protection for the mounted fiber connectors, to prevent damage to fibers and connectors during all regular

operation and maintenance functions. All cables shall be provided with strain relief. Bend diameters on cable fibers and jumpers must be greater than four (4) inches at all times to ensure optical and mechanical integrity of the optical fibers.

Optical Connectors

- All connectors shall be field-install able and perfectly matched to the cable used. The connectors shall provide tight fitting termination to the cladding and buffer coating. Epoxy-based or "hot melt " adhesives shall be used to bond the fiber and buffer to the connector ferrule and body prior to polishing the end face. No dry-termination or "quick crimp" connectors are allowed.

- After termination with connectors, the fiber ends must be visually inspected at a magnification of not less than 100 power to check for cracks or pits in the end face of the fiber. If any irregularities found cannot be removed by further polishing, the entire process must be redone by cutting off and disposing the connector body.

- Connectors shall have a maximum allowable connection loss of 0.3 dB per mated pair, as measured per EA.-455-34. No index-matching gel is to be used, dry interfaces only. Connectors must be capable of mounting on either 0.9 mm buffered fiber or 3.0 mm cordage.

- Each connector shall be of the industry standard ST type compatible, designed for and shall meet or exceed the applicable provisions of EA.-455-5, 455-2A, and 455-34, and shall be capable of 100 repeated matings with a maximum loss increase of 0.1 dB. Connectors shall incorporate a keyway design and shall have a zirconia ceramic ferrule. Connector bodies and couplings shall be made of corrosion-resistant and oxidation-resistant materials, such as nickel plated zinc, designed to operate in humid environments without degradation of surface finishes.

Fiber Optic Connectors

- Fiber-optic connectors shall be the straight tip (ST type), bayonet style, and field installable, self-aligning and centering. Fiber-optic connectors shall match the fiber core and cladding diameters. The connector coupler shall be nickel plated, and the alignment ferrule shall be ceramic. The connector shall have a short boot for strain relief. Fiber-optic equipment and cable shall use the same type connectors for correct mating. Connector insertion loss shall not exceed 0.3dB. Connectors must be capable of mounting on either 0.9 mm buffered fiber or 3.0 mm cordage. The connector shall be Lucent Technologies Series ST II, or equal.

Fiber Patch Cords

- Fiber patch cords shall consist of buffered, graded-index fiber with a 62.5 □m core and a 125 micrometer cladding consistent with all fiber properties required under Paragraph 2.2.B. The fiber cladding shall be covered by aramid yarn and a jacket of flame-retardant PVC. Duplex fiber jumpers/patch cords with a factory installed connectors and a tension rating of 888 N (200-pound) on the

cordage shall be provided. Cable retention shall be 220 N (50-pound) minimum, and connection repeatability shall yield 0.20 dB maximum change per 100 reconnects with ST connectors attached. Factory produced patch cords shall be of cordage sized at 3.0 mm and utilize straight tip (ST) connectors that provide a pull-proof non-optical disconnect feature. The patch cords shall be Lucent Technologies Series FL2EP-EP, or equal.

Spare Parts and Tools

- Furnish to the CONSTRUCTION MANAGER all necessary tools and spare parts of components required to maintain the system. Prior to final acceptance of work, provide a spare parts listing of all necessary spare parts and quantities for review by the CONSTRUCTION MANAGER. Tools shall include equipment needed to make fiber connectors or fiber optic cable. The spare parts shall include the following minimum requirements:

MINIMUM SPARE PARTS LIST

| No. | Part Description | Quantity |
|---|---|---|
| 1 | Fiber-Optic Cable | 200 Feet |
| 2 | Fiber-Optic Connectors | 24 each |
| 3 | Fiber-Optic Splices | 24 each |
| 4 | Fiber-Optic Patch Cords | 24 each |
| 5 | Fiber-Optic Splice Closure (Trays & Encapsulates) | 2 each |

2. Execution

GENERAL

- All system components and appurtenances shall be installed in accordance with the manufacturer's instructions and as indicated. Conduits shall be used for installation of fiber-optic cables. Each fiber-optic cable entering a cabinet shall be terminated at a patch panel. All fibers in the cable shall be terminated. Interfacing between a fiber-optic cable and a fiber-optic communications module shall be through a patch panel.

- A short cable slack of 10 feet minimum for repair shall be provided for all Fiber-Optic Cable Segments (FOCS) longer than 100 feet.

- All necessary interconnections, services, and adjustments required for a complete and operable data transmission system shall be provided. Verify the complete operation of the data transmission system in conjunction with field testing associated with systems supported by the fiber-optic data transmission system. Prior to formal acceptance testing, field tests shall include a power

attenuation test and a gain margin test. These tests shall be performed on each link and repeated from the opposite end of each link.

Power Attenuation Test:

Power attenuation test shall be performed at the light wavelength of the transmitter to be used on the circuit being tested. The flux shall be measured at the receiver end and shall be compared to the flux injected at the transmitter end. There shall be a jumper added at each end of the circuit under test so that end connector loss shall be validated. Rotational optimization of the connectors will not be permitted. If the circuit loss exceeds the calculated circuit loss by more than 2 dB, the circuit is unsatisfactory and shall be examined to determine the problem. The CONSTRUCTION MANAGER shall be notified of the problem and what procedures the CONTRACTOR proposes to eliminate the problem. Prepare a report documenting the results of the test. The report shall be submitted to the CONSTRUCTION MANAGER

- Verify all switches have the right configuration.
- Test all cat 5 / fiber converters.
- Identify and test all installed fiber optic cables.
- All cat 5 cables that require modification (connector rewiring / repining) should be modified before network installation.
- Test network connectivity before switching over DCS highway.
- Test network redundancy before switching over DCS highway.

## 12. Assumptions and Limitations

- Replacement of Q-Line I/O with Ovation I/O not necessary; except where noted/recommended.
- No combining of two or more WDPF Controllers into one Ovation Controller
- Use existing fiber optic cable and install fiber optic cable as needed.
- No more than two Fast Ethernet Networks
- No changes or additions to Control Software or Graphics after freeze; All Graphics will be converted and operate as before the upgrade
- Project Management and Coordination with both MBC Plant Staff and City Project Management.
- The City will review and accept all submittals, designs submitted by Emerson. The City will participate in co-ordination meetings.
- Existing Historians, HSR, need to be maintained during and accessible after the migration process is complete
- The planned phased cutover from WDPFII DPU's to Ovation controllers will be coordinated with MBC plant staff and City Project Management staff. This should have minimum impact on operations at the facility. If a halt to operation, or outage, is mandatory to facilitate a planned phased cut over, the maximum downtime allowed for installation cut over is thirty (30) hours. The effect of an outage will mandate a recovery

period of two (2) weeks, not to exceed three (3) weeks, for the Plant Operators. There will be no planned phased cut over during the recovery period.

- Emerson will assist with restarting the plant
- Spare capacity of Network shall be 40% for future growth.

- Emerson shall provide the Latest software/firmware Revision available at the time of Factory Acceptance Test (FAT)

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# EXHIBIT B

## SCHEDULE OF WORK

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## MILESTONE SCHEDULE

| MILESTONE | % OF CONTRACT PAYMENT | EST. COMPLETION DATE | WRITTEN DELIVERABLE |
|---|---|---|---|
| Notice to Proceed | | June 2008 | |
| Upon Approval of Hardware Submittal | 10% | August 2008 | Hardware Submittal form with Approval status from the City. |
| Upon Approval of Software Submittal and graphics | 10% | January 2009 | Software Submittal form with Approval status from the City. |
| Upon Hardware Complete on Test Floor (San Diego) | 45% | February 2009 | Approved Hardware Submittal form used as a bill of material, inventoried in San Diego, and verified by the City |
| Upon Start of Factory Acceptance Test | 10% | May 2009 | Factory Acceptance Test Submittal form with Approval status from the City and the actual start of the test itself. |
| Upon Completion of Factory Acceptance Test | 10% | September 2009 | City Signed Factory Acceptance Test Procedure. |
| Upon Phased Installation, Cutover and Checkout Complete | 10% | March 2010 | City Signed Phased Installation, Cutover and Checkout Procedure. |
| Upon Closeout | 5% | September 2010 | City issued Notice of Completion . |

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# EXHIBIT C

## PRICE SCHEDULE

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| | | | | | |
|---|---|---|---|---|---|
| 4 | Cutover | 62 | | | $47,973 |
| 5 | Submittals (Hardware, Software & Graphics) | 62 | | | $47,973 |
| 6 | Factory Acceptance Test (100 days) | 300 | | | $232,125 |
| 7 | 30 Day Acceptance Test | 5 | | | $3,869 |
| 8 | O&M Manual Updates | 22 | | | $17,023 |
| 9 | Graphic Conversion | 462 | | | $357,473 |
| 10 | Software Conversion | 740 | | | $572,575 |
| 11 | Fast Ethernet Submittal -System Layout | 12 | | | $9,285 |
| 12 | Safety/Security | 5 | | | $3,869 |
| 13 | Training (2 sessions for 2 wks w/5 training units & 2 instructors) | | | | $116,719 |
| 14 | Startup Assistance | 565 | | | $522,060 |
| 15 | Travel & Living Expenses | | | | $305,507 |
| | | | | | |
| | | | | | |
| | | | TOTAL EPM LABOR, III | | **$3,067,923** |
| | | | | | |
| | SOFTWARE CHANGES - IV | | | | |
| | | | | | |
| ITEM | DESCRIPTION | | QTY | UNIT PRICE | EXT. PRICE |
| 1 | Add an AI | | NA | $289 | $0 |
| 2 | Add an AO | | NA | $288 | $0 |
| 3 | Add a DI | | NA | $285 | $0 |
| 4 | Add a DO | | NA | $285 | $0 |
| 5 | Add an ITM Interface | | NA | $289 | $0 |
| 6 | Add a FDIM Interface | | NA | $289 | $0 |
| | | | | | |
| | | | TOTAL SW CHANGES, IV | | $0 |
| | ATTACHMENT A - 3RD PARTY SERVICES - LABOR, V | | | | |
| | | | | | |
| ITEM | DESCRIPTION | VENDOR | QTY | UNIT PRICE, $/HR | EXT. PRICE |
| 1 | UL Listing | UL Inc. | 1 | $15,888 | $15,888 |
| 2 | Microstation Drawings - Network Layout & HART Loops | C. Hackney | 1 | $24,000 | $24,000 |
| | | | | | |
| | | | | | |
| | | Sub Total | | | $39,888 |
| | | Markup | 15% | | $5,983 |
| | | Total | TOTAL 3RD PARTY LABOR, V | | **$45,871** |
| | ATTACHMENT B - 3RD PARTY SERVICES - MATERIAL/EQUIPMENT, VI | | | | |
| | | | | | |
| ITEM | DESCRIPTION | VENDOR | QTY | UNIT PRICE | EXT. PRICE |
| 1 | Fiber Optic Cable Installation, Patch Panels, & Ethernet Cabling | Atlas Fiber | 1 | $187,641 | $187,641 |
| | | | | | |
| | | | | | |
| | | Sub Total | | | $187,641 |
| | | Markup | 15% | | $28,146 |
| | | Total | TOTAL 3RD PARTY EQUIP, VI | | **$215,787** |
| | TOTALS | | | | |
| | EPM SUPPLIED EQUIPMENT(MFR), I | | | | $2,496,860 |
| | EPM SUPPLIED 3RD PARTY EQUIPMENT (OEM), II | | | | $21,208 |
| | EPM LABOR, III | | | | $3,067,923 |
| | SOFTARE CHANGES, IV | | | | $0 |
| | ATTACHMENT A - 3RD PARTY SERVICES - LABOR, V | | | | $45,871 |
| | ATTACHMENT B - 3RD PARTY SERVICES - MATERIAL/EQUIPMENT, VI | | | | $215,787 |
| | **TOTAL** | | | | **$5,847,649** |
| | **SALES TAX (Item I & II) "not included in TOTAL above"** | | | | **$195,150** |

**Facilities Control System Upgrades - MBC**
**Price Proposal Form**



**BASE CONTRACT - LUMP SUM PRICING** **EXHIBIT C (Page 1 of 2)**

| | EMERSON (MFR) SUPPLIED EQUIPMENT - I | | | | |
|---|---|---|---|---|---|
| | | | | UNIT PRICE/ | |
| ITEM | DESCRIPTION | | QTY | LIST | EXT PRICE |
| 1 | Ovation Hardware | | 1 Lot | | $1,442,410 |
| | WDPF to Ovation Migration Kits | | 41 | | |
| | HART Modules w/cables | | 48 | | |
| 2 | Network Hardware | | 1 Lot | | $117,380 |
| | Ethernet Switches | | 21 | | |
| | Copper to Fiber Media Converter | | 56 | | |
| | Rack Mount Media Converter Kits | | 10 | | |
| | Redundant Power for Rack Mount Media Converter | | 10 | | |
| 3 | Workstations w/Software | | 1 Lot | | $709,380 |
| | Ultra 25, Single Hard Drives | | 14 | | |
| | Ultra 25, Dual Hard Drives | | 3 | | |
| | AMS-Workstaiton | | 1 | | |
| | Monitors - 19" | | 11 | | |
| | RAID | | 3 | | |
| 4 | Spare Parts | | 1 Lot | | $99,470 |
| | HART Analog Input EM | | 2 | | |
| | HART Cables (Pre-fab Cables - 20') | | 3 | | |
| | 13/24V DAPS | | 3 | | |
| | WDPF-to-Ovation Migration Kit for Q-Line (OCR -400) | | 2 | | |
| | Root Ethernet Switch | | 2 | | |
| | Media Converter | | 4 | | |
| | Media Converter Rack Power Supply | | 3 | | |
| | Sun XVR 100 Graphic Card | | 1 | | |
| | RAID | | 1 | | |
| | 128MB Flash Memory Card | | 6 | | |
| | | | | | |
| | 1-yr Warranty | | | | $128,220 |
| | | | | | |
| | Sub Total | | | | $2,496,860 |
| | Sales Tax | | | | See Below |
| | Total | | | TOTAL MFR, I | **$2,496,860** |

| | THIRD PARTY (OEM) SUPPLIED EQUIPMENT - II | | | | |
|---|---|---|---|---|---|
| ITEM | DESCRIPTION | | QTY | UNIT PRICE | EXT PRICE |
| 1 | AMS Software | | 1 | $10,160.00 | $10,160 |
| 2 | Server Switches | | 1 | $8,282.00 | $8,282 |
| | | | | | |
| | | | | | |
| | Sub Total | | | | $18,442 |
| | Sales Tax | | | | See Below |
| | Markup | 15% | | | $2,766 |
| | Total | | | TOTAL OEM, II | **$21,208** |

| | EPM LABOR - III | | | | |
|---|---|---|---|---|---|
| | | Days | Hours | | |
| ITEM | DESCRIPTION | | QTY | UNIT PRICE $/HR | EXT PRICE |
| 1 | Project Management and Meeetings | 235 | | | $181,831 |
| 2 | Configuration and Testing | 540 | | | $417,825 |

## ADDITIONAL SERVICES - TIME & MATERIAL (Page 2 of 2)

Emerson manufactured items that may be required for the performance of any modification to this Agreement shall be billed with a 45% discount off list price as set forth in the Emerson "List Price Book", OEM items (manufactured by others) shall be billed at current list price; third party services and equipment shall be procured only after approval of the City's Project Manager, and billed at third party invoice plus 15%.

The hourly labor rate for labor (including maintenance, engineering, software updates/modifications, etc.) shall be billed as follows and shall include actual work, approved standby time, and travel time of one-hour per day for planned work.

1) Engineer Rate $ 185.00 per hour
2) Technician Rate $ 102.00 per hour

Pricing for future labor added under Additional Services after date of execution will be adjusted in accordance with the Bureau of Labor (BLS) Employment Cost Index (ECI) "Table 5. Compensation (Not Seasonally Adjusted): Employment Cost Index for total compensation, for private industry workers, by occupational group and industry" or shall be revised upon mutually agreeable indexes. The above stated hourly labor rates are indexed to the December 2007 BLS ECI and shall be adjusted annually from that date.

# EXHIBIT D

## TECHNICAL SPECIFICATIONS

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000745

# SECTION 01310 - PROGRESS SCHEDULE

## PART 1 - GENERAL

### 1.1 REQUIREMENTS OVERVIEW

A. The CONTRACTOR'S planning, scheduling and execution of the contract work shall be presented to the OWNER by submission of the progress schedule information and data specified in this Section.

