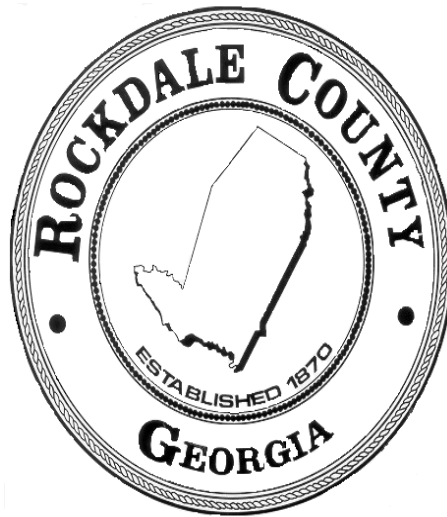


ROCKDALE COUNTY, GEORGIA

February 18, 2015

ON-SITE SODIUM HYPOCHLORITE GENERATION SYSTEM REPLACEMENT

**INVITATION TO BID
#15-03**



**ROCKDALE COUNTY FINANCE DEPARTMENT
PROCUREMENT OFFICE
958 MILSTEAD AVENUE
CONYERS, GA 30012
770-278-7552**

TABLE OF CONTENTS

INVITATION TO BID

Introduction

Division 0 – Bidding and Contract Requirements

- 00100 Instructions to Bidders
- 00300 Bid
- 00410 Bid Bond
- 00420 Statement of Bidder's Qualification
- 00422 Corporate Certificate
- 00425 Contractor's License Certification
- 00480 Non-Collusion Affidavit of Prime Bidder
- 00500 Contract Agreement
- 00610 Performance Bond
- 00620 Payment Bond
- 00700 General Conditions
- 00800 Supplementary Conditions

Division 1 – General Requirements

- 01010 Summary of Work
- 01025 Measurement and Payment
- 01060 Regulatory Requirements
- 01091 Codes and Standards
- 01200 Project Meetings
- 01300 Submittals
- 01310 Construction Schedules
- 01320 Construction Photographs
- 01340 Shop Drawings, Product Data, and Samples
- 01510 Temporary Facilities
- 01540 Job Site Security
- 01610 Transportation and Handling
- 01611 Storage and Protection
- 01630 Substitutions and Product Options
- 01660 Testing and Startup
- 01700 Project Closeout
- 01710 Cleaning
- 01720 Record Documents
- 01740 Warranties and Bonds

Division 3 – Concrete

- 03000 Reinforced Concrete
- 03200 Concrete Reinforcement
- 03600 Non-Shrink Grout

Division 11 – Equipment

- 11510 Onsite Sodium Hypochlorite Generation System

Division 15 – Mechanical

- 15050 Piping Systems
- 15064 Plastic Pipe
- 15096 Pipe Hangers and Supports
- 15120 Pipe Insulation

INTRODUCTION:

This is an Invitation to Bid for the purchase of **15-03: On-Site Sodium Hypochlorite Generation System Replacement in Rockdale County**. Instructions for preparation and submission of a bid are contained in this packet. Bids must be typed or printed in ink.

Rockdale County provides equal opportunity for all businesses and does not discriminate against any person or business because of race, color, religion, sex, national origin, and handicap or veterans status. This policy ensures all segments of the business community have access to supplying the goods and services needed by Rockdale County.

PURCHASING CONTACT FOR THIS REQUEST:

All questions concerning this invitation and all questions arising subsequent to award are to be addressed to the Procurement Officer at the following address:

Rockdale County Finance Department
Attn: Tina Malone, CPPO, CPPB
958 Milstead Avenue
Conyers, GA 30012
Phone: (770) 278-7552, Fax (770) 278-8910
E-mail: tina.malone@rockdalecounty.or

To maintain a "level playing field", and to assure that all bidders receive the same information, bidders are requested **NOT** to contact anyone other than the contact above until after the award of the contract. Doing so could result in disqualification of the bidder.

CONTRACT TERM:

One Hundred Fifty Days after Notice to Proceed.

DUE DATE:

Sealed bids will be received at the Rockdale County Finance Department, Procurement Division, 958 Milstead Avenue, Conyers, GA 30012 no later than **2:00 P.M., local time, Thursday, March 26, 2015**. Bids received after this time will not be accepted.

The Bidder shall complete, execute and submit the following documents, which are attached to these Contract Documents Four (4) hard copies and one (1) original hard copy and one (1) CD's in Adobe PDF format will be required for review purposes. (*With the original clearly marked "Original" and the Copies clearly marked "Copies."*). CD's that are blank or have incorrect information on them will not be acceptable and may be justification for disqualification. Check your disk(s) to ensure that they have the appropriate material on it before submitting.

- a. The Bid
- b. The Bid Bond
- c. Corporate Certificate, if the Bidder is a corporation
- d. Non-Collusion Affidavit of Prime Bidder
- e. Business License
- f. Contract Agreement

QUESTIONS AND CLARIFICATIONS:

You should submit your questions and/or requests for clarifications about this Bid Request no later than **5:00 P.M., local time, Friday, March 13, 2015**. Written responses from the County to the questions it receives will be issued in an addendum. Any questions and/or misunderstandings that may arise from this RFP must be submitted in writing and forwarded to the Purchasing Department at the above address or by email. It shall be the Bidders responsibility to seek clarification as early as possible prior to the due date and time. Any contractor who intends to submit a Bid is required to attend this meeting.

Answers to questions submitted that materially change the conditions and specifications of this Bid Request will be addressed in an addendum. Any discussions or documents will be considered non-binding unless incorporated and issued in an addendum.

PRE-BID CONFERENCE

There will be a **MANDATORY** pre-bid conference held at the Rockdale County Water Treatment Plant (WTP) at **2:00 P.M., local time, Tuesday, March 10, 2015**. Located at 3090 Gees Mill Road NE, Conyers, GA 30013.

ADDENDA:

Answers to questions submitted that materially change the conditions and specifications of this RFP/ bid will be issued as an addendum. Any discussions or documents will be considered non-binding unless incorporated and issued in an addendum.

Bidders should check with the Procurement Office frequently during the bidding process to verify that they have received all issued addenda. Bidders have the responsibility of making sure that they have received all issued addendums. Addenda are posted on the website at www.rockdalecounty.org, Bid Announcements, Current Bids.

QUALIFICATIONS OF OFFERORS:

Bidders must have a current business license from their home office jurisdiction and provide a copy of that license with the submittal of their bid response. Rockdale County vendors doing business in Rockdale County must have a current Rockdale County Business License.

Bids from any offeror that is in default on the payment of any taxes, license fees, or other monies due to Rockdale County will not be accepted.

Bidders are to submit at least (3) three references from projects with similar experience using the materials and process in this Invitation to Bid.

SILIENCE OF SPECIFICATIONS

The apparent silence of these specifications and any supplemental specifications as to any details, or the omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practices are to prevail and that only materials of first quality and correct type, size and design are to be used. All workmanship is to be first quality. All interpretations of this specification shall be made upon the basis of this statement, with County interpretation to prevail.

OPTION TO AUDIT

Successful bidder will be required to maintain complete records during the life of the contract and for a period of one year after completion of the contract. Such records are to be made available to the County if officially requested, to be audited by a designated County auditing staff. In such audits reveal overcharges and/or undercharges, such will be adjusted and compensation made by either party to correct charges.

TORT IMMUNITY:

No officer, employee, or agent of the County acting within the scope of his/her employment or function shall be held personally liable in tort or named as a defendant in any action for injury or damage suffered because of any act, event, or failure to act.

PROPRIETARY INFORMATION:

Careful consideration should be given before submitting confidential information to Rockdale County. The Georgia Open Records Act permits public scrutiny of most materials collected as part of this process. Please clearly mark any information that is considered a trade secret, as defined by the Georgia Trade Secrets Act of 1990, O.C.G.A. §10-1-760 et seq., as trade secrets are exempt from disclosure under the Open Records Act. Rockdale County does not guarantee the confidentiality of any information not clearly marked as a trade secret.

QUANTITIES:

The quantities listed in the Bidders Response Schedule are provided as an estimate for bid purposes. The County will not be obligated to quantities beyond actual needs.

SELECTION PROCESS:

The Rockdale County Procurement Office and/or Evaluation Committee makes a recommendation for award. The Board of Commissioners will make the actual award of the contract and has the authority to award the contract to a company different than the company recommended by the Purchasing Department and/or Evaluation Committee.

This is a past performance/quality/price trade-off source selection in which competing offeror's past and present performance history and product quality will be evaluated on a basis approximately equal to price. Award will be made to the responsible offeror whose bid represents the best value after evaluation in accordance with the factors listed below. Rockdale County Board of Commissioners may reject any or all bids if such action is in the county's interest.

Rockdale County may evaluate bids and award a contract without discussions with offerors. Therefore, the offeror's initial bid should contain the offeror's best terms from a price and technical standpoint. The County reserves the right to conduct discussions if the County later determines them to be necessary.

BONDS:

A Bid Bond in the amount of (10%) of the bid will be required at the time of bid submittal.

A Payment (and/or) Performance Bond in the amount of 100% of the contract will be required after the award is made and before notice to proceed is given.

All sureties of bonds for Rockdale County must be licensed to do business in the State of Georgia and must be listed on the Department of Treasury Federal Register.

PERMITS:

The awarded contractor will be responsible for acquiring any permits that are required for this project/purchase. Rockdale County will waive fees on all permits issued by Rockdale County.

ILLEGAL IMMIGRATION REFORM AND ENFORCEMENT ACT OF 2011

Vendors submitting a Qualification package in response to this RFP must complete the Contractor Affidavit under O.C.G.A. §13-10-91(b)(1) which is provided with the RFP package to verify compliance with the Illegal Immigration Reform and Enforcement Act of 2011.

- A. The form must be signed by an authorized officer of the contractor or their authorized agent.
- B. The form must be notarized.
- C. The contractor will be required to have all subcontractors and sub-subcontractors who are engaged to complete physical performance of services under the final contract executed between the County and the contractor complete the appropriate subcontractor and sub-subcontractor affidavits and return them to the County a minimum of five (5) days prior to any work being accomplished by said subcontractor or sub-subcontractor. Format for this affidavit can be provided to the contractor if necessary.

LOCAL VENDOR PREFERENCE POLICY

The Rockdale County Board of Commissioners adopted a Local Vendor Preference Policy on March 26, 2013. The policy will apply to all qualified Invitations to Bids and Request for Proposals after May 1, 2013. The Local Vendor Preference Policy allows Rockdale County vendors to get an extra 5 points on the evaluation criteria scoring for Request for Proposal. The Policy will give the local bidder the opportunity to match the price of a non-local vendor's bid price if they are low and within 5% of the low bidder's price on Invitation to Bids. A copy of the Policy may be downloaded from the County website at www.rockdalecounty.org, Under Finance/Purchasing.

The Local Vendor Preference Policy: **will** / will not - apply to this ITB

LIQUIDATED DAMAGES

All work must be completed within One-Hundred Fifty (150) calendar days after issuance of the purchase order, or a completion date agreed on by both the purchaser and vendor and placed in the contract. Due to the critical nature of this requirement, liquidated damages of \$100.00 per day may be assessed against the Contractor for each day the project is not completed. Liquidated damages will be deducted from all outstanding invoices.

GENERAL INFORMATION:**RECEIPT OF BID:**

No bids received after said time or at any place other than the time and place as stated in the notice shall be considered. No responsibility shall attach to Rockdale County for the premature opening of a bid not properly addressed and identified.

WITHDRAWAL OF BID:

A bidder may withdraw his bid before the bid due date, without prejudice to the bidder, by submitting a written request of withdrawal to the Rockdale County Procurement Office.

REJECTION OF BID:

Rockdale County may reject any and all bids and must reject a bid of any party who has been delinquent or unfaithful in any formal contract with Rockdale County. Also, the right is reserved to waive any irregularities or informalities in any bid in the proposing procedure. Rockdale County shall be the sole judge as to which bid is best, and in ascertaining this, will take into consideration the business integrity, financial resources, facilities for performing the work, and experience in similar operations of the various bidders.

STATEMENT OF EXPERIENCE AND QUALIFICATIONS:

The bidder may be required, upon request, to prove to the satisfaction of Rockdale County that he/she has the skill, experience, necessary facilities and ample financial resources to perform the contract(s) in a satisfactory manner and within the required time. If the available evidence of competency of any bidder is not satisfactory, the bid of such bidder may be rejected. The successful bidder is required to comply with and abide by all applicable federal and state laws in effect at the time the contract is awarded.

NON-COLLUSION AFFIDAVIT:

By submitting a bid, the bidder represents and warrants that such bid is genuine and not sham or collusive or made in the interest or in behalf of any person not therein named, that the bidder has not directly or indirectly induced or solicited any other bidder to put in a sham bid, or any other person, firm or corporation to refrain from proposing and that the bidder has not in any manner sought by collusion to secure to that bidder any advantage over any other bidder.