B. The WORK under this contract will be planned, scheduled, executed, and reported by the CONTRACTOR using a cost-loaded CPM (Critical Path Method) schedule within a Work Breakdown Structure specified by the CONSTRUCTION MANAGER. The CONTRACTOR will adhere to established technical standards for CPM scheduling using a computerized precedence diagram method. The CONTRACTOR is required to provide baseline and status data using a hard copy and DVD or CD format specified by the CONSTRUCTION MANAGER.

C. Within seven (7) calendar days after the Notice To Proceed, the CONSTRUCTION MANAGER will convene a meeting regarding the use of CPM schedules for the Project. The CONTRACTOR shall make certain that its Project Manager(s), and Superintendent(s), and those of the major Subcontractors, as well as any scheduling consultants they may employ, attend this meeting. During this meeting, the CONSTRUCTION MANAGER will describe the objectives of using CPM schedules, the procedures and requirements for the preparation and use of the CONTRACTOR'S Construction Schedule, and any special requirements the CONSTRUCTION MANAGER has for the CONTRACTOR'S schedules.

D. The CONTRACTOR is responsible for coordinating his own schedules (including subcontractors) as well as construction activities of others as directed by the CONSTRUCTION MANAGER. The CONSTRUCTION MANAGER will maintain the overall Project Construction Schedule, of which the CONTRACTOR'S Construction Schedule will be a part. The CONTRACTOR should refer to the Project Construction Schedule to ensure that project site coordination and work by others at the site properly depicts the CONTRACTOR'S planning.

E. All schedules shall be in accordance with the requirements of the Contract. The CONSTRUCTION MANAGER'S review or acceptance of any schedule shall not relieve the CONTRACTOR from responsibility for complying with the Contract requirements, adhering to those sequences of work indicated in or required by the contract documents, or from completing any work omitted from the schedule within the Contract Time.

### 1.2 SOFTWARE/INTERFACE REQUIREMENTS

A. The CONTRACTOR shall use CPM scheduling software to produce the contract schedules and reports as specified herein. This software shall run on IBM PC compatible equipment, be commercially available for lease or purchase, and be capable of processing and plotting schedule data as specified in this Section. Except for the Weekly Rolling Schedule the CONTRACTOR shall provide all schedules and schedule updates on DVD or CD. The schedule files shall be in Primavera Project Planner (P3) format for Windows (preferred) or Microsoft Project.

B. Within seven (7) calendar days after the Notice to Proceed, the CONTRACTOR shall submit, for review and acceptance by the CONSTRUCTION MANAGER, descriptive information on the CPM software and the resumes of scheduling personnel the CONTRACTOR intends to use in compliance with the requirements of this Section.

1.3 QUALITY ASSURANCE

A. Reserved

B. In preparing all contract schedules, it is the responsibility of the CONTRACTOR to work with each subcontractor and supplier to obtain information pertinent to the planning and updating of their respective activities and schedules.

1.4 DEALING WITH SUBSTITUTES

A. All schedules prepared by the CONTRACTOR shall be based solely on the WORK as awarded, and shall not include any substitute proposals, even if the CONTRACTOR pursues a substitution in accordance with provisions of the Contract.

B. The OWNER'S final determination on any proposed substitutions may not be made until after the CONTRACTOR'S Construction Schedule is prepared and accepted as provided in this Section.

1.5 USE OF FLOAT

A. **Total float and contract float belong to the project and are not for the exclusive benefit of any party.** *Total Float is the number of days by which a part of the WORK in the Construction* Schedule may be delayed from its early dates without necessarily extending the Contract Time. Contract Float is the number of days between the CONTRACTOR'S anticipated date for early completion of the WORK, or specified part, and the corresponding Contract Time. They shall be available to the OWNER, the CONSTRUCTION MANAGER, their consultants, or the CONTRACTOR, to accommodate changes in the WORK, or to mitigate the effect of events which may delay performance or completion. The CONSTRUCTION MANAGER will monitor and optimize the use of float for the benefit of the Program.

1.6 EARLY COMPLETION

A. An early completion schedule is one which anticipates completion of all or specified part of the work ahead of the corresponding Contract Time. Since Contract float belongs to the project, the CONTRACTOR shall not be entitled to any extension in Contract Time, or recovery for any delay cost incurred because of extensions in an early completion date, until all Contract Float is used or consumed and performance or completion of the WORK extends beyond the corresponding Contract Time.

1.7 FLOAT SUPPRESSION

A. Float suppression techniques are prohibited. The CONTRACTOR shall remove any float suppression techniques, e.g., preferential sequencing (crew movements, equipment use, for reuse, etc.), extended durations, imposed dates, scheduling of non-critical work, artificial logic, and

others, as a prerequisite to a request for an increase in Contract Price or Contract Time. Use of any type of schedule constraint requires prior approval by the CONSTRUCTION MANAGER.

1.8 NON-COMPLIANCE

A. The CONSTRUCTION MANAGER may refuse to recommend the whole or part of any payment if, in the CONSTRUCTION MANAGER'S opinion, the CONTRACTOR'S failure, refusal or neglect to provide the required schedule information precludes proper evaluation of the CONTRACTOR'S progress. The OWNER may withhold from any payment a set-off, if in the OWNER'S opinion, the CONTRACTOR'S failure refusal or neglect to provide the required schedule information precludes a proper evaluation of whether or not the CONTRACTOR is prosecuting the WORK with the diligence that will ensure its completion within Contract Time.

B. The OWNER reserves the right to have the CONSTRUCTION MANAGER assist the CONTRACTOR in the preparation of schedule which is overdue by more than 10 days, and the CONTRACTOR shall reimburse the OWNER for all associated costs. In the event the CONTRACTOR fails to pay those costs within 30 days after receipt of an invoice from the OWNER, the OWNER shall be entitled to a decrease in Contract Price or to withhold a set-off against any amounts recommended for payment. The CONSTRUCTION MANAGER'S assistance with schedule preparation shall not relieve the CONTRACTOR of his responsibilities for determination of the methods, techniques, and sequences for the performance of the WORK.

C. The CONTRACTOR agrees that the CONTRACTOR'S failure, neglect, or refusal to comply with the requirements of this Section, or any portion thereof, constitutes a material breach of the CONTRACTOR'S obligations under this Contract. The CONTRACTOR recognizes and agrees that such failure, neglect, or refusal prejudices the OWNER'S and the CONSTRUCTION MANAGER'S ability to recognize and mitigate delay, and such failure, neglect, or refusal prevent the timely issuance of extensions of Contract time, when such extension may be warranted. Therefore, the CONTEACTOR herby waives all rights to additional costs or time extensions due to delays or accelerations that result from or occur during periods of time that CONTRACTOR fails, neglect, or refuses to fully comply with the requirements of this Section.

D. These remedies for the CONTRACTOR'S failure, neglect or refusal to comply with the requirements of this Section are in addition to, and not in limitation of, those provided under other sections of the Contract.

**PART 2 - PRODUCTS**

2.1 CONTRACT SCHEDULES - GENERAL CRITERIA

A. Contract schedules include the CONTRACTOR'S Mobilization Schedule, all versions of the CONTRACTOR'S Construction Schedule including baselines, monthly updated schedules, revised schedules, and recovery schedules, and weekly rolling schedules. All Contract Schedules are prepared by the CONTRACTOR and reflect the CONTRACTOR'S plans for and status of the WORK. The CONTRACTOR shall provide three (3) copies of all Contract Schedules, except for weekly rolling schedules of which the CONTRACTOR shall provide enough copies for distribution at scheduled Progress and Coordination meetings.

B. The Contract Schedules shall show the breakdown of work into activities and relationships only to the extent required to effectively manage the work. The Contract Schedules shall show the division of the WORK into activities and specify the progression from the Notice to Proceed to the completion of the WORK. Each construction activity shown on the Contract Schedules will have a respective budget value, a portion of the Contract Price. The Contract Schedule shall include appropriate time allowances for submittals, items of interface with work performed by others, and specified Construction, Physical Checkout, Field Test, Functional Test, Start-up and Performance Test activities. Site-related activities shall not reflect a combining of work located in separate structures, work corresponding to different specifications, work performed by different subcontractors (first and second tiers), or rough-in and finish work of the same trade. Power and control wire shall not be scheduled together in the same activity. Work being performed by MBE/WBE firms shall be identified by a distinguishable coding. All activity durations shall be in work days.

C. The CONTRACTOR'S Construction Schedule shall include all procurement related activities which lead to the delivery of permanent materials to the site. Procurement activities include but may not be limited to preparation of shop drawings, review and acceptance of shop drawings, materials fabrication, and materials delivery. Upon written approval by the CONSTRUCTION MANAGER, these activities may be displayed or reported as a separate Off-Site Activities Schedule, properly correlated to the CONTRACTOR'S Construction Schedule.

D. The CONTRACTOR shall schedule those requisite duties and responsibilities of the OWNER, the CONSTRUCTION MANAGER and others (performing work for the OWNER) indicated in or required by the Contract Documents. The Contract Schedules shall incorporate appropriate activities and sequences based on the information given in the Contract Documents, and if not given, as indicated by the CONSTRUCTION MANAGER in writing.

E. The CONTRACTOR shall plan the WORK and provide for and allocate resources in the execution of the WORK so that the proportion of the incomplete schedule activities with float of five work days or less shall not exceed 20% of all incomplete schedule activities, unless approval for a greater proportion is granted by the CONSTRUCTION MANAGER.

2.2 COST LOADING

A. All construction activities shall be cost and man-hour loaded by the CONTRACTOR. Procurement related activities shall not be cost or man-hour loaded except as approved or directed by the CONSTRUCTION MANAGER. Cost fields shall be set to zero decimal places. Each field activity will be assigned a budget value for labor, materials and equipment. The sum of all budget values assigned shall equal the Contract total. The CONTRACTOR shall also assign estimated man-hours for each construction activity.

B. Man-hours shall be assigned to a resource named MH. Labor shall be assigned to a resource named LAB. Material cost will be assigned to a resource named MAT. Equipment cost will be assigned to a resource named EQP. Labor cost, estimated man-hours and activity duration shall be in correct proportion such that labor cost/man-hour yields a reasonable labor rate, and computed crew size as determined by man-hours/activity duration/8 is reasonable for the activity. In addition, construction activities for work which requires the following materials shall be loaded with the estimated quantities of the material to be used as listed below.

Resource

| Designator | Description | Units |
|---|---|---|
| EXC | Excavation | Cubic Yards |
| FIL | Fill Material | Cubic Yards |
| CIP | Cast-in-Place Concrete | Cubic Yards |
| RTN | Reinforcing Steel | Tons |
| ASP | Asphalt Paving | SF |
| CSF | Concrete Flatwork | Square Feet |

C. If the WORK includes items covered by allowances, the CONTRACTOR shall include one activity in the schedule for each allowance which is loaded with the cost of that allowance. The activity shall be scheduled as directed by the CONSTRUCTION MANAGER.

D. The CONTRACTOR shall prepare a Summary of Values which lists all Contract activities and their respective budget values that were developed in the cost loading process. The budgets shown in the Summary of Values will be the basis for determining the values earned as the work is accomplished, e.g., physical percent complete times the activity budget.

2.3 CONTRACTOR'S MOBILIZATION SCHEDULE

A. The initial schedule for the Contract work shall be the CONTRACTOR'S Mobilization Schedule, which is a bar chart schedule covering the first thirty (30) calendar days of work to be performed, starting with the Notice To Proceed. The CONTRACTOR'S Mobilization Schedule shall be cost loaded as described above and as directed by the CONSTRUCTION MANAGER and will be used as a basis for the initial Application for Payment covering the first full month of work. The cost loaded CONTRACTOR'S Mobilization Schedule will not be used as a basis for progress payments beyond the first full month.

B. When the CONTRACTOR'S Mobilization schedule is received and accepted by the CONSTRUCTION MANAGER, it becomes the basis for construction planning and updating until it is superseded by the accepted CONTRACTOR'S Construction Schedule.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. CONTRACTOR shall use the work breakdown structure (i.e. project, facility, and C.S.I. codes) and guidelines for developing the activity number and coding structures shown in Appendix A. The CONTRACTOR shall produce a Construction Schedule which will be an accurate representation of the proposed means and methods for accomplishing the WORK. This schedule will show all logical relationships and constraints between activities.

B. The CONTRACTOR'S Construction Schedule shall consist of a minimum of the following:

1. A time scaled CPM Plot on D size paper sorted by area, total float, early start and early finish. The plot must clearly and legibly show all activities and logical ties and shall display each activities title, original duration, remaining duration and total float value. The plot must also show the critical path for completion of the WORK.

2. Four tabular activity reports sorted by
   a. Bid Item, Activity ID
   b. Bid Item, Responsibility, Activity ID
   c. Bid Item, Area, Early Start Date, Early Finish Date

d. Total Float, Early Start, Early Finish

The Activity Reports shall include activity description, total duration, early start and finish dates, late start and finish dates, free float, total float, percent complete and remaining duration.

3. A tabular logic report sorted by Activity ID including activity description, total duration, early start and finish dates, late start and finish dates, free float, total float, percent complete, remaining duration and detailed predecessor and successor information for each activity, including any lag.

4. A tabular cost report sorted and sub-totaled by bid item, area and responsibility showing activity number, activity description, budgeted cost, physical percent complete, actual cost to date, actual cost for the current period and estimate to complete.

5. A detailed list of any added or deleted activities, changed actual dates, changes made to schedule activity descriptions, original durations, budgets or logic since the last revision.

6. A histogram showing on a monthly and cumulative basis the earned value of man-hours as compared to the approved baseline schedule.

7. A histogram showing on a monthly and cumulative basis the earned value of each loaded resource, e.g. cast in place concrete, as compared to the baseline schedule.

8. A schedule narrative.

9. An electronic copy of the schedule on DVD or CD. The schedule files shall be in Primavera Project Planner (P3) format.

10. Any other reports or plots requested by the CONSTRUCTION MANAGER.

The exact layout of the above required reports is subject to the approval of the CONSTRUCTION MANAGER. Except for the CPM plot, all reports and charts shall be printed on 81/2 x 11 paper and shall be comb-bound.

C. When the CONTRACTOR'S Construction Schedule is reviewed and accepted it becomes the baseline CONTRACTOR'S Construction Schedule. From then on, all activities and their relationships may not be changed, added, or deleted without the consent of the CONSTRUCTION MANAGER.

2.5 SCHEDULE UPDATE

A. Updating the CONTRACTOR'S Construction Schedule and scheduling of changes and other events affecting the schedule is the responsibility of the CONTRACTOR. Contract Time (including all contracted milestones) shall not be changed without a formal Change Order approved by the OWNER.

B. The contractor shall update the CONTRACTOR'S CONSTRUCTION SCHEDULE each month. Updating the schedule shall consist of the following:

1. Updating Activity Status:

Each month the CONTRACTOR shall enter percent complete, remaining duration, actual start, and actual completion dates into the schedule and recalculate the schedule based on the payment cutoff date for that month. Percent complete shall be the percent agreed to by the CONSTRUCTION MANAGER at the monthly schedule meeting. Remaining duration shall be the CONTRACTOR'S best estimate of the time required to complete activities which have started but not yet complete. Percent complete and remaining duration shall be arrived at independently for each activity. The remaining duration shall not be automatically calculated by the scheduling software based on the percent complete. The retained logic method of schedule calculation shall be used to calculate the schedule unless otherwise approved by the CONSTRUCTION MANAGER.

2. Corrections to the Schedule:

Each month, the CONTRACTOR shall make those corrections to the schedule which has been identified by the CONSTRUCTION MANAGER since the last update. Generally, these corrections will include but may not limited to correction of inaccurate actual dates, correction of logic for activities which did not start or finish as scheduled and are being driven by the data date, inaccurate representation of contract milestones, missing actual start or completion dates, incorrect budget or actual cost amounts, and out of sequence progress. The CONTRACTOR shall also correct any similar errors he is aware of and shall inform the CONSTRUCTION MANAGER of any such corrections.