INTEREST OF:

By submitting a bid, the bidder represents and warrants that a Commissioner, Administrator, employee, nor any other person employed by Rockdale County has, in any manner, an interest, directly or indirectly, in the bid or in the contract which may be made under it, or in any expected profits to arise therefrom.

DOCUMENTS DEEMED PART OF THE CONTRACT:

The notice, invitation to bidders, general conditions, and instructions for bidders, special conditions, specifications, bid, and addenda, if any, will be deemed part of the contract.

GOVERNING LAWS:

This contract is made under and shall be governed and construed in accordance with the laws of the State of Georgia.

ERRORS AND OMISSIONS:

The vendor shall not take advantage of any errors or omissions in this Bid Request, and shall promptly notify Rockdale County of any omissions or errors found in this document.

STANDARD INSTRUCTIONS:

1. The instructions contained herein shall be construed as a part of any bid invitation and/or specifications issued by Rockdale County and must be followed by each bidder.
2. The written specifications contained in this bid shall not be changed or superseded except by written addendum from Rockdale County. Failure to comply with the written specifications for this bid may result in disqualification by Rockdale County.
3. All goods and materials shall be F.O.B. Destination Conyers, Georgia and no freight or postage charges will be paid by Rockdale County unless such charges are included in the bid price.
4. The following ITB# 15-03 must be written clearly on the outside of each bid envelope in order to avoid prior opening in error.
5. All bids must be received and in-hand at bid due date and time. Each bidder assumes the responsibility for having his/her bid received at the designated time and place of bid due date. Bids received after the stated time and date may be subject to rejection without consideration, regardless of postmark. Rockdale County accepts no responsibility for mail delivery.
6. Unless otherwise stated, all bids submitted shall be valid and may not be withdrawn for a period of 120 days from the due date.
7. Each bid form submitted must include the name of the business, mailing address, the name, title and signature of the person submitting the bid. When submitting a bid to Rockdale County the first page of your bid package should be the bid form listing the price, delivery date, etc., unless the bid form is requested to be in a separate envelope.
8. Rockdale County reserves the right to accept a bid that is not the lowest price if, in the County's judgment, such bid is in the best interest of the County and the public. The County reserves the right to reject any and all bids.
9. Telephone, Telegraphic or Facsimile bids will not be accepted.
10. 1No sales tax will be charged on any orders except for contracts that include construction materials being purchased through a third party.

Federal I.D. #58-6000882
Sales Tax Exempt #58-800068K
11. If applicable, completed questionnaires must be signed manually. Rockdale County reserves the right to accept or reject any bid on the basis of incomplete or inaccurate answers to the questionnaire.
12. If applicable, warranty information shall be provided.
13. Bidders shall state delivery time after receiving order.
14. Bidders shall identify any subcontractors, and include an explanation of the service or product that they may provide.

DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS**SECTION 00100
Instructions to Bidders****1.01 CONTRACT DOCUMENTS**

- A. The Contract Documents include the Contract Agreement, Invitation to Bid, Instructions to Bidders, Contractor's Bid (including all documentation accompanying the Bid and any post-Bid documentation required by the Owner prior to the Notice of Award), Bonds, all Special Conditions, General Conditions, Supplementary Conditions, Specifications and addenda, together with written amendments, change orders, field orders and the PM/CM written interpretations and clarifications issued in accordance with the General Conditions on or after the date of the Contract Agreement.
- B. Shop drawing submittals reviewed in accordance with the General Conditions, geotechnical investigations and soils reports, and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site, are not Contract Documents.
- C. The Contract Documents shall define and describe the complete work to which they relate.

1.02 DEFINITIONS

- A. Where the following words or the pronouns used in their stead occur herein, they shall have the following meaning:
 - 1. "Owner" shall mean Rockdale County, Georgia, party of the first part to the Contract Agreement, or its authorized and legal representatives.
 - 2. "Program Manager/Construction Manager" shall mean Rockdale Water Resources (RWR)-Engineering Dept., hereinafter also designated as "PM/CM".
 - 3. "Designer" shall mean Rockdale Water Resources along with EDEC, Inc. for the electrical associated specifications and instructions, and Rindt-McDuff Associates, Inc. for the building specifications and instructions.
 - 4. "Contractor" shall mean the party of the second part to the Contract Agreement or the authorized and legal representative of such party..
 - 5. "Work" and "Project" shall mean the entire completed construction required to be furnished under the Contract Documents.
 - 6. "Contract Time" shall mean 90 consecutive calendar days as provided in the Contract Agreement for completion of the Project, to be computed from the date of the Notice to Proceed.
 - 7. "Liquidated Damages" shall mean the sum of \$250.00 which the Bidder agrees to pay for each consecutive calendar day beyond the Contract Time required to complete the Project. Liquidated Damages will end upon written notification from the Owner of final acceptance of the Project.

8. "Products" shall mean materials or equipment permanently incorporated into the Project.
9. "Supplier" shall mean equipment manufacturer. For this project, all equipment shall be provided through the Contractor according to these Contract Documents.
10. "Provide" shall mean to furnish and install
11. "Balanced Bid" shall mean a Bid in which each of the unit prices and total amount bid for each of the listed items reasonably reflects the value of that item with regard to the entire job considering the prevailing cost of labor, material and equipment in the relevant market. A Bid is unbalanced when, in the opinion of the Owner, any unit prices or total amounts bid on any of the listed items do not reasonably reflect such values.
12. "Substantial completion of the work", solely for the purposes of Official Code of Georgia Annotated (O.C.G.A.) §13-10-20(c), shall be defined as occurring on the date of the written notification from the PM/CM that the Project is ready for final inspection, as specified in Section 00800, Article 30, paragraph (g).
13. "Satisfactorily completed", solely for the purposes of O.C.G.A. §13-10-20(b), shall mean the completion of all work, certifications and affidavits as specified in Section 00800, Article 30, paragraph (g).

1.03 PREPARATION AND EXECUTION OF BID

- A. Each Bid must be prepared to represent that it is based solely upon the materials and equipment specified in the Contract Documents.
- B. Each Bid must be submitted on the Bid forms which are attached to the Contract Documents. All blank spaces for Bid prices, both words and figures, must be filled in, in ink. In case of discrepancy, the amount shown in words will govern. All required enclosed certifications must be fully completed and executed when submitted. Bids shall be submitted to Rockdale County Department of Finance, 958 Milstead Avenue, 3rd Floor, Room #300, Conyers, Georgia 30012.
- C. Each Bid must be submitted in a sealed envelope, addressed to the Rockdale County Finance Department. Each sealed envelope containing a Bid must be plainly marked on the outside with the name of the project.
- D. The Bidder shall provide on the outside of the sealed envelope the following information, otherwise the Bid will not be opened and will be returned to the Bidder:
 1. Bidder's Name
 2. Project Name
- E. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed to the Owner at Department of Finance, 958 Milstead Avenue, Conyers, Georgia 30012, Attn: Tina Malone. The project name shall be placed on the outside of the envelope.
- F. Any and all Bids not meeting the aforementioned criteria for Bid submittal, may be declared non-responsive, and subsequently returned to the Bidder.