3. Revisions to the Schedule:

Schedule Revisions are defined as any change to schedule activities or logic other than the updating of actual start and completion dates, percent complete or remaining duration. All schedule revisions must be approved by the CONSTRUCTION MANAGER in advance. Schedule revisions shall be based on the upon impact to the schedule of changes in the work or other delays as agreed to by the CONSTRUCTION MANAGER during negotiations for the change or other impact in question. The specific activities added and their logical ties to existing schedule activities shall be explained in detail in the schedule narrative. After any schedule impact is negotiated and the specific activities and logic to be added have been approved, the CONTRACTOR shall promptly incorporate the revision into the schedule prior to the next update. Added activities shall be coded as directed by the CONSTRUCTION MANAGER indicating which RFP they are associated with. Revisions shall be man-hour and resource loaded. No cost shall be added to the schedule until after a Change Order or field order has been issued.

C. Each schedule update will include the same reports and plots required for the initial submittal of the CONTRACTOR'S Construction Schedule, or as requested by the CONSTRUCTION MANAGER.

D. The resource/cost percent complete field, or it's equivalent in scheduling software other than P3, shall not be used. The amount payable to date of any activity shall always be equal to the physical percent complete of the activity multiplied by the budgeted value for the activity.

2.6 Reserved

2.7 SCHEDULE NARRATIVE

A. The Schedule Narrative accompanying the initial submittal of the CONTRACTOR'S Construction Schedule shall describe the general sequence of the work, the critical path, any long lead equipment, any physical constraints to completing the work and any assumptions made in developing the schedule.

B. The Schedule Narrative accompanying each update to the CONTRACTOR'S Construction Schedule and shall, at a minimum, address the following:

1. Milestones Completed
2. A descriptive summary of each revision incorporated into the schedule since the last update and it's affect on the schedule.
3. Any change to the critical path.
4. Any actual or anticipated problems with delivery of materials or equipment.
5. Any problems with submittal approval.
6. Any corrective action undertaken by the contractor to address schedule problems.
7. Anything impacting critical path, milestones and contractual completion.
8 Identify by activity number and name of all critical paths or controlling activities being delayed
9. The date the delay began to each critical path or controlling activity
10. The duration (to date) of each delay to each critical path or controlling activity.

2.8 SCHEDULING OF MILESTONES

A. Contractor shall include in the schedule all major Milestones with detailed description. Contract Interface Milestones shall have an early start constraint date matching the milestone date. Contract Interim Milestones and Contract Completion shall have a late finish constraint date matching the milestone or Contract Completion date. These are the only constraints allowed in the schedule without prior written approval by the CONSTRUCTION MANAGER. Using the Milestone Activity Code shown in Appendix A, each activity shall be coded to the earliest Contract Interim Milestone by which the activity is required to be complete. Neither this coding, nor the CONSTRUCTION MANAGER'S review or acceptance of the assigned codes, modifies in any way the contractual requirements of any milestone or the Contract Completion date.

B. Liquidated damages:
Liquidated damages will be tied to all critical milestones. The cutover duration is considered as one of the major milestones. The damages will be assessed per Section 26 of the AGREEMENT.

2.9 CALENDARS

A. All activities shall be scheduled against a normal five day work week with holidays excluded from the available work days unless otherwise approved by the CONSTRUCTION MANAGER. If the contractor includes more than one calendar in his schedule, the following convention shall be used for defining schedule calendars:

| | |
|---|---|
| Calendar 1 | 5 day with holidays |
| Calendar 2 | 6 day with holidays |
| Calendar 3 | 7 day with holidays |

| | |
|---|---|
| Calendar 4 | 5 day without holidays |
| Calendar 5 | 7 day without holidays |

2.10 SCHEDULE IMPACT ANALYSIS

A. Whenever the CONTRACTOR requests an extension of the CONTRACT TIME or any CONTRACT MILESTONE, the CONTRACTOR shall provide an analysis of the critical path as required by the GENERAL CONDITIONS. At a minimum, the analysis must contain the following:

1. The version of the CONTRACTOR'S Construction Schedule on which the analysis is based.

2. The contract milestones affected and the number of days extension requested for each.

3. A plot starting at the time line and showing the controlling path to each affected milestone before the change or delay in question.

4. A plot including the activities which were added to represent the change or delay starting at the time line and showing the controlling path to each affected milestone after the change or delay in question.

5. A listing of all activities and logic added, deleted or changed to represent the impact of the change or other delay being analyzed.

6. An electronic copy of both before and after schedules on DVD or CD. The schedule files shall be in Primavera Project Planner (P3) version3.1 format.

**PART 3 - EXECUTION**

3.1 SCHEDULE DEVELOPMENT

A. CONTRACTOR'S Mobilization Schedule

1. Within fifteen (15) calendar days following written Notice to Proceed, the CONTRACTOR shall submit to the CONSTRUCTION MANAGER for review and approval the CONTRACTOR'S Mobilization Schedule covering the first 30 calendar days of work to be performed.

2. The CONSTRUCTION MANAGER will review the CONTRACTOR'S Mobilization Schedule and will provide written comments within fifteen (15) calendar days of receipt.

3. If revisions are required, the CONTRACTOR shall make appropriate adjustments or corrections and shall deliver to the CONSTRUCTION MANAGER the revised CONTRACTOR'S Mobilization Schedule directing specific attention, in writing, to adjustments or corrections made other than those made in response to the CONSTRUCTION MANAGER'S comments on the previous submittal. The CONSTRUCTION MANAGER will review and return written comments on the revised

schedule within ten (10) calendar days. This step shall be repeated until the schedule is accepted. Acceptance of the CONTRACTOR'S Mobilization Schedule by the CONSTRUCTION MANAGER shall be a **CONDITION PRECEDENT** to processing the first Applications for Payment.

4. The activities, budget values and progress from the Mobilization Schedule shall be carried forward into the CONTRACTOR'S Construction Schedule.

B. CONTRACTOR'S Construction Schedule

1. The CONTRACTOR shall submit the CONTRACTOR'S Construction Schedule within thirty (30) calendar days after the date of the Notice To Proceed. This schedule shall reflect the entire scope of the Contract WORK as awarded.

2. The CONTRACTOR'S Construction Schedule shall bear the CONTRACTOR'S stamp of approval signed by the CONTRACTOR. The CONTRACTOR'S stamp of approval shall constitute a representation to the OWNER and CONSTRUCTION MANAGER that the CONTRACTOR has verified all data in the CONTRACTOR'S Construction Schedule and assumes full responsibility for doing so, and that the CONTRACTOR has reviewed and coordinated all activities and logic in the CONTRACTOR'S Construction Schedule with the requirements of the WORK.

3. The CONSTRUCTION MANAGER will review and return written comments on the CONTRACTOR'S Construction Schedule to the CONTRACTOR within thirty (30) calendar days.

4. If revisions are required, the CONTRACTOR shall make appropriate adjustments or corrections and shall deliver to the CONSTRUCTION MANAGER the revised CONTRACTOR'S Construction Schedule directing specific attention, in writing, to adjustments or corrections made other than those made in response to the CONSTRUCTION MANAGER'S comments on the previous submittal. The CONSTRUCTION MANAGER will review and return written comments on of the revised CONTRACTOR'S Construction Schedule within fifteen (15) calendar days. This step shall be repeated until the schedule is accepted. Acceptance of the CONTRACTOR'S Construction Schedule by the CONSTRUCTION MANAGER shall be a **CONDITION PRECEDENT** to processing any Application for Payment, after the first full month.

5. The CONSTRUCTION MANAGER'S review and comments will be for conformance with the Contract Time and those sequences of work indicated in or required by the Contract Documents, to record dates for milestones, and for conformance with the requirements of this Section and other information given in the Contract Documents which may have a bearing on the schedule. The CONSTRUCTION MANAGER'S review will also be for reasonableness and consistency in the cost loading of the schedule activities. The CONSTRUCTION MANAGER'S review shall not extend to the CONTRACTOR'S means, methods, or techniques, the correctness of which shall remain the sole responsibility of the CONTRACTOR.

6. Once the CONTRACTOR'S Construction Schedule is accepted by the CONSTRUCTION MANAGER it becomes the baseline CONTRACTOR'S Construction

Schedule for the WORK, and is the basis for (a) the monitoring of the CONTRACTOR'S progress against milestones and Contract Time, and (b) the evaluation and reconciliation of extensions in Contract Time.

3.2 MONTHLY UPDATE OF THE CONTRACTOR'S CONSTRUCTION SCHEDULE

A. The cutoff date for the payment application and schedule update shall be determined by mutual agreement between the owner/CONSTRUCTION MANAGER and the Contractor.

B. Schedule Status Submittals

1. An update of the CONTRACTOR'S Construction Schedule is due monthly, with (attached to) each Application for Payment. Receipt by the CONSTRUCTION MANAGER of the update of the CONTRACTOR'S Construction Schedule will be a **CONDITION PRECEDENT** to processing each Application for Payment.

2. Neither the updating of the CONTRACTOR'S Construction Schedule nor the updating of any report or schedule submitted to the CONSTRUCTION MANAGER by the CONTRACTOR under this Section shall have the effect of amending or modifying, in any way, the Contract Time, Contract Completion Date, or Contract Milestone Dates.

C. Monthly Reviews

1. Monthly review meetings between the CONSTRUCTION MANAGER and the CONTRACTOR will be held within seven (7) calendar days prior to the payment cutoff date. The purpose of this meeting is to finalize the percent to be paid for activities completed or in progress, and to review and discuss any required corrections and proposed revisions to the schedule.

2. Prior to the monthly review meeting, the CONTRACTOR will update the status of each activity in progress or completed with actual or estimated actual start and finish dates, physical percent complete and remaining duration for activities started but not completed and calculate the CPM Network through payment cut off date. The CONTRACTOR shall provide an electronic copy of the updated schedule to the CONSTRUCTION MANAGER three work days prior to the schedule review meeting. Contractor will provide appropriate reports as defined by the CONSTRUCTION MANAGER at the monthly review meeting.

3. After the meeting, the CONTRACTOR shall make revisions to the status of activities as directed by the CONSTRUCTION MANAGER and submit the payment application along with the final update of the CONTRACTOR'S Construction Schedule within seven calendar days.

3.3 SCHEDULE REVISIONS

A. The CONTRACTOR'S Construction Schedule must be revised when it is no longer useful as a status and control mechanism as determined by the CONSTRUCTION MANAGER or when a change or delay impacts the CONTRACTOR'S timing and sequence of the WORK. Contract Time (including all contracted milestones) cannot be changed without a formal Change Order approved by the OWNER.

B. All schedule revisions must be presented at the monthly review meeting for CONSTRUCTION MANAGER'S coordination and acceptance. The CONTRACTOR shall provide a separate sub-network schedule for each proposed revision showing the revised activities and how he proposes to tie them into the CONTRACTOR'S Construction Schedule. No time or cost will be granted under this Contract for the cumulative effect of changes.

3.4 SCHEDULE RECOVERY

A. Within five days after a schedule problem is recognized and documented, the CONTRACTOR shall submit to the CONSTRUCTION MANAGER a recovery schedule which shall consist of proposed revisions to the CONTRACTOR'S Construction Schedule demonstrating how the CONTRACTOR intends to achieve all contractual milestones including contract completion within the allotted contract time. The accompanying narrative should describe the cause of the problems and the actions planned by the CONTRACTOR to recover the schedule. The CONTRACTOR shall promptly undertake appropriate action at no additional cost to the OWNER to recover the schedule whenever the current schedule shows that the CONTRACTOR did not or will not achieve a milestone established in the CONTRACTOR'S Construction Schedule.

B. Appropriate recovery actions may include, but not be limited to, assignment of additional labor, and/or equipment, shift or overtime work, expediting of submittals or deliveries, overlapping of activities or sequencing changes to increase activity concurrence.

C. Lack of Action: The CONTRACTOR'S refusal, failure or neglect to take appropriate recovery action or to submit a recovery schedule shall constitute reasonable evidence that the CONTRACTOR is not prosecuting the WORK, or separable part, with the diligence that will ensure its completion within the applicable Contract Time. Such lack of action shall constitute sufficient basis for the CONSTRUCTION MANAGER to recommend the withholding of some or all of any payment due, and shall be considered grounds for termination by the OWNER.

**NTS: The classification of Activity Codes and Coding Structure outlined below is generic. It shall be edited to meet project-specific conditions and work classifications.**

## APPENDIX A

## ACTIVITY CODES & CODING STRUCTURE

Subsection 2.4.A. of Contract Specification Section 01310 informs the CONTRACTOR that a work breakdown structure for developing activity number and coding structures will be provided by the CONSTRUCTION MANAGER. The following narrative and lists supply this information for the Contract.

The information provided herein is based on the capabilities of the Primavera Project Planner (P3) CPM scheduling program.

ACTIVITY NUMBERING

The Primavera Project Planner (P3) CPM scheduling program has a feature that allows schedules to have a Master/Sub-project relationship. This feature has been utilized in development of the schedule for the program. As a result of this nesting the CONSTRUCTION MANAGER requires that the activity numbering for the CONTRACTOR'S CPM schedule, including the two characters for the sub-project code, be six (6) characters or less.

ACTIVITY CODES & CODING STRUCTURE

The Activity Codes Structure contains eleven (11) Activity Codes and one (1) Activity ID Code. Below is a description of the code classifications.

ATYP: Activity Type. Indicates whether the activity is a submittal, fabrication, delivery or construction activity. The code field length is two (2) characters.

FACL: Facility ID. Designations for individual facilities within the project. The code field length is four (4) characters.

CSI: CSI Specification. Follows the same breakdown as the Contract Specifications. The code field length is five (5) characters.

BI: Bid Item. Designates the bid item the activity applies to. The code field length is three (3) characters.

FUND: Funding Phase. Indicates which funding phase applies to the activity. The code field length is five (5) characters.

RESP: Responsibility. Designates who is responsible for completing the work indicated by the activity. Also to be used to identify work to be performed by MBE/WBE firms. The code field length is four (4) characters.

CPKG: Construction Package. Designates which construction contract package the activity belongs. The code field length is five (5) characters.

SYS: System. Designates the plant system to which the activity belongs; e.g. Odor Control System. The code field length is four (4) characters.

AREA: Area Code. This code is used to divide the WORK into logical groupings of related activities, e.g. foundations, slab on grade, building shell, etc. The code field length is four (4) characters.

MSTN: Milestone. Designates the Interim Milestone the activity applies to. The code field length is three (3) characters.

RFP: RFP. A code to be used for tracking activities added to the schedule after approval of the baseline. The code field length is two (5) characters.

SUBP: Sub-project ID. Designates the sub-project that the activity is part. The code values for this category are designated when the sub-project is added to the master schedule. The code field length is two (2) characters.

For reasons of compatibility with the overall project and program schedule, the activity coding structure (i.e. the order of the codes and the length of each field) shall not be changed without prior approval by the CONSTRUCTION MANAGER.