- G. The Contractor, in signing a Bid on the whole or any portion of the Project, shall conform to the following requirements:
1. Bids which are not signed by individuals making them shall have attached thereto a power of attorney evidencing authority to sign the Bid in the name of the person for whom it is signed.
 2. Bids which are signed for a partnership shall be signed by all of the partners or by an attorney-in-fact. If a Bid is signed by an attorney-in-fact, there should be attached to the Bid a power of attorney executed by the partners evidencing authority to sign the Bid.
 3. Bids which are signed for a corporation shall have the correct corporate name thereof and the signature of the president or other authorized officer of the corporation manually written below the corporate name following the wording "By _____". Corporation seal shall also be affixed to the Bid.
 4. The Bidder shall complete, execute and submit the documents as mentioned on page 3 of the Invitation to Bid.

1.04 PRE-BID CONFERENCE

See Page 3 of the Invitation to Bid in regards to the Pre-Bid Conference.

1.05 METHOD OF BIDDING

The unit or lump sum price for each of the several items in the Bid of each Bidder shall include its pro rata share of overhead and profit so that the sum of the products, obtained by multiplying the quantity shown for each item by the unit price, represents the total Bid. Any Bid not conforming to this requirement may be rejected. Additionally, Unbalanced Bids will be subject to rejection. Conditional Bids will not be accepted. The special attention of all Bidders is called to this provision, for should conditions make it necessary to revise the quantities, no limit will be fixed for such increased or decreased quantities nor extra compensation allowed

1.06 ADDENDA AND INTERPRETATIONS

- A. No interpretation of the meaning of the Specifications or other pre-bid documents will be made to any Bidder orally.
- B. Every request for such interpretation should be made in writing and addressed to Rockdale County Finance Department, 958 Milstead Avenue, Suite 300, Conyers, Georgia 30012 fax: 770/929-4039, and to be given consideration must be received at least four business days prior to the date fixed for opening Bids.
- C. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Contract Documents which, if issued, will be published on the Rockdale County website available to all prospective Bidders prior to the date fixed for the opening of Bids.
- D. Failure of Bidders to receive or acknowledge any Addendum shall not relieve them of any obligation under the Bid. All Addenda shall become part of the Contract Documents.

1.07 BID MODIFICATIONS

Bidders may modify their Bid by at any time prior to the scheduled closing time for receipt of Bids, provided such is received by the Owner prior to the closing time

1.08 BID SECURITY

- A. Each Bid must be accompanied by a Bid Bond, prepared on the form of Bid Bond included herein or a Surety Company's Standard Bid Bond, duly executed by the Bidder as principal and having as surety thereon a surety company authorized to do business in the State of Georgia and listed in the latest issue of U.S. Treasury Circular 570, in the amount of 10 percent of the Bid. Attorneys-in-fact who sign Bonds must file with each Bond a currently dated copy of their power of attorney.
- B. If for any reason whatsoever the successful Bidder withdraws from the competition after opening of the Bids, or if Bidder refuses to execute and deliver the Contract and Bonds required within 10 days after receipt of notice of the acceptance of Bid, the Owner may proceed to enforce the provisions of the Bid Bond.

1.09 RECEIPT AND OPENING OF BIDS

The Owner may consider a minor irregularity any Bid not prepared and submitted in accordance with the provisions hereof and may waive any minor irregularities or reject any and all Bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be opened.

1.10 SUBCONTRACTS

The Bidder is specifically advised that any person, firm or other party to whom it is proposed to award a subcontract under this Contract must be acceptable to the Owner.

1.11 CONDITIONS OF THE PROJECT

- A. Each Bidder must be informed fully of the conditions relating to the construction of the Project and the employment of labor thereon. Failure to do so will not relieve a successful Bidder of the obligation to furnish all material and labor necessary to carry out the provisions of the Contract. Insofar as possible, the Contractor, in carrying out the work, must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.
- B. The Bidder is advised to examine the location of the Project and to be informed fully as to its conditions; the conformation of the ground; the character, quality and quantity of the products needed preliminary to and during the prosecution of the work; the general and local conditions and all other matters which can in any way affect the work to be done under the Contract. Failure to examine the site will not relieve the successful Bidder of an obligation to furnish all products and labor necessary to carry out the provisions of the Contract.

The Bidder shall notify the Owner of the date and time Bidder proposes to examine the location of the Project. The Bidder shall confine examination to the specific areas designated for the proposed construction, including easements and public right-of-ways. If, due to some unforeseen reason, the

Owner's proceedings for obtaining the proposed construction site (including easements), have not been completed, the Bidder may enter the site only with the express consent of the property owner. The Bidder is solely responsible for any damages caused by examination of the site.

1.12 NOTICE OF SPECIAL CONDITIONS

If any special federal, state, county or city laws, municipal ordinances, and the rules and regulations of any authorities having jurisdiction over construction of the Project, enclosed, herein referred to, or applicable by law to the Project, conflict with requirements of the Contract Documents, then the most stringent requirement prevails.

1.13 OBLIGATION OF BIDDER

By submission of a Bid, each Bidder warrants that Bidder has inspected the site and has read and is thoroughly familiar with the Contract Documents (including all addenda). The failure or omission of any Bidder to examine any form, instrument or document shall in no way relieve any Bidder from any obligation in respect to the Bid.

1.14 METHOD OF AWARD

- A. The contract will be awarded to the responsive, responsible Bidder submitting the Bid which is in the best interest of the Owner as determined by the Owner.
- B. The Bidder to whom the award is made will be notified. The Owner reserves the right to reject any and all Bids and to waive any minor irregularities in Bids received whenever such rejection or waiver is in the Owner's interest.
- C. A responsive Bidder shall be one who submits a Bid in the proper form without qualification or intent other than as called for in the Contract Documents, and who binds himself or herself on behalf of the Bid to the Owner with the proper Bid Bond completed and attached, and who properly completes all forms required to be completed and submitted at the time of the Bidding. The Bidder shall furnish all data required by these Contract Documents. Failure to do so may result in the Bid being declared non-responsive.
- D. A responsible Bidder shall be one who can fulfill the following requirements:
 - 1. The Bidder shall maintain a permanent place of business. This requirement applies to the Bidder where the Bidder is a division of a corporation, or where the Bidder is 50 percent or more owned by a person, corporation or firm.
 - 2. The Bidder shall demonstrate financial resources of sufficient strength to meet the obligations incident to the performance of the work covered by these Contract Documents. The ability to obtain the required Performance and Payment Bonds will not alone demonstrate adequate financial capability.
- E. Acceptance of the Bidder's documentation and substantiation or Contract Award by the Owner does not relieve the Bidder of liability for non-performance as covered in the Contract Documents, nor will the Bidder be exempted from any other legal recourse the Owner may elect to pursue.

END OF SECTION 00100

SECTION 00300

Bid

DOCUMENTS DEMMED PART OF THE CONTRACT: The Notice of Invitation to Bid, the Invitation to Bidders, general and supplemental terms and conditions, specifications and instructions to bidders, Contract Documents, Technical Specifications, special conditions, promised work completion, proposals, attachments, and addenda, if any, will be part of the final contract.

BID FORM – ITB# 15-03

Instructions: Complete all THREE parts of this bid form.

PART I: Bid Summary

Complete the information below

1.	LUMP SUM	\$
2.	10% CONTINGENCY	\$
3.	TOTAL AMOUNT	\$
4.		\$
5.		\$
6.		\$

PART II: Addenda Acknowledgements (if applicable)

Each vendor is responsible for determining that all addenda issued by the Rockdale County Finance Department have been received before submitting a bid.

Addenda	Date Vendor Received	Initials
"1"		
"2"		
"3"		
"4"		
"5"		
"6"		

PART III: Vendor Information:

Vendor Name	
Address	
Telephone	
E-Mail	
Representative (print name)	
Signature of Representative	
Date Submitted	

PART IV.

The Bidder agrees hereby to commence Work under this Contract, with adequate personnel and equipment, on a date to be specified in a written order of the Engineer, and to fully complete all Work under this Contract within 150 consecutive calendar days from and including said date. Bidder further agrees to pay as liquidated damages, the sum of \$100.00 for each consecutive calendar day thereafter required to deliver Equipment.

PART V.

The Bidder furthermore agrees that, in the case of a failure to execute the Contract Agreement and Bonds within ten days after receipt of conformed Contract Documents for execution, the attached Bid Bond accompanying this Bid and the monies payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure.

Attached hereto is a Bid Bond for the sum of _____ Dollars (\$_____) according to the conditions of "Instructions to Bidders" and provisions thereof.

BIDDER: _____

By: _____

Name: _____
(Print or Type)

Title: _____

Address: _____

Phone: _____

Attest: _____

Name: _____
(Print or Type)

Title: _____
(SEAL)

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a notary. If signed by others, authority for signature shall be attached.

The full names and addresses of persons or parties interested in the foregoing Bid, as principals are as follows:

<u>Name</u>	<u>Address</u>
_____	_____
_____	_____
_____	_____
_____	_____

END OF SECTION 00300

SECTION 00410
Bid Bond

STATE OF GEORGIA

COUNTY OF ROCKDALE

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal, and _____, as Surety, are held and firmly bound unto Rockdale County, Georgia in the sum of _____ Dollars (\$_____) lawful money of the United States of America, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted to the Owner a Bid for **BID #15-03**, ONSITE SODIUM HYPOCHLORITE GENERATION SYSTEM REPLACEMENT.

NOW THEREFORE, the conditions of this obligation are such that if the Bid be accepted, the Principal shall, within ten days after receipt of conformed Contract Documents, execute a Contract in accordance with the Bid upon the terms, conditions and prices set forth therein, and in the form and manner required by the Contract Documents and execute sufficient and satisfactory separate Performance and Payment Bonds payable to the Owner, each in an amount of 100 percent of the total Contract Price, in form satisfactory to the Owner, then this obligation shall be void; otherwise, it shall be and remain in full force and effect in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid Owner, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et. seq. and all the provisions of the law referring to this character of bond as set forth in said Sections or as may be hereinafter enacted and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Principal has hereunder affixed its signature and seal, and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of _____, 2014.

SUPPLIER - PRINCIPAL: _____

By: _____

Name: _____
(Print or Type)

Address: _____

Phone: _____

Attest: _____

Name: _____
(Print or Type)

Title: _____
(SEAL)

Note: Attest for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a notary.

SURETY: _____

By: _____

Name: _____
(Print or Type)

Title: _____

Phone: _____

Attest: _____

Name: _____
(Print or Type)

Title: _____
(SEAL)

Note: Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

Resident agent in state in which Work is to be performed:

Name: _____

Address: _____

Phone: _____

END OF SECTION 00410

SECTION 00420
Statement of Bidder's Qualifications

CONTRACTOR'S QUALIFICATION STATEMENT AND QUESTIONNAIRE

NAME OF PROPOSED CONTRACTOR: _____

I. INSTRUCTIONS

- A. For the purposes of this Questionnaire, "Contractor" refers to the company presenting a proposal for the purposes and scope of work outlined in the bid documents where said company would be hired as a contractor of the County for goods, services, and/or labor whether in the form of contracting, consulting, or vendor services.
- B. All questions are to be answered in full. If copies of other documents will answer the question completely, they may be attached and clearly labeled. If additional space is needed, additional pages may be attached and clearly labeled.
- B. The owner, Rockdale County, Georgia, its agents and representatives, shall be entitled to contact each and every reference listed in response to this questionnaire, and each entity referenced in any response to any question in this questionnaire. By completing this questionnaire, the contractor expressly agrees that any information concerning the contractor in possession of said entities and references may be made available to the owner.
- C. Only complete and accurate information shall be provided by the contractor. The contractor hereby warrants that, to the best of its knowledge and belief, the responses contained herein are true, accurate, and complete. The contractor also acknowledges that the owner is relying on the truth and accuracy of the responses contained herein. If it is later discovered that any material information given in response to a question was provided by the contractor, knowing it was false, it shall constitute grounds for immediate termination or rescission by the owner of any subsequent agreement between the owner and the contractor. The owner shall also have and retain any other remedies provided by law.
- D. This form, its completion by the contractor, and its use by the contractor, and its use by the owner, shall not give rise to any liability on the part of the owner to the contractor or any third party or person.