**CLASSIFICATION OF ACTIVITY CODES:**

| | Name | Length | Description |
|---|---|---|---|
| 1. | ATYP | 2 | ACTIVITY TYPE |
| 2. | FACL | 4 | FACILITY ID |
| 3. | CSI | 5 | CSI DIVISION |
| 4. | BI | 3 | BID ITEM |
| 5. | FUND | 5 | CWP FUNDING PHAS |
| 6. | RESP | 4 | RESPONSIBILITY |
| 7. | CPKG | 5 | CONSTRUCTION PKG |
| 8. | SYS | 4 | SYSTEM |
| 9. | AREA | 4 | AREA |
| 10. | MSTN | 3 | MILESTONE |
| 11. | RFP | 5 | RFP NUMBER |

**ACTIVITY CODES DICTIONARY**

ATYP - Activity Type

| VALUE | TITLE |
|---|---|
| C | Construction |
| M | Contract Interim Milestones |
| I | Contract Interface Milestones |
| S | Submittal |

| | |
|---|---|
| D | Delivery |

FACL - Facility

| VALUE | TITLE |
|---|---|
| 00 | Site |
| 02 | Plant Influent Meter Vault |
| 05 | Headworks and Grit Tanks |
| 10 | Primary Sedimentation and Grit Tanks |
| 12 | Flow Equalization Basins |
| 15 | Aeration Basins |
| 16 | Blower Building |
| 20 | Secondary Clarifiers |
| 25 | Tertiary Filters |
| 29 | UV Basins and Control Building |
| 34 | Effluent Pump Station |
| 50 | Operations Building |
| 51 | Maintenance Building |
| 55 | Chemical Building |
| 60 | Odor Control |
| 66 | Main Electrical Plant |
| 67 | Unit Sub Stations |

CSI Specification

| VALUE | TITLE |
|---|---|
| Same as Contract Specifications | |

BI Bid Item

| VALUE | TITLE |
|---|---|
| Same as Bid Form | |

FUND CWP Funding Phase

| VALUE | TITLE |
|---|---|
| As Determined by Approved Phase Funding | |

RESP Responsibility

| VALUE | TITLE |
|---|---|
| OWNR | Owner |
| CM | Construction Manager |
| (Contractor to assign unique code for himself and each sub) | |

CPKG Construction Package

| VALUE | TITLE |
|---|---|
| CP01 | CP1 - Sitework |
| CP02 | CP2 - Operations & Maintenance Buildings |

| | |
|---|---|
| CP03 | CP3 - Process Facilities |
| CP04 | COMNET |

SYS System

| VALUE | TITLE |
|---|---|
| To be determined by the CONSTRUCTION MANAGER | |

AREA AREA

| VALUE | TITLE |
|---|---|
| 0000 | |
| 0010 | Mobilization |
| 0080 | Temporary Utilities & Pumps |
| 0095 | Utility Gallery Structure |
| 0100 | Yard Piping |
| 0120 | Site Work |
| 0130 | Site Paving |
| 0140 | Landscaping |
| 0141 | Fountain/Pump Vault |
| 0200 | Headworks Building |
| 0210 | Headworks Building Piping |
| 0220 | Headworks Process Piping |
| 0230 | Headworks Grit Removal |
| 0240 | Headworks Odor Control |
| 0260 | Headworks Electrical |
| 0265 | Headworks Equipment |
| 0270 | Headworks HVAC |
| 0300 | Primary Sedimentation Structure |
| 0320 | Primary Sedimentation Process Piping |
| 0330 | Primary Sedimentation Odor Control |
| 0350 | Primary Sedimentation Electrical |
| 0360 | Primary Sedimentation Equipment |
| 0370 | Primary Sedimentation HVAC |
| 0400 | Flow Equalization Tanks |
| 0410 | Flow Equalization Process Piping |
| 0430 | Flow Equalization Electrical |
| 0440 | Flow Equalization Equipment |
| 0450 | Flow Equalization Valve Vault |
| 0500 | Aeration Basins Structure |
| 0510 | Aeration Basins Process Piping |
| 0530 | Aeration Basins Odor Control |
| 0550 | Aeration Basins Electrical |
| 0570 | Aeration Basins Equipment |
| 0600 | Blower Building Structure |
| 0620 | Blower Building Process Piping |
| 0650 | Blower Building Electrical |
| 0660 | Blower Building Equipment |
| 0670 | Blower Building HVAC |
| 0700 | Secondary Clarifiers Structure |

| | |
|---|---|
| 0710 | Secondary Clarifiers Process Piping |
| 0740 | Secondary Clarifiers Odor Control |
| 0760 | Secondary Clarifiers Electrical |
| 0770 | Secondary Clarifiers Equipment |
| 0810 | Plant Drain Pump Station |
| 0870 | Influent Pump Station |
| 0900 | Tertiary Filters Structure |
| 0910 | Tertiary Filters Process Piping |
| 0930 | Tertiary Filters Equipment |
| 0950 | Tertiary Filters Electrical |
| 0960 | Tertiary Filters HVAC |
| 1000 | UV & Control Structure |
| 1010 | UV & Control Process Piping |
| 1050 | UV & Control Electrical |
| 1060 | UV & Control Equipment |
| 1070 | UV & Control HVAC |
| 1100 | Effluent Pump Station Structure |
| 1120 | Effluent Pump Station Process Piping |
| 1150 | Effluent Pump Station Electrical |
| 1160 | Effluent Pump Station Pumps & Equipment |
| 1170 | Effluent Pump Station HVAC |
| 1200 | Operations Building Structural |
| 1240 | Operations Building Electrical |
| 1250 | Operations Building HVAC |
| 1260 | Operations Building Plumbing |
| 1300 | Maintenance Building Structure |
| 1350 | Maintenance Building Electrical |
| 1360 | Maintenance Building HVAC |
| 1370 | Maintenance Building Plumbing |
| 1400 | Chemical Building Structure |
| 1420 | Chemical Building Tanks & Equipment |
| 1440 | Chemical Building Process Piping |
| 1470 | Chemical Building Electrical |
| 1480 | Chemical Building HVAC |
| 1500 | Site Electrical Ducts |
| 1510 | Site Electrical Equipment |
| 1520 | Site Electrical Stations |
| 1620 | Plant Phone & Paging Systems |
| 1630 | Security |
| 1780 | Odor Control HVAC |

MSTN Milestone

| VALUE | TITLE |
|---|---|
| Per Specification 01010 | |

RFP RFP Number

| VALUE | TITLE |
|---|---|
| Per Each RFP | |

SUBP Project ID

| VALUE | TITLE |
|---|---|
| AA | CP1 - Site Preparation |
| BB | CP2 - Operations and Maintenance Buildings |
| CC | CP3 - Process Facilities |

**** END SECTION ****

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SECTION 1521

SECTION 5.28

# CONFINED SPACE ENTY

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21.1 General Requirements

21.1.1 Contractors shall comply with the MWWD Confined Space Entry Procedures and CCR, Title 8, Section 5157 (*MWWD does not use Title 8, Section 5158*). All existing spaces have been classified as either non-permit or permit-required. The classification may change depending upon the nature of the work being performed. Space classification must be agreed to by the MWWD safety officer or his designee and the Contractor prior to work starting work.

21.1.2 The contractor's designated entry supervisor shall be required to complete and sign a Confined Space Entry Permit for all "Permit Required" spaces as defined by Federal or State statues, or where MWWD has designated a space as Permit Required. By signing the permit, the entry supervisor affirms that all standard operating procedures and job safety analyses have been reviewed with and understood by the work crew.

21.1.3 The completed permit will be conspicuously posted at the entry site

21.1.4 Additions or substitutions of personnel will have their name and signature added to the permit subsequent to being informed of entry conditions as defined above.

21.1.5 Contractors shall provide a confined space attendant as specified by the permit. Requirements for the attendant include the following:

- Remain in the immediate proximity of the confined space entry point.
- Do not enter the confined space.
- Initiate on-site rescue procedures and, if necessary, summon additional rescue and other emergency services as soon as a determination is made that entrants may need assistance to escape from permit space hazards.
- Have no other duties that would impair their responsibility as a confined space attendant.

21.1.6 Whenever welding, cutting, or heating is performed in a confined space, exhaust ventilation shall be used and located as close to the source as possible. When sufficient ventilation cannot be provided, employees shall be protected by airline respirators. Hot work requires a hot work permit. See Section 24 - "Hot Work"

21.2 Rescue

21.2.1 To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would

increase the overall risk of entry or would not contribute to the rescue of the entrant.

21.2.2 Each entrant must wear a full body harness with a lifeline attached to a "D Ring" or carabiner located at the center of the entrant's back or front, such that an unconscious person will remain in the head up position. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space such that rescue can begin immediately.

21.2.3 A mechanical winching device with at least a 3:1 ratio and centrifugal breaking system shall be available to lower and retrieve personnel from vertical type permit spaces more than 5 feet deep. The device will be secured to a suitable tripod or fixed point, and whose winch line is clear of all obstructions to raise and lower personnel.

21.2.4 The Contractor shall ensure that at least one standby person at the site is trained and immediately available to perform rescue and emergency services. The Contractor shall ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces.

21.2.4 Should the Contractor elect to use an outside rescue service, the rescue service must be notified in advance of the hazards that may be encountered.

21.3 Coordination

21.3.1 The Contractor shall obtain all available information regarding hazards and entry conditions. MWWD will explain why the space is classified as permit-required and describe any past experiences associated with the space.

21.3.2 In the event that MWWD employees and Contractor employees are working together in or near a permit space, entry operations shall be coordinated.

21.4 Definitions

21.4.1 Acceptable Entry Conditions: The conditions that must exist in a permit-required confined space to allow entry and to ensure employees involved in the entry can safely enter into and work within the space.

21.4.2 Attendant: An individual stationed outside one or more permit spaces who

monitors the authorized entrants and who performs all attendant's duties assigned in the Contractor's permit space program.

21.4.3 Authorized Entrant: An employee who is authorized by the Contractor to enter a permit space.

21.4.4 Emergency: Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

21.4.5 Entry: The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

21.4.6 Entry Supervisor: The person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry.

21.4.7 Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

a. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

b. Airborne combustible dust at a concentration that meets or exceeds its LFL; *Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.*

c. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

d. Atmospheric concentration of any substance for which a dose is published in Cal/OSHA regulations and which could result in employee exposure in excess of its dose or permissible exposure limit;

e. Any other atmospheric condition that is immediately dangerous to life or health.

21.4.8 Hot Work: Operations capable of providing a source of ignition (e.g., riveting, welding, cutting, grinding, burning, and heating.)

21.4.9 Hot Work Permit: The employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

21.4.10 Oxygen Deficient Atmosphere: An atmosphere containing less than 19.5 percent oxygen by volume.

21.4.11 Oxygen Enriched Atmosphere: An atmosphere containing more than 23.5 percent oxygen by volume.

21.4.12 Permit-Required Confined Space (Permit Space): A confined space that has one or more of the following characteristics:

a. Contains or has a potential to contain a hazardous atmosphere;
b. Contains a material that has the potential for engulfing an entrant;
c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
d. Contains any other recognized serious safety or health hazard.

21.4.13 Standby Rescue: Person(s) immediately available to perform rescue and emergency services.

# SECTION 13400

# DISTRIBUTED CONTROL SYSTEM

# SECTION 13400 - DISTRIBUTED CONTROL SYSTEM (DCS)

## PART 1 --GENERAL

### 1.1 WORK OF THIS SECTION

A. The PROVIDER shall furnish all equipment and provide all needed engineering to accomplish the functional and technical requirements of these contract documents including, but not limited to, project management, design assistance, coordination with on-site area Contractors, plant staff, detailed system design and integration, conducting graphic development meetings, equipment supply, shipment, storage, job site delivery; programming and configuration, installation oversight, training, calibration, testing, startup, and maintenance. The DISTRIBUTED CONTROL SYSTEM PROVIDER (DCSP) shall be Emerson Process Management (EPM) and the DCS shall be Emerson Ovation.

B. It is the intent of these specifications to have the DCSP singularly responsible for the procurement, supply, delivery, implementation and future support of all DCS equipment (i.e., hardware and software). In order to preserve this focused responsibility, the DCSP shall be:

1. The manufacturer of the DCS hardware being proposed for this project or offer the hardware in their standard product line.
2. The originator of all data acquisition and control software.
3. The integrator of all Workstation (WS) and communication software.
4. The programmer and integrator of all DCS functions.
5. The source of all DCS documentation.

C. The DCSP shall be responsible for providing all equipment, labor, engineering, and services associated with integrating all of the instrumentation and Control devices, and special systems (Fire Detection, Energy Management, HVAC, CCTV, and control valve data links), into the DCS in a transparent and seamless manner.

D. RESERVED

E. As a minimum, the DCSP shall assume full responsibility for the following:

1. Implementation of the DCS:
   a. Provide all engineering, resources, equipment, and labor required to:
      1) Design and submit DCS hardware, software, and spare part submittals.
      2) Design and submit DCS training submittal for training to be conducted at the Department Headquarters and at the Project Site.

3) Conduct user meetings at the Department Headquarters dedicated to the development of graphic criteria and design of graphic screens.

4) Submit all required graphic criteria and graphic design submittals.

5) Procure all hardware and software required to conform to these specifications.

6) Program, configure, and integrate all software into hardware platforms as required to conform to these specifications.

7) Prepare all required classroom training materials and conduct all training at the Department Headquarters and at the Project Site.

8) Perform an Operational Readiness Test (ORT) at the Department Headquarters to verify conformance of the DCS to these specifications.

2. Integration of the DCS with the facility:

a. Provide all engineering, resources, equipment and labor required to:

1) Attend meetings as defined in the scope of work, held at the Department Headquarters and at the project site.

2) RESERVED

3) Install DCS equipment, data communications devices, fiber optic and other communications cables and other equipment as specified in these Contract Documents.

4) Coordinate with suppliers for data link information and configure DCS data links to communicate equipment furnished by others.

5) Oversee the performance of on-site loop and commissioning tests by others.

6) Conduct a 30-day DCS performance test.

7) Update and submit all documentation and previous submittals to reflect "as-built" or record conditions.

1.2 RESERVED

1.3 CODES

A. The WORK of this Section shall comply with the current editions of the following codes as adopted by the City of San Diego Municipal Code:

1. *Uniform Fire Code*

2. National Electrical Code

3. Underwriters Laboratory (UL) (or third-party certification that work meets UL requirements)

B. Where the requirements set forth in the Contract Documents are greater or more rigid than the mandatory requirements referenced herein the applicable portions of the Contract Documents shall govern.

C. In the case of conflict between any mandatory requirements and the Contract Documents, the mandatory requirement shall be followed in each case, but only after submitting such proposed changes to the CONSTRUCTION MANAGER for approval.

D. Nothing contained in the Contract Documents shall be so construed to conflict with any national state, municipal, or local laws or regulations governing the installation of Work specified herein, and all such acts, ordinance, and regulations, including the National Electrical Code, are hereby incorporated and made a part of the Contract Documents. All such requirements shall be satisfied by the DSCP at no additional expense to the OWNER.

1.4 SPECIFICATIONS AND STANDARDS

A. Except as otherwise indicated, the current editions of the following apply to the WORK of this Section:

| | | |
|---|---|---|
| 1. | ISA-S5.1 | Instrument Symbols and Identification |
| 2. | ISA-S5.4 | Instrument Loop Diagrams |
| 3. | ISA-S12.4 | Instrument Purging for Reduction of Hazardous Area Classification |
| 4. | ISO 9001 | Quality systems - Model for Quality Assurance in Design/Development, Production, Installation and Servicing. |
| 5. | SAMA | Scientific Apparatus Makers Association (SAMA) SAMA-PMC-33.1 |
| 6. | IEEE 812 | Standard Definitions of Terms Relating to Fiber Optics |
| 7. | EIA/TIA-568 | Commercial Building Telecommunications Wiring Standard |

1.5 ELECTRONIC DOCUMENT SUBMITTALS

A. All final submittals are required in both paper and electronic format. Three copies of each final submittal shall be provided on CD-ROM OR DVD.

B. Where preliminary submittals are required in electronic format, three copies of the preliminary submittal shall be provided on CD-ROM OR DVD for the City's review.

C. File Requirements:

1. Documents shall be in Adobe Acrobat PDF format, version as specified by the Contract Manager. Vendor and DCSP shop drawings developed under the Contract shall be in Bentley Microstation (.DGN) format. Documents in electronic format (Microsoft Word, Excel, etc.) shall be converted to standard PDF format using the Acrobat printer driver.

2. Deviation from this standard will be accepted only if advance approval is given by the Project Manager.

3. Documents not available in electronic format shall be scanned at 300 dpi, bitonal (black and white) and converted into Adobe Acrobat (PDF). Scanned image enhancement software shall be used. PDF sub-format shall be full Image + Hidden Text PDF file format.

4. All PDF documents shall be reviewed, and corrected if necessary, for orientation and legibility.

5. Individual document files shall not exceed 3 megabytes in size.

D. Document Organization and Indexing:

1. Submittals shall be logically organized. File names shall be in UPPERCASE only, a maximum of 64 characters, contain no spaces, and clearly indicate the file contents.

2. Supplier's submittals that include O&M documentation for more than one equipment item shall be divided into separate documents for each equipment item.

3. Each document's Table of Contents shall be bookmarked to the referenced sections within the document.

4. A master PDF index file shall be generated, with a master Table of Contents, and links to individual document files. External PDF link file names shall be in uppercase only.

5. A table shall be provided and submitted in spreadsheet format which includes the information about each document file. The contents of the table shall be submitted and approved by the Project Manager. An example of information to be provided is as follows: (This is an example only)

   a. Document file name

   b. Document title and description

   c. Hard Copy Catalog No. (used by facility document coordinator)

   d. Document Type:

      1) Design

         a) Design Specifications

b) Design Drawings

2) Operations

a) Facility design O&M manuals

b) Facility manufacturer O&M manuals

c) Standard Operations Procedures

d) Record Drawings

3) Maintenance

a) Maintenance Management System

b) Facility Loop and Wiring Diagrams

4) Training

5) Student study guide

6) User guides

7) User manuals

e. Environmental

f. Engineering

g. Research & Development

h. Division Processes and Procedures

i. Facility Name

j. Specification Number

k. Process Name

l. Unit Process Number

m. Manufacturer's Name (if applicable)

n. Supplier's Name (if applicable)

o. EMPAC asset number (if applicable)

p. Asset Description (if applicable)

1) Keyword

2) Qualifier

1.6 SHOP DRAWINGS AND SAMPLES

A. The DCSP shall prepare and submit complete and organized shop drawings, as specified herein. Incomplete or partial submittals are not acceptable. All shop drawings and record drawings shall be submitted in hard and electronic copy. All drawing shall be developed in Bentley Systems MICROSTATION CAD software.

B. The DCSP shall provide a project loop drawing submittal (PLDS) to verify the DCS interfaces with all instrumentation and devices being provided. For each DCS input/output, the DCSP shall note on the PLDS the following information:

1. PCM number and physical location.

2. Type of input.

3. Tag number

4. I/O card location and address.

5. All DCS-dependent displayed functions using ISA symbology.

6. Drawing reference for DCS software content.

C. In these Contract Documents all systems, all meters, all instruments, and all other elements are represented schematically, and are designated by symbology as derived from Instrument Society of America Standard ISA S5.1 (latest revision). The nomenclature and numbers designated herein and on the Drawings shall be employed exclusively throughout shop drawings, and similar materials. Any other symbols, designations, and nomenclature unique to any manufacturer's standard methods shall not replace those prescribed above, used herein, and on the Drawings.

D. All shop drawings shall include the letter head and/or title block of the DCSP. The title block shall include, as a minimum, the DCSP's registered business name and address, project name, drawing name, revision level, and personnel responsible for the content of the drawing. The quantity of submittal sets required shall be as specified in Section 01300, "Contractor Submittals".

E. The DCS hardware submittal (DCSHS) shall be a singular all inclusive submittal which shall include, but not be limited to:

1. A complete set of system diagrams which depict:

a. All Process Control Modules (PCMs), Workstations (WSs), Historian System (HS) devices, video devices, printers, UPS, telemetry devices, communication devices, network equipment and communication links.

b. All conduit and wire required to support the power, ground, Input/Output, and communication requirements of the system. A separate diagram shall be submitted for each DCS component fully annotated with conduit size, number, associated with the power source. All conduit and wire numbers shall be consistent with the numbering system shown in these Contract Documents.

c. All separation requirements between signal, power and communication conductors shall be clearly shown.

2. Comprehensive power diagrams which shall show and identify each component of each system and shall show which components require a nominal 110 volt, 60 Hz power source. Where a voltage regulator is required, it shall be included.

3. Technical data sheets for each component together with a technical projects brochure or bulletin which show:

   a. The component name as used on project drawings and in these specifications.

   b. Manufacturer's model number or other identifying product designation.

   c. The project tag number.

   d. The project system of which it is a part of.

   e. The project site to which it applies.

   f. Input and output characteristics.

   g. Requirements for electric power.

   h. Specifications for ambient operating condition.

   i. Details on materials of construction for those components to be field mounted.

4. Site-specific arrangement and construction drawings for all DCS equipment cabinets, including dimensions, identification of all components, preparation and finish data, nameplates, and the like. All drawings shall be accurately scaled and show the position of the equipment in its intended installation location. All drawings must show a scaled representation of the placement of all DCS equipment being provided under this contract and its spatial relationship to all other equipment (both new and existing) located in the abutting and adjoining areas. All acquired access and clearances associated with the DCS equipment and other equipment must be shown with a statement of compliance to manufacturer's recommendation, NEC and other applicable codes. All drawings must be drawn to a 1/2-inch = 1 foot scale.

5. Installation, mounting and anchoring details for all components and assemblies to be field mounted, including access requirements, conduit connections or entry details. All details must be site specific.

6. Calibration, adjustment and test details for all components and systems.

7. Complete and detailed bill of material.

8. Calculations shall be submitted to verify each network's optical power budget. Calculations shall include the PMD being used, transmitter output power level

(dbm), receiver input power level (dbm), losses generated by splices, connectors, and repeaters. The resulting calculations shall represent the allowable end-to-end optical link budgets for use in designing the network.

9. The hardware submittal copies shall be numbered, with controlled distribution. Updates for the DCS Hardware submittal shall be issued whenever the hardware configuration or equipment supplied changes as a result of change orders, requests for substitution or any other procedure. Updates shall be clearly marked as to the pages to be removed and replaced. Updates shall be issued to all holders of controlled distribution copies.

F. The DCS Software Submittal (DCSSS) shall be included in a singular all inclusive submittal which shall include but not be limited to:

1. A complete set of all available software algorithms.

2. A complete set of control strategies which depict all monitoring and control functions on a loop by loop basis, in a modified SAMA-type format.

3. An English narrative of each data acquisition or control loop mission and anticipated action. Narratives shall enumerate the signal point name, signal descriptor, associated PCM number, associated system template displays, system functions activated by signal (i.e., interlocks, alarms, logs, etc.).

4. A complete set of annotated module configuration sheets depicting each loop linkage.

5. A complete listing of the DCS data base listing for each data points relevant parameters such as range, contact orientation, limits, incremental limits, I/O card type, I/O hardware address and assignment.

6. Detailed descriptions of procedures used to implement and modify control strategies and data base construction.

7. The software submittal copies shall be numbered, with controlled distribution. Updates for the DCS Software submittal shall be issued periodically or upon major software configuration changes occur as a result of change orders, requests for substitution or any other procedure. Updates shall be clearly marked as to the pages to be removed and replaced. Updates shall be issued to all holders of controlled distribution copies.

G. The DCS Graphic Submittal (DCSGS) shall reflect the results of process graphics meetings held for the facility. These meetings shall be chaired by the DCSP and attended by a user group participants and the CONSTRUCTION MANAGER. The DCSP shall allocate 0.5 hours of meeting time per custom graphic display. The DCSGS copies shall be numbered, with controlled distribution. Updates for the DCSGS shall be issued after each meeting or upon major graphics configuration changes. Updates shall be clearly marked as to the pages to be removed and replaced. Updates shall be issued to all holders of controlled distribution copies. Subsequent to the successful review of the DCSGS, the DCSP shall submit for each facility:

1. One complete set of all WS accessible displays which are unique to this project (i.e., process global, system global, process regional, systems regional, process group, process loop, process component, integrated tutorials, integrated process tutorials, integrated documentation, user assistance). These displays shall be in full size color graphic format and replicate the proposed screen contents. All background colors shall be identical to that of the screen content. All displays shall be arranged in a hierarchical order with references to associated WSs.

2. A system display linkage diagram which defines the hierarchical order and the linkages via page, down, left, right commands.

3. A definition of each displays data fields by tag numbers.

4. A definition of each displays dynamic elements which shall blink, change color, rotate or change shape in response to process changes.

5. A listing of all "help" text associated with each display screen.

6. The software submittal copies shall be numbered, with controlled distribution. Updates for the DCS Software submittal shall be issued periodically or upon major software configuration changes occur as a result of change orders, requests for substitution or any other procedure. Updates shall be clearly marked as to the pages to be removed and replaced. Updates shall be issued to all holders of controlled distribution copies.

H. The DCSP shall submit the procedures proposed to be followed during the tests required under this project. Procedures shall include statement indicating test objectives, test descriptions, forms, and checklists to be used to control and document the required tests. Prior to the preparation of the detailed test procedures, the DCSP shall submit outlines of the specific proposed tests. Submittal shall include examples of the proposed forms and checklists. Once the Preliminary Test Procedure Submittal have been reviewed by the CONSTRUCTION MANAGER and returned stamped either "no exceptions noted" or "make corrections noted", the DCSP shall submit the proposed detailed test procedures, forms, and checklists. Once the detailed Test Procedures Submittal have been reviewed by the CONSTRUCTION MANAGER and returned stamped either "no exceptions noted" or "make corrections noted", the tests may be scheduled. Upon completion of each required test, document the test by submitting a copy of the signed-off test procedures shall be submitted as test documentation. These requirements shall apply to the factory testing of all panels, and all on-site tests. The DCSP shall submit a detailed ORT specification to the CONSTRUCTION MANAGER at least 6 weeks in advance of commencement of the ORT.

I. Subsequent to the receipt of the OWNER's and CONSTRUCTION MANAGER's inputs made at the pre-submittal conference, the DCSP shall submit a training plan to cover all training required under this contract. All material shall be in compliance with the requirements of paragraph 3.8. The training shall include:

1. A resubmittal of the material submitted under the proposed training plan with the incorporation of all modifications agreed to at the pre-submittal conference.

2. Schedule of training courses including dates, durations, and locations of each class.

3. Resumes of the instructors who will actually implement the plan.

1.7 OWNERS MANUAL

A. The organization of the preceding shop drawing submittal shall be compatible to eventual inclusion with the Operations & Maintenance Manual submittals for this facility and shall include final alterations reflecting "record" conditions. Submittal not organized as described herein and incomplete submittals for a given Loop shall not be accepted. Accordingly, the initial multiple-copy shop drawing submittal shall be separately bound in a standard size, 3-ring, loose-leaf, vinyl plastic, hard cover, binder suitable for bookshelf storage. Binder ring size shall not exceed 3-inches. Two (2) final sets of technical manuals shall be supplied for the OWNER in accordance with Section 01300, "Contractor Submittal", and one final set shall be supplied for the CONSTRUCTION MANAGER, as a condition of acceptance of the project.

1. Initially, 2 sets of these manuals shall be submitted to the CONSTRUCTION MANAGER for review after return of favorably reviewed shop drawings and data required herein. Following the CONSTRUCTION MANAGER's review, one set will be returned to the DCSP with comments. The sets shall be revised and/or amended as required and the requisite final sets shall be submitted to the CONSTRUCTION MANAGER 15 days prior to start-up of systems. The CONSTRUCTION MANAGER will distribute the copies.

2. In addition to updated shop drawing information reflecting actual existing conditions, each set of technical manuals shall include installation, connection, operation, troubleshooting, maintenance and overhaul instructions in complete detail. This shall provide the OWNER with comprehensive information on all systems and all components to enable operation, service, maintenance and repair. Exploded or other detailed views of instruments, assemblies and accessory components shall be included together with complete parts lists and ordering instructions.

3. Repair parts list for each item (as applicable); such lists shall contain the name of each item, purchase order number, model/serial number, and the recommended repair parts to stock, along with the catalog, part, or piece number of each such repair part.

4. Outline dimensional drawings and assembly drawings and the names of the parts.

5. Copies of maintenance specifications, schedules, and instructions.

6. Copies of operation and adjustment instructions for all equipment and components.

7. Processor, peripheral, and data communications equipment instruction, reference, wiring, and option manuals.

8. Software manuals and program source and object listings, annotated in clear English, technically correct flow charts, narrative descriptions, diagnostics, and user's guides. Permanent copies of all programs on magnetic tape/CD / DVD shall be provided for the OWNER's use. Software documentation shall include full instructions on how a program is used, including execution procedures and system software dependency.

9. System test plans and procedures.

10. Simple, English language instructions on how to operate the system through the Workstation (WS).

11. All Operations and Maintenance materials, including shop drawings and the DCSP's standard DCS manuals and documentation, shall also be submitted in an electronic format. All text files shall be in Microsoft Word for Windows. Electronic data shall be submitted on CD medium.

1.8 AS-BUILT DRAWINGS

A. As-built drawings shall be prepared in accordance with Section 01300 with the following exceptions and changes:

1. The DCSP shall keep current an approved set of complete DCS loop drawings, PIDs, control descriptions, Input/Output termination lists, control schematics, DCS installation drawings, UPS installation drawings, network conduit and cable routing drawings, and test reports. These drawings shall include all devices furnished under this specification and interfaces with all other devices furnished under this specification and interfaces with all other devices which communicate with the DCS.

2. One set of original drawings and two copies of each as-built drawing under this Section shall be submitted to the CONSTRUCTION MANAGER after completion of field checkout, but before placing the systems in service for the OWNER'S use.

1.9 SERVICES OF MANUFACTURER

A. The DCSP shall provide job site visits and services of a manufacturer's technical field representatives for all equipment which is furnished by others. Job site visits shall occur during the calibration, testing and start-up phase of the project.

1. The DCSP shall provide the services of competent field technicians to oversee the installation, testing, calibration, start-up, operation and maintenance of the equipment provided under this Section.

2. Provide all necessary assistance to instruct the OWNER's representative in regard to the operation of the equipment supplied. This assistance shall be provided during the start-up phase of the project and the first year of the facility operation following project completion and OWNER acceptance.

1.10 GUARANTEE

A. The DCSP shall guarantee the WORK of this section and all applicable Sections in conformance with the requirements of Section 00800-Supplementary General Conditions.

1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

A. After the successful completion the Operational Readiness Testing, and subsequent to the site construction progressing to a point where the intended locations for DCS equipment are complete and free from exposure to on-going construction, all equipment, cabinets, panels, and consoles shall be packed in protective crates and enclosed in heavy duty polyethylene envelopes or secured sheeting to provide complete protection from damage, dust, and moisture. Dehumidifiers shall be placed inside the polyethylene coverings. The equipment shall then be skid-mounted for final transport. Lifting rings shall be provided for moving without removing protective covering. Boxed weight shall be shown on shipping tags together with instructions for unloading, transporting, storing, and handling at the job site. Special instructions for proper field handling, storage, and installation required by the manufacturer for proper protection, shall be securely attached to each piece of equipment prior to packaging and shipment.

B. Each component shall be tagged to identify its location, tag number, and function in the system. A permanent stainless steel or other non-corrosive material tag firmly attached and permanently and indelibly marked with the instrument tag number, as given in the tabulation, shall be provided on each piece of equipment under this Section. Identification shall be prominently displayed on the outside of the package.

1. Equipment shall not be stored outdoors. Equipment shall be stored in dry permanent shelters, including in-line equipment, and shall be adequately protected against mechanical injury. If any apparatus has been damaged, such damage shall be repaired by the DCSP at their own cost and expense. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such test such as directed by the CONSTRUCTION MANAGER. This shall be at the cost and expense of the DCSP, or the apparatus shall be replaced by the DCSP at their own expense.

1.12 QUALITY ASSURANCE

A. The DCSP shall have instituted a quality assurance program which utilizes organized methodologies and industry standards. All manufacturing, design, development, production, installation, and field service resources of the DCSP shall be certified as conforming to all of the requirements of international quality standard ISO 9001. The certification shall be submitted to the CONSTRUCTION MANAGER. This certification shall be a "Certification of Quality", from an internationally recognized certification agency. The program shall include the following aspects at a minimum:

1. System of traceability of manufactured unit and system software throughout development, production and testing.

2. System of "burn-in" for all components and available supportive documents.

3. Demonstrated record of prompt positive response to field failures.

4. Record of prompt shipments in accordance with contract obligations.

5. Documented program of failure analysis.

6. Quality assurance organization which complies with ISO 9001 guidelines.

7. Documented product safety policy relevant to all products intended to be furnished under this Contract.

**PART 2 -- PRODUCTS**

2.1 GENERAL

A. **Current Technology:** All hardware and software shall be the most recent field-proven models and revision levels marketed by their manufacturers at the time of proposal submission. It is the intent of the Department to obtain a DCS which utilizes state-of-the-art products in the DCSP'S product line, such as RISC-based devices. Products within the DCSP'S product line which have been superseded by newer, more advanced devices shall not be acceptable. All hardware and software shall be certified by the supplier to be Year-2000 compliant. All systems shall perform as specified without date ambiguity or error on and after January 1, 2000 or when a date element in calculations becomes January 1, 2000 or later. Successful operation and calculation shall be demonstrated during startup and testing.

B. **Hardware and Software Commonality:** Where there is more than one item of similar equipment, being furnished under this contract, all such equipment shall be the product of a single manufacturer and feature the interchangeability of parts. Minor deviations from this requirement are acceptable when specific technical requirements impose a deviation in the specifications. In case of a discontinued or upgraded product, or other cases where changing technology requires changes in equipment, the DCSP shall submit a Substitute Item Request Form. All equipment shall be of modular design to facilitate interchangeability of parts and to assure ease of servicing. This interchangeability shall apply to the following components, as a minimum, of the DCS.