II. GENERAL BACKGROUND

- A. Current address of contractor: _____

- B. Previous Name or address of contractor: _____
- C. Current president or CEO and years in position: _____
- D. Number of permanent employees: _____
- E. Name and address of affiliated companies: _____

III. FINANCIAL STATUS

A. Please attach financial statements for the past three years for which they are complete. If such statements are not available, please furnish the following information:

1. LAST COMPLETE FISCAL YEAR:

A.	Revenues (Gross)	_____
B.	Expenditures (Gross)	_____
C.	Overhead & Admin (Gross)	_____
D.	Profit (Gross)	_____

2. YEAR PRIOR TO "1" ABOVE:

A.	Revenues (Gross)	_____
B.	Expenditures (Gross)	_____
C.	Overhead & Admin (Gross)	_____
D.	Profit (Gross)	_____

3. YEAR PRIOR TO "2" ABOVE:

A.	Revenues (Gross)	_____
B.	Expenditures (Gross)	_____
C.	Overhead & Admin (Gross)	_____
D.	Profit (Gross)	_____

B. BANKRUPTCIES

1. Has the Contractor, or any of its parents or subsidiaries, ever had a Bankruptcy Petition filed in its name, voluntarily or involuntarily? (If yes, specify date, circumstances, and resolution).

2. Has any Majority Shareholder ever had a Bankruptcy Petition filed in his/her name, voluntarily or involuntarily? (If yes, specify date, circumstances, and resolution).

3. _____

C. BONDING (IF APPLICABLE)

1. What is the Contractor's current bonding capacity? _____

2. What is the value of the Contractor's work currently under contract? _____

IV COMPANY EXPERIENCE – SIMILAR PROJECTS

A. List three projects and/or references of reasonably similar nature, scope, and duration to that requested in the bid documents that your company has performed in the last five years, specifying, where possible, the name and last known address of each owner of those projects:

Reference/Project #1:

Name and Address:

Date of Project:

Type of Project:

Cost of Project:

Client contact info:

Other contact info:

Reference/Project #2:

Name and Address:

Date of Project:

Type of Project:

Cost of Project:

Client contact info:

Other contact info:

Reference/Project #3:Name and Address: _____

Date of Project: _____

Type of Project: _____

Cost of Project: _____

Client contact info: _____

_____Other contact info: _____

_____**V ARBITRATIONS, LITIGATIONS, AND OTHER PROCEEDINGS**Has your company been involved in any arbitration demands _____
filed by, or against, you in the last five years?Has your company been involved in any lawsuits (other than _____
labor or personal injury litigation) filed by, or against, you in the last five years?Has your company been involved in any lawsuits, _____
proceedings, or hearings initiated by the National Labor Relations Board or
similar state agency in the past seven years?Has your company been involved in any lawsuits, proceedings, or _____
hearings by the Occupational Safety and Health Administration concerning the
project safety practices in the last seven years?Has your company be involved in any lawsuits, proceedings, _____
or hearings by the Internal Revenue Service, or any state revenue department,
concerning the tax liability (other than audits) in the last seven years?Have any criminal proceedings or investigations been brought _____
against your company in the last ten years?

If you answered yes to any of the questions above, please identify the nature of the claim, the amount in dispute, the parties, and the ultimate resolution of the proceeding (attach documentation if needed):

VI COMMENTS

Please list any additional information that you believe would assist the Owner in evaluating the possibility of using your company on this Project. You may attach such additional information as an Exhibit to this Statement and Questionnaire.

I certify to the Owner that the information and responses provided on this Questionnaire are true, accurate and complete. The Owner, or its designated representative, may contact any entity or reference listed in this Questionnaire. Each entity or reference may make any information concerning the Contractor available to the Owner, or its designated representative.

Contractor:

Signature

Date

Title

Sworn to and subscribed before me
This _____ day of _____

Signature

Notary Public

My Commission Expires:

END OF SECTION 00422

SECTION 00425
Contractor's License Certification

Contractor's Name: _____

Georgia Utility Contractor's License Number: _____

Expiration Date of License: _____

I certify that the above information is true and correct and that the classification noted is applicable to the Bid for this Project.

Signed: _____

Printed: _____

Date: _____

END OF SECTION 00425

ROCKDALE COUNTY BOARD OF COMMISSIONERS
NON-COLLUSION AFFIDAVIT OF VENDOR

State of _____)

County of _____)

_____, being first duly sworn, deposes and says that:

(1) He is _____ (owner, partner officer, representative, or agent) of _____, the Vendor that has submitted the attached RFP;

(2) He is fully informed respecting the preparation and contents of the attached RFP and of all pertinent circumstances respecting such RFP;

(3) Such RFP is genuine and is not a collusive or sham RFP;

(4) Neither the said Vendor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Vendor, firm or person to submit a collusive or sham RFP in connection with the Contract for which the attached RFP has been submitted or refrain from proposing in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Vendor, firm or person to fix the price or prices in the attached RFP or of any other Vendor, or to fix any overhead, profit or cost element of the proposing price or the proposing price of any other Vendor, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against Rockdale County or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached RFP are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Vendor or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

(Signed)

(Title)

Subscribed and Sworn to before me this _____ day of _____, 20

Name _____

Title _____

My commission expires (Date)

ROCKDALE COUNTY BOARD OF COMMISSIONERS
NON-COLLUSION AFFIDAVIT OF SUB-CONTRACTOR

State of _____)

County of _____)

_____, being first duly sworn, deposes and says that:

(1) He/She is _____ (owner, partner officer, representative, or agent) of _____, the sub-contractor that has submitted the attached RFP;

(2) He is fully informed respecting the preparation and contents of the attached RFP and of all pertinent circumstances respecting such RFP;

(3) Such RFP is genuine and is not a collusive or sham RFP;

(4) Neither the said sub-contractor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affidavit, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Vendor, firm or person to submit a collusive or sham RFP in connection with the Contract for which the attached RFP has been submitted or refrain from proposing in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Vendor, firm or person to fix the price or prices in the attached RFP or of any other Vendor, or to fix any overhead, profit or cost element of the proposing price or the proposing price of any other Vendor, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against Rockdale County or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached RFP are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the sub-contractor or any of its agents, representatives, owners, employees, or parties in interest, including this affidavit.

(Signed)

(Title)

Subscribed and Sworn to before me this _____ day of _____, 20 ____.

Name _____

Title _____

My commission expires (Date)

Contractor Affidavit under O.C.G.A. §13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. §13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of (name of public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. §13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. §13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

Federal Work Authorization User Identification Number

Date of Authorization

Name of Contractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ____, 201__ in _____(city), _____(state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 201__.