1. Processor Modules

2. Bulk Memory Modules

3. Communication Interface Modules

4. Analog and Discrete Signal Modules

5. Power Supply Modules

C. **Fault Tolerant:** Where a system processor is indicated to be redundant, that unit shall function as a fault tolerant device. Fault tolerant processing shall consist of two parallel-operation processors (electronics) with separate connections to the system communication network. Both processors shall receive and process information simultaneously, with faults detected by the processors themselves. A fault tolerant configuration shall provide synchronous read/execute/compare capabilities with no database transfer. Upon detection of a fault, self-diagnostics shall be run by both processors to determine which processor is defective. The non-defective processor

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shall then assume communication without affecting normal system operation. Upon replacement of the defective processor, the operator shall initiate the processor and initiate a command from the workstation to download the database and control logic from the active processor. The operator shall then choose to initiate a transfer to the replaced processor. Alternatively, the download may occur automatically.on processor replacement. The use of backup, "hot standby", or "automatic switch over" configurations are acceptable if the transition from failed device to backup device does not degrade the process monitoring and control system or the system's availability.

D. **Environmental Suitability**: All DCS devices provided under this contract shall be provided with enclosures which are suitable for use in a treatment facility environment where there are typically high energy AC fields, DC control pulses, and varying ground potentials between the transducers or process instrument locations and those occupied by DCS components. The system design shall be adequate to provide proper protection against interferences from all such possible situations. As a minimum, all DCS equipment shall be resistive to airborne contaminants commonly found in wastewater treatment facilities, and be suitable for installation in an environment which conforms to a G2 classification as defined by ISA-S71.04.

1. **Field-Situated Equipment**: DCS equipment being furnished under this contract shall be suitable for use in wastewater treatment facilities, some of which are in an environment of salt-sea laden air with traces of methane and hydrogen sulfide. The system design shall be adequate to provide proper protection against such an environment. All field-situated equipment including PCMs shall be UL-listed or certified by a qualified third-party as meeting UL requirements. All DCS devices shall be housed in an enclosure suitable for its intended service and installation location. All DCS devices to be installed in MCC or other protected areas shall be furnished in NEMA 1 rated enclosures. All DCS devices to be installed in indoor unprotected areas shall be furnished in NEMA 12 rated enclosures. All DCS devices to be installed in indoor areas subject to hose-down conditions, or outdoor areas, shall be furnished in NEMA 4X rated stainless steel enclosures. All DCS devices to be installed in areas where corrosive agents are present in quantities which exceed the warranty limits of the equipment (Headworks, Digesters, Solids Handling, etc) shall be furnished in purged, refrigerated/ air scrubbed NEMA 4X rated stainless steel enclosures. As a minimum, the DCS shall be designed and constructed for satisfactory, long, and low maintenance operation under the following environmental conditions;

   a. Temperature Range: 0 through 50 degrees C ( 32 through 122 degrees F)

   b. Thermal Shock: 0.55 degrees C ( 1 degree F per minute maximum)

   c. Relative Humidity: 5 through 95 percent (non-condensing)

2. **Control Room-Situated Equipment**: Each Area control room or central control room will be normally air conditioned to maintain environmental conditions defined herein. No positive control of relative humidity is provided or contemplated. DCS equipment shall meet the following environmental requirements:

a. PCMs:

1) Temperature Range: Storage: -40 to 70 degrees C; Operating: 0 to 50 degrees C.

2) Thermal Shock: 6 degrees C maximum rate of change in 30 minutes.

3) Relative Humidity: Storage: 0 to 100% non-condensing

4) Operating: 5 to 95% non-condensing

b. WS

1) Temperature Range: Storage: -40 to 70 degrees C

2) Operating: 0 to 40 degrees C.

3) Thermal Shock: 6 degrees C maximum rate of change in 30 minutes.

4) Relative Humidity: Storage: 5 to 95% non-condensing

5) Operating: 5 to 95% non-condensing

3. **Noise Tolerance:** The DCSP shall furnish and install sound adsorption materials within/over (i.e., printer covers) DCS equipment enclosures to be installed in those area control centers where DCS devices share work space with personnel to ensure that, with only the DCS equipment operating, the ambient dB level is 55 dB or less when monitored three (3) feet from the operating DCS equipment.

4. **Environmental Operating Range:** All indoor and outdoor enclosures shall be suitable for operation in the ambient conditions associated with the locations designated in the Control Documents. Heating, cooling, and dehumidifying devices shall be incorporated in order to maintain all devices 20% below their rated environmental operating ranges. The DCSP shall furnish all internal power wiring for these devices (i.e., heaters, fans, etc.). Enclosures suitable for the environment shall be furnished. All instrumentation in hazardous areas shall be suitable for use in the particular hazardous/classified location in which it is to be installed, and be in conformance with the National Electrical Code (NEC).

5. **Surge and Radio Interference:** All DCS devices shall be IEEE surge withstand qualified. Radio Frequency Protection (RFI) shall conform to SAMA-PMC-33.1.

6. Each PCM shall be provided with an RTD which reports the control room temperature excursions associated with PCM enclosures. For those PCM enclosures which utilize purging, sensors shall be provided which report to the control room to high temperature, low pressure, and "door ajar" conditions. All I/O and sensors associated with enclosure monitoring are to be furnished by the DCSP.

E. **Equipment Locations:** The DCS configurations indicated are diagrammatic. The locations of equipment are approximate. The exact locations and routing of wiring and cables shall be governed by structural conditions and physical interferences and by the location of electrical terminations on equipment. All equipment shall be located and installed so that it will be readily accessible for operation and maintenance. Where job conditions require reasonable changes in approximated locations and arrangements, or when the OWNER exercises the right to require changes in location of equipment which do not impact material quantities or cause material rework, the DCSP shall make such changes without extra cost to the OWNER.

F. **Alternative Equipment and Methods:** Equipment or methods requiring redesign of any project details are not acceptable without prior written approval of the CONSTRUCTION MANAGER. Any changes inherent to a proposed alternative, including design modifications, shall be at no additional cost to the OWNER or CONSTRUCTION MANAGER. The required approval shall be obtained by the DCSP prior to submittal of shop drawings and data. Any proposal for approval of alternative equipment or methods shall include evidence of improved performance, operational advantage and maintenance enhancement over the equipment or method specified, or shall include evidence that a specified component is not available.

G. **DCS Project Growth**: All equipment furnished under this contract will be provided with not only the resources required to meet the function requirements of this project but in addition, all equipment and resources including PCMs; I/O cards; graphic displays; data base; reporting packages; RAM, disks, processor cycle time and memory, etc., shall be provided to accommodate a [20] percent growth in project requirements. All equipment and resources, including but not limited to all costs associated with equipment procurement, equipment testing, system documentation, project management, system engineering, modification to documentation, etc, shall be provided under this contract such that the entire twenty (20) percent project growth can be implemented into the DCS without any additional cost to the OWNER. The 20 percent spare I/O point requirement shall be calculated by rounding calculations down when the fractional I/O point counts are less than 0.5 and rounding up to the nearest integer when fractional points are equal to or exceed 0.5. Fractional I/O card counts shall be rounded up.

H. **DCS Ultimate Project Growth**: In addition to and over-and-above the requirements of paragraph 2.1 G, the entire DCS being furnished under this contract shall be capable of being modularly expanded to accommodate a 100 percent increase in process I/O points, process report/display requirements and manual input requirements. All equipment and resources provided under this contract shall be able to be modularly accept the anticipated future expansion without the need to replace or retire any DCS component or resource. The DCS provided shall be able to incorporate the ultimate system growth without any degradation of monitoring, control, or display response times. As a minimum, all DCS devices shall be sized to accept the DCS ultimate growth (current requirements multiplied by 2.2).

I. **Uninterruptible Power Systems:** All DCS components shall be powered from utility and (except for laser printers) UPS. UPS shall be furnished for DCS components in conformance with the requirements of Section 16611. All UPS for the DCS shall be sized by the DCSP to furnish a minimum ride-through time of 30 minutes. The

DCSP shall also furnish all wire, conduit, and I/O boards to enable the DCS to monitor the following functions associated with all instrumentation and DCS UPS;

1. Normal Mode
2. Emergency Mode
3. Bypass Mode
4. Low Battery
5. Trouble
6. Alarm

J. **PRIMARY SYSTEM COMPONENTS:** The DCS shall consist of the following primary components;

1. Process Control Modules (PCMs): PCMs shall be directly hardwired to process I/O, intelligent transmitters, and Programmable Logic Controllers (PLCs). All PCMs shall be fault tolerant. PCMs shall receive power from dedicated UPS or, in the event of a failure to the UPS, from the supply power to the UPS. Each PCM shall contain all of the required data acquisition, alarming and control strategies required to monitor and control its associated process. PCMs shall be configured by operator interface devices called Workstations (WS) which utilize object-oriented interactive editors to download database and control configurations over the Process Information Network (PIN). The failure of any other DCS device shall not affect the monitoring and control capabilities of the PCMs. PCMs shall dual ported to communicate with other DCS devices over the Process Information Network (PIN). For additional PCM requirements, see paragraph 2.2.

2. Process Inputs/ Outputs (I/O): All process I/O shall be terminated in an enclosure which is proximal or integral with the PCM that is associated with the I/O. All I/O modules shall be IEEE surge withstand qualified with individual A/D and D/A converters on a per-point basis.

    a. If the DCSP'S analog input/analog output I/O boards do not provide A/D and D/A conversion on a per-point basis, or adequate signal isolation, the DCSP shall:

        1) Furnish spare analog input/analog output or AD/DA boards to conform to the per-point requirement (i.e. if a board has 8 inputs which share an A/D, seven spare analog input boards or seven spare A/D converter boards shall be furnished.

        2) Partition I/O so that the failure of an I/O board will not disable a control strategy. If the implementation of this partitioning results in the need to provide additional analog input/analog output boards, they shall be furnished by the DCSP at no additional cost to the Owner.

3) Furnish and install signal isolators on the field side termination assembly of the PCM on a per-point basis.

b. For additional requirements, see paragraph 2.3.

c. All I/O shall be optically isolated. Process I/O shall accept the following variations:

1) Analog Inputs To DCS

a) Four (4) wire transmitters shall provide an isolated 4 to 20 mA signal.

b) Two (2) wire transmitters shall provide an isolated 4 to 20 mA signal powered from dc power supplies internal to the DCS.

c) The DCS shall have a fixed 4-20 ma analog input load of 250 ohms. Provision shall be made to ensure continuity of the loop independent of the DCS equipment status.

2) Analog Outputs From DCS

a) Outputs shall be isolated 4 to 20 mA dc signals powered from the DCS

b) Signal shall be capable of driving a loop impedance of 0 to six hundred (600) ohms or greater.

3) Discrete Inputs To DCS

a) Inputs shall be unpowered, isolated contact closures rated at 1A at 24 V dc. Contacts shall be of noble metal or hermetically sealed.

b) The DCS shall monitor the inputs using internal 24V dc power supplies.

c) Field contacts for alarms will be wired to discrete inputs in a fail-safe mode; i.e. an open wire will result in an alarm.

4) Discrete Outputs From DCS

a) Outputs shall be unpowered, isolated contacts rated at 5 amps, 120V ac.

b) 120V ac power for sensing all discrete outputs shall be provided external to the DCS.

5) Intelligent Transmitter Interface To DCS

a) Intelligent transmitters shall communicate with the DCS using a bi-directional communication interface.

b) The DCS interface shall enable remote transmitter configuration and simultaneous DCS database updating from a DCS workstation (WS).

d. Programmable Logic Controller (PLC) Interface With DCS

1) The instrumentation panels to be provided under Section 13300 shall be provided with PLC controllers and membrane LED displays in lieu of the specified relays and window-box annunciators.

2) PLCs shall communicate with the DCS using serial communication cables furnished and installed by others. Protocol shall be one of the following:

a) Modbus RTU, with the PLC acting as the slave.

b) Ethernet

3. **Workstations (WS):** WS devices shall be dual ported to the PIN to provide the operations staff with an object oriented advanced Graphical User Interface (GUI) used to monitor and intervene in the control of process areas. The sharing of electronics between any type of workstation device (i.e., WSs, PCWSs) is not permitted. Each workstation device shall be stand-alone. Each WS shall be X-WINDOW compliant and serve as a device which shall have all the utilities required to perform network management and system configuration functions (i.e. database, control strategies, process graphics, report formats, trends, x-y plots, alarm reports, etc). WS devices shall also be ported to the Facility Information Network (FIN) which provides;

a. An interface into all FIN connected devices.

b. Communicate with the Department Information Network (DIN) to support WS information requests and to service requests from other DIN/FIN connected devices. This interconnectivity shall enable all WS, independent of their physical locations, to access all information which is available to another WS. All WS functionality shall be regulated by password authorization. Each WS shall interface with the various networks using the X-Window facility provided at each WS. For additional WS requirements, see paragraph 2.5.

4. **Process Information Network (PIN)**: The PIN shall consist of communications processors and fiber optic cables all of shall be dual ported into all connected DCS devices. The PIN, in its installed configuration shall be fault tolerant. The PIN provides connectivity between the WSs, PCMs, and the Historian System (HS) to enable the timely update and archiving of process information and timely control response. For additional PIN requirements, see paragraph 2.4.

5. **Redundant Historian System (HS):** The HS shall consist of a fault tolerant processor, each with mass storage modules, data management and reporting software, and peripheral devices needed to support and maintain the HS. The HS shall be dual ported into the PIN in a fault tolerant manner. Additionally, the HS shall be ported into the FIN to provide connectivity with FIN devices. For additional HS requirements, see paragraph 2.8.

6. **Facility Information Network (FIN):** The FIN shall provide connectivity between the DCS and plant facility management systems. The FIN shall specifically have connectivity to WS and HS devices using X-Window facilities. For additional FIN requirements, see paragraph 2.4.

7. **Department Information Network (DIN):** The DIN shall provide connectivity between the all Department facilities and resources by virtue of a network which incorporates high-speed fiber, and telephone data links and radio technology. For additional DIN requirements, see paragraph 2.4.

## 2.2 PROCESS CONTROL MODULES

A. **General**: The PCM shall be a 32 bit microprocessor with on-board random access memory (RAM) for read/write functions. The PCM, in conjunction with field Input/Output (I/O) modules shall perform all system data acquisition, alarm detection, regulatory, logic, timing and sequential process control. PCMs shall perform continuous control, sequential control, and data acquisition concurrently in the same microprocessor. PCMs shall communicate with the Historian System (HS), Workstations (WS) over the Process Information Network (PIN). All PCMs shall be fault tolerant and be provided with the implemented built-in capability to provide continued correct execution in the presence of the failure of a common logic board or software faults. Failover from one processor to another shall occur within 1000 ms. Each PCM shall be supplied to provide complete redundancy (excluding I/O) configured for fault tolerant processing via standard system configuration procedures. Fault tolerant features shall each include, but not be limited to, control processors, power supplies, wiring and buses. PCM's shall be remotely configurable from WSs over the PIN. Each PCM shall have the capacity to accommodate a minimum of 2000 field-originated I/O points, without requiring additional memory or processors, assuming a mix of 25% analog I/O and 75% discrete, with 50% of memory reserved for control logic

B. **Communications:** PCM's shall communicate with each other directly in a peer-to-peer manner using peer protocol or logical link protocol in which the sequence of message exchanges between two entities in the same layer is facilitated by utilizing the services of underlying layers to effect the successful transfer of data/control information from one location to another location.

C. **PCM Functionality:** Independent of the operation or failure of any other DCS device, the PCM shall perform the following core or essential functions;

1. Real-time data acquisition at scan rates specified at the WSs.

2. Perform input signal smoothing, averaging, or totalization, as required.

3. Alarm limit checking for absolute limits, deviation rates, or warning limits on *designated variables*.

4. Real-time process control based on logic and control strategies downloaded from the WSs to the PCM's over the PIN.

5. Communicate variable data information (i.e., current value, alarm status, set point, output control constants, etc.) to the HS and WSs.

6. Communicate with all other system processors regardless of their function without the need for hardware or software gateways. Respond to interrogations for data and receive downloaded operating system, processing records, point data base information and updated parameters for application programs operating in the PCM.

7. Perform regulatory, logic and sequential control based on configuration data written in a high level process oriented control language, compiled, and downloaded to the PCM.

8. Have an extensive array of self-diagnostics which test and report on the integrity of each printed circuit board in the common logic file in addition to I/O failures. Errors and/or failures shall be indicated locally by Light Emitting Diode (LED) and reported at the WSs.

9. The PCM shall function as a stand-alone unit which performs all of the functions described herein completely independent from the functioning of the HS device, WSs, the PIN, bridges, routers or other PCMs, i.e., a failure. Any device furnished under this section or other PCM(s) shall not impact data acquisition, control, scaling, alarm checking, or communication functions of a given PCM.

D. **PCM Hardware Component Platform**: Each PCMs hardware platform shall use fully redundant Intel or Intel-compatible microprocessors, each with its own bus connection. No hard disks or other moving parts shall be used. The PCM shall consist of the following components:

1. **Microprocessor Unit**: The microprocessor CPU shall be a CISC- complex Instruction Set Computer or a RISC-Reduced Instruction Set Computer. The CPU shall conform to the following:

   a. Intel-compatible 32 BIT processor, 400 MHz or faster

   b. Floating point processor.

   c. Crystal controlled real time clock.

   d. Power fail/auto restart.

   e. Watch dog timer protection (hardware or API).

   f. Redundant isolated power supplies (may be shared with I/O)

   g. Serial interface to process I/O.

   h. Priority interrupt driven.

2. **Memory**: CPU memory shall be on-board and shall conform to the following:

   a. CMOS shared RAM memory with battery backup. After the configuration of all database and control strategies which incorporate the current I/O quantities plus the 20 percent growth required under 2.1 G, each PCM shall have 25 percent of its memory which is dedicated to (1) the storage of

database and control strategies and (2) field I/O termination points unused with both resources available for future expansion. Requirements for spare memory capacity may be, on approval by the Engineer, applied on a Facility basis.

b. Cache memory which is positioned between the CPU and the bus which maintains a copy of referenced data from the shared memory.

c. CMOS-ROM or EPROM in which firmware and the operating system resides.

3. RESERVED

2.3 PROCESS INPUTS/OUTPUTS (I/O)

A. General: Process I/O modules shall be rack mounted or DIN rail-mounted in an enclosure which is proximal or integral to/with the associated PCM. All process I/O boards shall be slot independent i.e. any I/O card can occupy any card slot. The backplane of the I/O nest shall permit the removal of I/O cards without the need to remove power from the I/O card being removed. All process I/O channels shall be electrically isolated (input isolated, output isolated, and power isolated) from field terminations and adjacent channels as defined in ISA-S50.1.

B. All I/O boards shall conform to ANSI/IEEE C37.90-1989 for surge withstand capability and EN50082-2 for electromagnetic compatibility immunity.

C. Analog input boards shall provide 120 dB at 50 or 60 Hz and 60 dB common mode and normal mode noise rejection respectively. Analog Input boards shall have an on-board isolation of 500 DCV pr peak ac between channels or channel to ground.

D. Analog input boards or modules shall be provided to interface with process I/O and intelligent transmitters as follows;

1. Analog input boards shall be provided to accept 4-20 mA, pulse frequency, and thermocouple (Type K, T, J, R, and S) inputs. Through board level jumper selection on a point-by-point basis, the analog input channel can act as either source for two wire transmitters) or sink (four wire transmitters). Each analog input shall have a minimum of 12-bit resolution, minimum accuracy of plus or minus 0.1 percent, maximum long-term drift of 0.02 percent, and a dedicated A/D converter.

2. Intelligent transmitter modules (ITMs) which allow receiving continuous self-diagnostic data shall be provided. The reading of transmitter data or value shall not disturb or interfere with the reading of the measurement signal.

a. Intelligent process instrumentation shall be directly connected to the DCS through a bi-directional digital communication interface at the PCM. Analog transmission of variables from intelligent transmitters shall not be acceptable.

b. Each ITM shall contain a minimum of six (6) individual channels, each of which provides isolated power and communication to the intelligent device. All digital communication with the intelligent process instrumentation from

the DCS WS shall be in engineering units and shall be received a minimum of ten (10) times per second. Each message shall contain the following;

1) Primary measurement information such as flow, pressure, level, etc.

2) Transmitter temperature readings in a 32 bit floating point format which complies with IEEE.

3) Data security information

4) Diagnostic information

5) Message checking

c. Information (when available from the field instrument), which shall be displayable at any DCS WS, shall include:

1) The assignment of configurable parameters such as tag number, location, address, tag name, designation of digital or 4 to 20 mA output, upper and lower range values, zero elevation or suppression, linear or square root output for d/p cells, and damping time.

2) Perform a loop integrity check.

3) Rearrange without using calibrating input pressure.

4) Display the 4 to 20 mA signal in terms of percent of span, or engineering units.

5) Last calibration date.

6) Fail-safe direction.

7) Read process variables in user selected engineering units.

8) Diagnose problems and determine fault between processor or transmitter.

d. All ITMs shall be slot independent. ITM operation shall not be impacted in the event that one of a pair of fault tolerant PCM processor fails.

e. The transmitter bus provided shall where indicated provide ISA SP50, or ISP (interOperable Systems Project) connectivity.

f. In addition to ISA SP 50 and ISP conformity, all ITM devices shall be furnished to communicate with devices which use the HART protocol.

E. Analog output boards shall be provided to output 4-20 mA commands. Each analog output shall have a minimum of 12-bit resolution, accuracy of 0.1 percent of full scale, and a dedicated D/A converter.

F. Discrete input boards shall be of the voltage monitoring type and shall be powered by the PCM. The discrete input board shall accept 24 V dc.

G. Discrete output boards shall be unpowered isolated contacts rated for 5 amps at 120 V ac.

H. PLCs shall interface to the DCS through a foreign processor interface (FPI) which is defined as follows;

1. The DCS shall be provided with an integrated foreign processor interface (FPI) in the PCM which supports monitoring and control of the PLC. The FPI shall support the following protocols: MODBUS (master), Allen-Bradley DF1. The FPI shall be fault-tolerant and redundant where indicated.

2. The DCS shall have an open architecture which shall enable the FPI to provide a means of integration of with multiple vendors in a manner which is transparent to the user at the WS level. All of the data associated with the FPI shall appear at the WS as being identical in format and presentation to data derived from PCMs. All WS interaction functions that the operator uses to monitor and control inputs/outputs associated with the PLC(s) shall be identical as those used by the operator to interact with inputs / outputs associated with the PCM(s).

3. The FPI shall be provided to interface with all PLCs which provide inputs/outputs to the DCS.

4. The FPI shall support the following functions;

a. PLC-derived data shall appear identical to PCM-derived data in the process I/O data base for PCM-to PCM communications.

b. The ability to have closely-coupled continuous and sequential control strategies which involve PCM and PLC coordination.

## 2.4 COMMUNICATION SYSTEMS

A. **General:** Data communication subsystems shall be comprised of industrial grade redundant communication buses that provide high speed data transmission between all distributed processors and I/O modules. Each communication network shall be designed around the International Standards Organization's Open System Interconnection (OSI) model, IEEE 802 or ANSI X3T12 industry standards and support a hierarchical communications network. Communications shall be masterless with communications residing in each distributed processor. All communication cables shall be installed in conduits. The DCSP shall review the contract drawings to review the current communications system design. The DCSP shall furnish all cable required to accommodate the communications system being provided. The PIN and the FIN may be integrated into a single Fast Ethernet network, provided that the PIN real-time data uses synchronous mode transmission.

B. **Low-Level Protocols**: Physical and data link layer protocols shall support local area networks (LANs), metropolitan area networks or wide area networks (WANs). Information shall be conveyed in packets with a sustained signaling rate of at least 2 million bits per second.

C. **Mid-Level Protocols**: Network and transport layer protocols shall provide addressing and routing facilities to enable a host on one network to send a block of information to host located on another network thereby expanding a host's communication environment from a single network to a network of networks, or an ethernet, joining addressable hosts. Mid-level protocols shall support the implementation of half-gateways i.e., LAN - backbone coupling and full gateways i.e., LAN-LAN couplings. Node-node gateways shall perform protocol translation and if necessary implement virtual circuits where required. For those applications which access the network layer directly, a programming interface shall be implemented in the packet network to facilitate the use of datagrams i.e., blocks of information embedded within single packets which can be sent to individual hosts without using additional protocol software.

D. **High-Level Protocols**: The Session, Presentation, and Application Layers shall use the transport mechanism provided by the Mid-Level Protocols to implement a distributed computational environment. Session Layer services shall augment the virtual circuit facilities present at the Transport Layer. The Presentation Layer shall regulate the representation of data items conveyed across the network. Support for the ONC (Open Network Computing) product suite (i.e. XDR, RPC, NIS, NIS+), BSD sockets, SYS V streams shall be provided.

E. **Process Information Network (PIN)**: The DCSP shall furnish and oversee the installation of a Process Information Network (PIN) which shall connect all DCS and information system devices in a manner which creates an environment in which applications on distinct devices shall accomplish work cooperatively by sharing information as well as synchronizing the operation of the two applications of a common task. The PIN shall be the DCSP's standard and most secure offering for a process control network, and shall use a physical star and/or Fast Ethernet topology. The PIN shall conform to the following;

1. Each DCS and information system device shall be furnished with a PIN communication device, complete with detailed device command algorithms encoded as processor instructions, to manage the device/controller interface.

2. The PIN shall be able to support the system response times stated in paragraph 2.5 with a database sized in conformance with 2.1 H (i.e. 220% of the current database).

3. The PIN shall utilize redundant fiber optic cables between structures. Within structures, Category 5 unshielded twisted pair cable (UTP) may be used, provided that levels of induced electrical noise do not interfere with data transmission. The cables shall be furnished and installed by the DCSP.

4. The DCSP shall review the contract documents to determine if the conduit system meets the DCSP's requirements, determine the exact length requirements and to compare the tensile strength associated with the cable to be provided with the handhole/pullbox spacing indicated in the contract documents. If additional handholes/pullboxes are needed to accommodate the characteristics of the DCSPS cable, they shall be furnished by the DCSP at no expense to the OWNER. The PIN shall utilize a medium which as a minimum conforms to the following:

a. Industrial grade, water resistant optic fiber, coated with a suitable material to preserve the intrinsic strength of the glass, suitable for installation in conduits which are encased/directly buried/ cable trays.

b. Cable of all dielectric construction.

c. Multi-mode, graded index, solid glass waveguides with the following characteristics:

- Nominal core diameter 62.5 microns
- Minimum ellipicity 2.0 percent
- Outside clad diameter 125.0 microns
- Maximum Numerical Aperture (NA) 0.275
- Maximum attenuation (850) 3.75 dB/Km
- Maximum attenuation (1,300) 1.5 dB/Km

d. Each fiber continuous with no factory splices.

e. Tight buffer.

f. Fast Ethernet compatible.

g. Drop cables shall be of variable lengths of flexible fiber optic cable, typically not to exceed 400 feet so that loss in the drop cable is less than 1 dB. This length of drop cable shall permit relative freedom in routing the trunk cable and locating the station.

F. **Facility Information Network (FIN):** The intent of these contract documents is to conceptually describe the desired level of functionality and key criteria associated with the FIN.

1. **FIN CONCEPTS:** The FIN shall connect all WSs associated with the facility with multiple file servers which will run various future applications. The FIN shall provide connectivity between the DCS and plant facility management systems. The FIN shall specifically have connectivity to WS and HS devices. Each WS shall interact with (i.e. monitor and manipulate data) resources associated with the FIN. The HS shall provide a DCS historical resource for the FIN connected devices to support FIN applications. All FIN resources and applications, including those implemented under this contract and future applications, shall all be accessible and manipulable from the WS in a manner that is identical to any terminal directly connected to the FIN while the WS is using X-WINDOW utilities. The FIN shall have access to the current DCS database, all WS display graphics, and the DCS historical database. Any PCWS device connected to the FIN shall have monitoring and display capabilities equivalent to that of the WSs.

2. **FIN Design Criteria:** The FIN shall enable plant staff to select different third-party applications which run on varying hardware and software platforms. The FIN shall comply with IEEE 802.3 for 10 BASE-T Ethernet, or IEEE 802.3u Fast Ethernet (100BASE-T). Within a building, the FIN configuration shall provide a dedicated 10 Mbps Ethernet 10BaseT port to each device on the FIN, using switched Ethernet. Switching shall use the fragment-free or store-and-forward

method. Stackable switching hubs, provided with UPS power, shall provide support for SNMP management, and for multiple MAC addresses. External to a building, backbone connections to the switching hubs shall be 100 Mbps Fast Ethernet. All FIN WSs and PCWSs shall be provided with 10/100 network interface cards. The FIN to be designed and furnished by the DCSP shall conform to the following;

a. Machine Independent

b. Operating system independent

c. Network independent

d. Transport protocol independent

e. Accommodate multiple servers

f. Accommodate 75 nodes

3. **FIN Cable Installation:** The PROVIDER shall furnish all FIN cable. FIN cable shall conform to the cable specified for the PIN, and when routed through the process areas, shall be installed in the same conduits as the PIN. In the operations building, the FIN cable shall be routed to a patch panel which shall be provided under this contract. The patch panel shall be located as shown on the contract drawings. From the patch panel, the FIN shall be extended to the various office sites as indicated on the electrical drawings. From the patch panel, the FIN shall be extended to the various office sites (as shown on the contract electrical drawings of the Reference Documents) using **two** 4-pair solid conductor #24 AWG cable wired in conformance with the EIA/TIA-568a cabling specifications and recommendations. The untwisted pair (UTP) cable shall not be run in conduits that carry electrical cable and shall not be run near fluorescent lights or large electromagnetic machinery. Teflon sheaths shall be used for plenum installations. All closet connections and wall plates shall be clearly labeled for easy identification of origin and end node. UTP shall be AT&T DIW 24/4 EIA/TIA 568 Category 5, or equal.

4. For connections between buildings, multi-mode fiber shall be used. The PIN and FIN may be different strands within the same bundle of fiber. The PROVIDER shall allocate one spare strand for every strand used for PIN and FIN application.

5. Fiber optic cable terminations: All fiber optic cables shall be terminated in a fiber optic patch panel, Siecor model WCC or equal, with epoxy- type ST connectors. One fiber optic jumper cable shall be provided for each fiber.

6. **FIN Testing**: The capability of FIN devices to extract data from the PIN and compile this data into Excel spreadsheets shall be tested. The capability of WSs and other FIN devices to use the Microsoft Office and Microsoft Windows resources shall be tested.

G. **Department Information Network (DIN):** The intent of these contract documents is to conceptually describe the desired level of functionality and key criteria associated with the DIN.

1. **DIN CONCEPTS:** The DIN shall interconnect with the FINs and PINs associated with North City Water Reclamation Plant (NCWRP), Metropolitan Biosolids Center (MBC), Point Loma Wastewater Treatment Plant (PLWTP), and the South Bay Water reclamation Plant (SBWRP). This interconnection shall utilize a multistranded single-mode fiber optic One Gigabit Ethernet data communication link between all facilities.

2. A WS at any facility shall be identical to and have the same access to all process displays and FIN data via a remote X-windows session. Serial data transport within the DIN to the existing Ovation system at COMC shall be configured for selected real-time and calculated process data to be placed onto the COMC PIN for display and control.

3. **DIN Design Criteria:** The DIN shall provide a service backbone network for the Department. At the COMC control room at MOC 2, the WSs located in the Department Headquarters shall have the capability of the following;

   a. Dynamically view any WS process display screen associated with the selected facility connected to the DIN.

   b. View all displays associated every facilities' FIN resources. This shall include dynamically linking into MMS, MIS, LIMS, etc data associated with the selected facility.

   c. View current and historical associated with both the PIN and FIN resources at any facility.

   d. Receive, in a dynamic manner, all high priority alarms associated with any facility.

   e. Generate overview process reports based on data extracted from each plants historical database. Reports shall be generated on a daily, weekly, monthly and annual basis.

   f. Generate overview reports based on data extracted from each plant's FIN database, such as management / maintenance / laboratory / process data. Reports shall be generated on a daily, weekly, monthly and annual basis.

   g. Receive a selected set of real-time process data at COMC and alarms for display on an inter-facility overview graphic. A total of 100 digital I/O and 50 analog points shall be implemented.

## 2.5 WORKSTATIONS (WS)

A. **General**: Each WS platform shall feature graphics, multitasking with preemptive priority scheduling and virtual memory to enable concurrent processing without degradation of response times required for critical tasks, and networking capabilities that enable the workstations to run sophisticated applications and bridge the gap between various MIS functions and the process. WSs shall function as a stand alone process control and system configuration device. Each WS shall have the resources to maintain an integrated facility-wide, department-wide, and community-

wide database. WSs shall present a windowed, high resolution, color-graphic interface to the operator in the depiction of present and past values of process.