NOTARY PUBLIC
My Commission Expires:

Subcontractor Affidavit under O.C.G.A. § 13-10-91(b)(3)

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) on behalf of (name of public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned subcontractor will continue to use the federal work authorization program throughout the contract period and the undersigned subcontractor will contract for the physical performance of services in satisfaction of such contract only with sub-subcontractors who present an affidavit to the subcontractor with the information required by O.C.G.A. § 13-10-91(b). Additionally, the undersigned subcontractor will forward notice of the receipt of an affidavit from a sub-subcontractor to the contractor within five business days of receipt. If the undersigned subcontractor receives notice that a sub-subcontractor has received an affidavit from any other contracted sub-subcontractor, the undersigned subcontractor must forward, within five business days of receipt, a copy of the notice to the contractor. Subcontractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

Federal Work Authorization User Identification Number

Date of Authorization

Name of Subcontractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ____, 201__ in _____(city), _____(state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 201__.

NOTARY PUBLIC
My Commission Expires:

Sub-subcontractor Affidavit under O.C.G.A. §13-10-91(b)(4)

By executing this affidavit, the undersigned sub-subcontractor verifies its compliance with O.C.G.A. §13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract for (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract) and (name of contractor) on behalf of (name of public employer) has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. §13-10-91. Furthermore, the undersigned sub-subcontractor will continue to use the federal work authorization program throughout the contract period and the undersigned sub-subcontractor will contract for the physical performance of services in satisfaction of such contract only with sub-subcontractors who present an affidavit to the sub-subcontractor with the information required by O.C.G.A. §13-10-91(b). The undersigned sub-subcontractor shall submit, at the time of such contract, this affidavit to (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract). Additionally, the undersigned sub-subcontractor will forward notice of the receipt of any affidavit from a sub-subcontractor to (name of subcontractor or sub-subcontractor with whom such sub-subcontractor has privity of contract). Sub-subcontractors hereby attest that its federal work authorization user identification number and date of authorization are as follows:

Federal Work Authorization User Identification Number

Date of Authorization

Name of Sub-Subcontractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, ____, 201__ in _____(city), _____(state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 201__.

NOTARY PUBLIC

My Commission Expires: _____

Affidavit Verifying Status for County Public Benefit Application

By executing this affidavit under oath, as an applicant for the award of a contract with Rockdale, County Georgia, I _____ . [Name of natural person applying on behalf of individual, business, corporation, partnership, or other private entity] am stating the following as required by O.C.G.A. Section 50-36-1:

1) _____ I am a United States citizen

OR

2) _____ I am a legal permanent resident 18 years of age or older or I am an otherwise qualified alien or non-immigrant under the Federal Immigration and Nationality Act 18 years of age or older and lawfully present in the United States.*

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of Code Section 16-10-20 of the Official Code of Georgia.

Signature of Applicant:

Date

Printed Name:

* _____
Alien Registration number for non-citizens

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
_____ DAY OF _____, 20____.

Notary Public
My commission Expires:

***Note:** O.C.G.A. § 50-36-1(e)(2) requires that aliens under the federal Immigration and Nationality Act, Title 8 U.S.C., as amended, provide their registration number. Because legal permanent residents are included in the federal definition of "alien", legal permanent residents must also provide their alien registration number. Qualified aliens that do not have an alien registration number may supply another identifying number below.

END OF SECTION 00480

SECTION 00500 Contract Agreement

This Contract Agreement made and entered into on the _____ day of _____, 2014 by and between Rockdale County, Georgia, party of the first part (hereinafter called the "Owner"), and _____, party of the second part, (hereinafter called the "Contractor"),

WITNESSETH:

That the Contractor, for the consideration hereinafter fully set out, hereby agrees with the Owner as follows:

That the Contractor will furnish all products, tools, construction equipment, skill and labor of every description necessary to carry out and to complete the construction of **ONSITE SODIUM HYPOCHLORITE GENERATION SYSTEM REPLACEMENT** and will complete Work in strict conformity with the Drawings and the Specifications, together with the foregoing Bid made by the Contractor, the Invitation to Bid, Instructions to Bidders, General and Supplementary Conditions, Special Conditions, Performance and Payment Bonds and all Addenda hereto incorporated (if applicable) which form essential parts of this Contract Agreement, as if fully contained herein.

That the Contractor shall commence the Work to be performed under this Contract Agreement on a date to be specified in a written Notice to Proceed and shall fully complete all work hereunder within 150 days, in accordance with Contractor's attached schedule.

Time is of the essence and is an essential element of this Contract, and the Contractor shall pay to the Owner, not as a penalty, but as liquidated damages, the sum of \$250.00 for each calendar day that there is default of completing the Work within the time limit named herein. If the Contractor abandons the Contract before commencement of the Work or defaults in completion of all the Work after commencement thereof, the Contractor shall be liable for such liquidated damages. These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Owner and the Contractor due to the uncertainty and impossibility of making a determination as to the actual and consequential damages incurred by the Owner and the general public of Rockdale County, Georgia as a result of the failure on the part of the Contractor to complete the Work on time. Such liquidated damages referred to herein are intended to be and are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

The Owner hereby agrees to pay to the Contractor for the faithful performance of this Contract Agreement, subject to additions and deductions as provided in the Specifications and Bid, in lawful money of the United States a sum of \$ _____ which sum shall also pay for loss or damage arising out of the nature of the Work aforesaid, or from the action of the elements, or from unforeseen obstructions or difficulties encountered in the prosecution of the Work, and for all expenses incurred by, or in consequence of the Work, its suspension or discontinuance and for well and faithfully completing the Work and the whole thereof, as herein provided, and for replacing defective work or products for a period of one year after completion.

The Owner shall make monthly partial payments to the Contractor in accordance with the provisions of the Contract Documents.

Final payment on account of this Contract Agreement shall be made within 30 days after the completion by the Contractor of all work covered by this Contract Agreement and Final Acceptance of such Work by the Owner, in accordance with the provisions of the Contract Documents.

It is further mutually agreed between the parties hereto that if, at any time after the execution of this Contract Agreement and the surety bonds hereto attached for its faithful performance, the Owner shall deem the surety or sureties upon such bond to be unsatisfactory, or if, for any reason, such bond ceases to be adequate to cover the performance of the Work, the Contractor shall, at no additional expense to Owner, within five days after the receipt of notice from the Owner to do so, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the Owner. In such event, no further payment to the Contractor shall be

deemed to be due under this Contract Agreement until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the Owner.

IN WITNESS WHEREOF, the parties hereto have executed this Contract Agreement under their respective seals on the day and date first above written in two counterparts each of which shall, without proof or accounting for the other counterparts, be deemed an original Contract.