B. **WS Functionality**: The DCS shall be provided with WSs that provide an engineering interface to the control system. The WS shall be designed to function as a workstation for process control and instrumentation engineers. The WS interface shall operate in both a (1) fill-in-the blanks mode wherein the user interacts through an interactive prompt and response sequence and (2) a graphics-oriented mode wherein the user implements control logic & CRT based graphics by physically drawing configurations and schematics on the screen. The WS shall have inherent pan and zoom features which enable the display of control schemes, logic and displays which exceed the spatial constraints of a CRT screen. Each WS shall be configured to be universal in scope (e.g. have access to all system displays and data). Each WS shall have a password security system to prevent the unauthorized access of system configuration activities. The security system shall be comprised of at least 12 layers of prescribed access with associated authority. While the WS is in a configuration mode, all data entered shall be subject to reasonableness and validity checks. If an invalid/unreasonable input has been made, the engineering interface shall detect the condition and provide prompts or help facilities.

C. **WS Display Response Times**: The interactive shared display system coupled with the data communication networks described herein shall perform in accordance with the following response dynamics:

1. Steady state displays shall display data which is no more than one (1) second old.

2. The time between an Operator manipulation and a reaction at the final control element shall not exceed two (2) seconds.

3. The elapsed time from when the Operator requests a new display to a display being presented shall not exceed one (1) seconds.

4. These times do not apply to remote X-Windows WS.

D. **Operator Interaction**: The Operator shall be provided with a means of interacting with the various displays which assist monitoring (overviews), permit control intervention (groups), provide parameter review and adjustment (detail), are predictive (trends) and assist the Operator in diagnostics (alarms, schematics, menus). The Operator shall interact with these displays, order changes in values, and modify configurations in a man-machine conversational mode via the following two interfaces: track ball or mouse, standard keyboard. The entry device shall be integrated with the man-machine design structure to enable a minimum amount of key strokes in common operations such as "Alarm Acknowledge" and "On/Off", "Fast/Slow" manipulations. Long strings of alphanumeric coded entries via buttons are unacceptable for process operating procedures.

E. **WS Hardware Component Platform**: Each WSs hardware platform shall utilize a Reduced Instruction Set Computer (RISC) with integrated mass storage and communication devices to enable independent stand-alone operation. All hardware platforms which comprise the DCS shall exhibit object code compatibility in that the same object code can be executed on all hardware platform implementations with

the need to recompile, relink, or change formats. The following WS hardware and software requirements present minimum requirements. The DCSP shall furnish all additional resources required to meet the requirements of these specification.

1. 64 bit, 1.34 GHz floating point RISC processor, with 1 MB on-chip cache.
2. PCI bus.
3. 19" LCD Color Monitor:
   a. 1152x900 @ 66Hz, 76Hz , 1280x1024 @ 67Hz, 76Hz,1600x1200 @ 75Hz
4. Total of 1GB of DIMM on the motherboard, with a maximum capacity of 8 GB.
5. 80 GB (1 x 80 GB) 7200 rpm SATA Disk.
6. One dual DVD
7. Sun XVR Graphics Accelerator.
8. 2 x 10/100/1000 Ethernet, 3 PCI-E, 2 PCI-X.
9. RESERVED
10. Sun Ultra 25 workstation or equal.

F. **WS Operating System (OS) Software**: The OS shall comply with the requirements of paragraph 2.14.

G. **WS database Management System (DBMS)**: Each WS shall have its own Real-Time Data Base (RTDB) that reflects the current state of all process variables. All real time process data shall be available to any WS connected to the PIN.

H. **WS Tools Platforms (TP)**: The TP shall extend the functionality of the multitasking OS by providing application tools or extensions of the OSS platform. The TP shall provide, through a procedural call interface, software to support:

1. User-operating system interface (shells) to allow the user to manipulate files and run application programs in a concurrent manner.
2. Database management systems (DBMS) which employ Structured Query Language (SQL) interface to a relational database. Shell environment variables to support SQL shall be configured for Oracle.
3. Multimedia input/output to mass storage and image input/output i.e., optical disks using mapped files and special storage device drivers incorporated into the OS platform.

I. **WS Standards Compliance**: The following standards shall apply to maximize the interoperability and connectivity of the system and to provide object code compatibility between all hardware platforms used on this project:

1. Floating point processor shall comply with IEEE-754.

2. Network communications shall comply with IEEE-802.3/802.4.

3. Peripheral interface shall comply with Ultra-SCSI

4. Compatible with network protocols TCP/IP.

5. User interface based on X Windows, X11.

2.6 PERSONAL COMPUTER (PCWS) WORKSTATION

A. **General:** Where indicated, PCWSs shall be utilized as an interface device to access PIN, FIN, or DIN data. Trackball or mouse devices shall be the primary operator input devices, with keyboards as the supplementary input device. All PCWSs shall be functionally interchangeable and identical in display arrangements, menu selections, command terminology, and data access methods. All PCs shall be capable of accessing both typical operator process control functions and engineering configuration functions, through configurable software modes using X-WINDOWS. PCWS functional modes shall be password protected for system security and user identification.

B. Each PCWS shall consist of individual electronics (i.e., PCWS electronics shall NOT be shared amongst more than one PCWS) to support one 19-inch high resolution LCD, network communications and utilize a password-protected resource configuration mode for high level system and control configuration. PCWSs shall function with equal process monitoring and manipulation capability, thereby giving complete flexibility for password-protection of configuration and assignment of displays and software modes for a given situation.

C. Each PCWS shall be as follows:

1. Each PCWS shall be as follows:

2. A motherboard with 32-bit bus width using PCI.

3. An Intel Core duo processor CPU, highest speed currently available, 2.66 GHz or faster.

4. 2 GB SDRAM

5. 3 Universal Serial Bus (USB) ports

6. Minimum 400 GB EIDE hard drive, with 7200 or higher spindle speed.

7. RESERVED

8. Four expansion slots: 2 PCI, 2 PCI express

9. A 19" LCD monitor with 128 MB graphic/video card, NVIDIA GeForce 7350LE or equal

10. A combination Ethernet/Fast Ethernet TP network interface card

11. A PC compatible mouse, Microsoft or equal

12. A 20 - speed CD ROM/ 10X Re-Writable (CDR/CDRW) drive

13. RESERVED

14. A keyboard

15. A tower case with dual fans and 300+ watt power supply, FCC Class B certified

16. Preloaded Microsoft Windows XP Professional, Microsoft Office (latest version).

## 2.7 HISTORIAN SYSTEMS

A. **General:** The Historian Systems (HS) shall consist of a set of fault tolerant microprocessor stations which executes computation intensive file server functions to support system and historical data management functions. The HS shall:

1. Communicate with internal electronics over the highway network with all system processors to execute requests of bulk storage file data.

2. Collect performance statistics, perform processor reloads, provide message broadcasting, handle all processor alarms and messages, and maintain consistent time and date information in all system processors.

3. Maintain a process information data base to support historical data storage, retrieval operations, report/log generation, trending, event reconstruction, operator "help" and system electronic documentation.

4. Maintains an on-line plant-wide historical database which contains the following:

   a. Analog values on change in excess of a settable dead band.

   b. Digital points on change of state.

   c. Operator event messages (operator actions)

   d. Alarm messages

   e. Point attributes

   f. Sequence of Event (SOE) messages

   g. File/report storage

5. Data Storage: Either of the following shall be provided:

   a. A contemporary database consisting of the most recent ninety (90) days of six (6) second averages of all analog and calculated values.

      1) This storage segment shall be sized on the basis of accommodating a number of variables equal to twice the number of analog inputs associated with this project. After data is over ninety (90) days old,

data shall automatically compressed into the storage of hourly averages and daily averages. This compressed data shall be stored on line for a minimum period of two (2) years. Subsequent to the expiration of the two (2) year period, data shall be archived to either optical or tape mediums. The selection of the medium shall be user selectable. Adequate resources shall be provided in both mediums to archive a total of two (2) years of data.

2) An alarm and event database which retains discrete occurrences with timestamps for a period of one (1) year. This storage segment shall be sized on the basis of 1/100th of the number of discrete inputs associated with this project being stored each minute. Subsequent to the expiration of the one (1) year period, data shall be archived to either optical or tape mediums. The selection of the medium shall be user selectable. Adequate resources shall be provided in both mediums to archive a total of one (1) year of data

b. Alternatively, all specified data may be stored and compression/averaging done during retrieval. Data shall be backed up to the optical disk on a daily basis. Digital values shall be stored, at a minimum, whenever a change of state occurs, and analog data stored whenever a change in its value exceeds a specified dead band. Sufficient fixed-disk space shall be provided to store 1000 analog points and 3000 digital points for 200 days, with 400 days available on optical disk, with the following assumptions:

1) Each stored analog point exceeds dead bands 5 times per minute.

2) Each stored digital point changes state once every 100 minutes.

3) Point attributes are saved once per week

4) A total of 7000 operator event messages

5) A total of 3500 alarm messages

6) A total of 1400 SOE messages

7) File/report storage is not included.

6. A report database shall be maintained by the retaining of all reports generated during a thirteen (13) month period. The recall of these reports from memory shall not require the recompiling of report data. At the user's option, all report data may also be copied to optical storage in parallel with the storage of report formats in FHS disk memory.

B. **Types**: The HS shall be a redundant Emerson Ovation System Historian.

C. **Historian Hardware:** The DCSP shall furnish all necessary interconnecting cables, accessories and appurtenances as well as additional processor or peripheral hardware as required for proper operation of the system and to meet the functional requirements indicated on the Drawings. The FHS processor shall be physically and functionally independent of other system processors, as indicated on the Drawings. All major FHS components and peripheral devices shall be of the same DCSP. The

FHS processor shall be capable of tolerating and riding through a power interruption of 100 milliseconds or less without interruption of normal operation. The FHS processor and peripherals shall be housed in a separate enclosure using a self-supporting mounting structure and shall not share any common components or devices with other processors.

1. Except as provided below, each FHS process shall comply with the requirements of Section 2.5, Workstations.

2. The CPU shall have the capacity to support all supplied software for the system without utilizing more than 50 percent of its processing capability during any 60 second interval. The spare processing capacity is required for future expansion of the system. The DCSP shall submit verification of this design requirement during the submittal phase of the project.

3. In addition to the HS having adequate storage and processing resources to support all specified software and system functionality, the FHS shall be provided with a minimum of fifty (50) percent spare processing and memory resources.

D. **Main Memory:** The CPU shall be provided with solid-state memory sized to meet the maximum operating requirements of the system as supplied, and shall include at least 100 percent spare capacity. Spare capacity must be completely free and available for the Owner's use at the time of final acceptance. The main memory supplied with the system shall be modularly expandable beyond that delivered with the initial system. It shall be possible to expand the main memory storage to **four** times that required by the initial system without requiring major software modification.

E. **Fixed Disks and removable Media:** The HS shall include not less than two fixed disks and one removable media drive. Additional disk or removable media drives shall be provided as required to meet capacity requirements.

1. The HS shall be provided with at least two (2) 160 - Gbyte fixed hard disk drives to store all system software, database information and all run-time data.

2. The HS shall be configured to back up the hard disk data to DLT IV tape via the DIN or FIN.

3. The HS shall also include one RAID array system for long term historical data storage. The RAID array shall receive historical data from the hard disk drive and shall meet the following requirements:

   a. Capacity up to 307 GB

   b. Cache memory: 128 MB

   c. Expansion: SCSI Daisy Chain

   d. Supports multiple RAID arrays.

   e. RAID levels: 0, 1, 0 + 1, 3, and 5.

   f. Data transfer rates: 160 MB / second per channel.

g. Disk tray, fan and power supplies shall be hot swappable.

h. Type: Raid Web Indy 2231 SCSI IDE Rack mount RAID or equal

4. Each media storage device shall incorporate parity or error-detecting code generation and checking. Detected errors shall be either corrected automatically or reported by FHS system management software for software action. RAID array shall automatically detect bad array sectors and failing disk drives before data is affected.

F. **FHS Communication Software:** The Historian/Log Server shall use the FIN and PIN for communications and printing tasks.

G. **FHS Data Connectivity:** All of the FHS data bases shall be ODBC (Open Data Base Connectivity) compliant. Ability to read data from standard ODBC applications such as Microsoft Excel, Access and Applix Data over the FIN shall be provided and demonstrated. Ovation API over the FIN shall be provided and demonstrated.

2.8 PERIPHERAL DEVICES

A. **General:** A peripheral device processor or internal printer server shall be provided to translate messages from other processor stations on the network into device specific messages. The processor shall provide the interface to hard copy output devices within the system and other terminal I/O devices.

B. **Peripheral Servers:** Peripheral servers, such as printer servers, shall enable 32-bit device network access to the FIN from any FIN-attached workstation. Server software drivers shall be supported by the network operating system, and all application software attached through a peripheral server shall use operating system services for peripheral access. Log/report printers shall be provided with peripheral servers.

C. **Log/Report Printers:** The log/report printers shall be Hewlett-Packard Laserjet 5200 with HP Jet Direct network card. A TCP/IP address shall be assigned to each printer.

1. 600 dots per inch

2. 12 pages per minute output

3. 35,000 pages per month duty cycle

4. 48-MB SIMM memory.

5. 350-sheet paper capacity

6. Internal 35 MHz processor with font management software

7. 45 scalable typefaces

D. **Ink Jet Printers:** Full color, non-impact, ink-jet type printer(s) shall be furnished to produce quality multi-colored reproductions of the graphic operator interface CRT displays. The printer shall produce an image on standard 8-1/2 x 11 inch single-

sheet paper in less than 120 seconds with a graphic resolution of 600 dpi black and 300 dots per inch color. Printer shall utilize four (black, cyan, magenta, and yellow) disposable print cartridges and be capable of accurately reproducing all color shades which can be generated for the DCS graphic displays. Printer shall also accept clear polyester film for creating transparencies of CRT displays, reports and logs. Printers shall have Adobe PostScript Level 2. Printers shall have **160 MB** built-in RAM, 250-sheet paper feeder, and shall be Hewlett-Packard Color LaserJet 3800N or equal. Printers shall be connected directly to the FIN using an internal printer server card.

E. **RESERVED.**

2.9 PERIPHERAL CABLING

A. The DCSP shall provide and install all peripheral device cables. The DCSP shall review the contract documents to determine exact length requirements.

2.10 EQUIPMENT ENCLOSURES AND CONSOLES

A. **General:** The DCS equipment furnished under this contract shall be housed in enclosures designed to provide physical and environmental protection for the interior modules, busses and terminations. All PCM enclosures shall be provided with dual feed, fully redundant power modules utilizing power auctioning to provide intermediate power to all enclosure components. Input power source shall be 120 Vac 60 Hz and 125 or 24 V dc. Enclosures shall contain racks which allow easy removal of all modules, i.e., processors, I/O boards, power supplies, etc. without removal of wiring or power. All modules shall be restrained to prevent accidental disconnection. Each enclosure shall be designed to pass through a 36 x 90 inch doorway opening. All equipment enclosures shall be UL-listed or certified by a qualified third party as meeting UL requirements.

B. ***Field Enclosures:*** *Field enclosures shall provide moisture and contaminant* protection and meet the electrical classification specified. Enclosures shall as a minimum provide NEMA 1 protection. Internal air circulation fans to aid in convection cooling or other means of temperature conditioning shall be provided as needed. Power and signal wiring shall enter the enclosures from its top or bottom section and terminate at termination assemblies residing in the bottom or side sections of the enclosure. Terminal connections shall support a single 12 AWG or two 14 AWG wires. A terminal shall be provided for each conductor of external circuits plus one ground for each internally powered analog signal shield. Each analog loop shall be individually fused with all fuses or circuit breakers clearly labeled and located for each maintenance if individual isolation is not provided at the board level.

C. **Area Control Room Consoles:** Area control room consoles shall be ergonomically designed to optimize the utilization of the WSs and printers, provide proper operational and maintenance access, and conceal interconnecting cables and wires. Consoles shall consist of free-standing high-quality modular office systems designed for computer use and support. The DCSP shall coordinate with the City to determine colors, materials, arrangement, and lighting. Each console shall provide covered storage space for reference materials, drawer unit(s) for office supplies, and at least *three linear feet of free desk area per workstation. Power poles for data and power* cables shall be provided. Area control room consoles shall be provided with one