APPROVED AS TO FORM BEFORE EXECUTION

By: _____
Attorney for the Owner

OWNER: ROCKDALE COUNTY, GEORGIA

By: _____

Name: _____
(Please Print)

Title: _____

WITNESS:

Name: _____
(Please Print)

(SEAL)

Title: _____

SUPPLIER:

By: _____

Name: _____
(Please Print)

Title: _____

ATTEST:

Name: _____
(Please Print)

(SEAL)

Title: _____

Note: If the Supplier is a corporation, the Contract Agreement shall be signed by the president or vice president, attested by the secretary and the corporate seal affixed. If the Supplier is a partnership, the Contract Agreement shall be signed in the partnership name by one of the partners, with indication that he or she is a general partner.

END OF SECTION 00500

**SECTION 00610
Performance Bond**

STATE OF GEORGIA
COUNTY OF ROCKDALE

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS, that we, _____,
as Principal, (hereinafter known as Contractor), and we, _____, as Surety, do hereby
acknowledge ourselves indebted and firmly bound and held unto Rockdale County, Georgia for use and benefit of
those entitled thereto, in the sum of _____ Dollars (\$ _____) for the
payment of which will and truly to be made, in lawful money of the United States of America, we do hereby bind
ourselves, successors, assigns, heirs and personal representatives.

BUT THE CONDITION OF THE FOREGOING OBLIGATION OR BOND IS THIS: WHEREAS, the Owner has
engaged the said Contractor for the sum of _____ Dollars (\$
_____) to perform the Work specified in the Contract Documents entitled, "ONSITE SODIUM
HYPOCHLORITE GENERATION SYSTEM REPLACEMENT" as more fully appears in a written Contract Agreement
bearing the date of _____, 2014, a copy of which Contract Agreement is by reference hereby made a
part hereof.

NOW, THEREFORE, if said Contractor shall fully and faithfully perform all the undertakings and obligations under the
said Contract Agreement hereinbefore referred to and shall fully indemnify and save harmless the said Owner from all
costs and damage whatsoever which it may suffer by reason of any failure on the part of said Contractor to do so, and
shall fully reimburse and repay the said Owner any and all outlay and expense which it may incur in making good any
such default, and shall correct all defects in products and workmanship appearing within one year of the completion of
all Work, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

And for value received it is hereby stipulated and agreed that no change, extension of time, alteration or addition to the
terms of the said Contract Agreement, or in the Work to be performed there under, or the Specifications accompanying
the same shall in any wise affect the obligations under this Contract Agreement or Bond, and notice is hereby waived
of any such damage, extension of time, alteration or addition to the terms of the Contract Agreement or to the Work or
to the Contract Documents.

This bond is given pursuant to and in accordance with the provisions of O.C.G.A. Section 36-10-1 et. seq. and
36-82-100 et. seq. and all the provisions of the law referring to this character of Bond as set forth in said Sections or as
may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Contractor has hereunder affixed its signature and seal, and said Surety has
hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this _____ day of
_____, 2014, executed in six counterparts.

CONTRACTOR - PRINCIPAL: _____

By: _____

Name: _____
(Please Print)

Title: _____

ATTEST: _____

Name: _____
(Please Print)

Title: _____

(SEAL)

Note: Attestation for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a notary.

SURETY: _____

By: _____

Name: _____
(Please Print)

Title: _____

ATTEST: _____

Name: _____
(Please Print)

Title: _____

(SEAL)

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

END OF SECTION 00610

SECTION 00620
Payment Bond

STATE OF GEORGIA
COUNTY OF ROCKDALE

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal, (hereinafter known as Contractor), and we, _____ as Surety, are held and firmly bound unto Rockdale County, Georgia (hereinafter called the Owner), in the penal sum of _____ Dollars (\$ _____) lawful money of the United States of America, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Contractor has entered into a certain Contract Agreement with said Owner, dated _____, 2013, to perform the Work specified in the Contract Documents entitled, "ONSITE SODIUM HYPOCHLORITE GENERATION SYSTEM REPLACEMENT" (hereinafter called the Contract), which Contract Agreement and the Contract Documents for said Work shall be deemed a part hereof as fully as if set out herein.

NOW, THEREFORE, the condition of this obligation is such, that if said Supplier and all subcontractors to whom any portion of the Work provided for in said Contract Agreement is sublet and all assignees of said Supplier and of such subcontractors shall promptly make payments to all persons supplying them with labor, products, services, or supplies for or in the prosecution of the Work provided for in such Contract Agreement, or in any amendment or extension of or addition to said Contract Agreement, and for the payment of reasonable attorney's fees, incurred by the claimant in suits on this Bond, then the above obligation shall be void; otherwise, it shall remain in full force and effect.

HOWEVER, this Bond is subject to the following conditions and limitations:

- (a) Any person, firm or corporation that has furnished labor, products, or supplies for or in the prosecution of the Work provided for in said Contract Agreement shall have a direct right of action against the Supplier and Surety on this Bond, which right of action shall be asserted in a proceeding, instituted in the county in which the Work provided for in said Contract Agreement is to be performed or in any county in which Supplier or Surety does business. Such right of action shall be asserted in proceedings instituted in the name of the claimant or claimants for its use and benefit against said Supplier and Surety or either party (but not later than one year after the final settlement of said Contract Agreement) in which action such claim or claims shall be adjudicated and judgment rendered thereon.
- (b) The Principal and Surety hereby designate and appoint the _____, as the agent of each party to receive and accept service of process or other pleading issued or filed in any proceeding instituted on this Bond and hereby consent that such service shall be the same as personal service on the Supplier and/or Surety.
- (c) In no event shall the Surety be liable for a greater sum than the penalty of this Bond, or subject to any suit, action or proceeding thereon that is instituted later than one year after the final settlement of said Contract Agreement.
- (d) This Bond is given pursuant to and in accordance with provisions of O.C.G.A. Section 13-10-1 et. seq. and 36-82-100 et. seq. hereinafter, and all the provisions of law referring to this character of Bond as set forth in said Sections or as may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

IN WITNESS WHEREOF, the said Supplier has hereunder affixed its signature and seal, and said Surety has hereunto caused to be affixed its corporate signature and seal, by its duly authorized officers, on this ____ day of _____, 2014, executed in six counterparts.

CONTRACTOR- PRINCIPAL: _____

By: _____

Name: _____
(Please Print)

Title: _____

ATTEST: _____

Name: _____
(Please Print)

Title: _____

(SEAL)

Note: Attestation for a corporation must be by the corporate secretary; for a partnership by another partner; for an individual by a notary.

SURETY: _____

By: _____

Name: _____
(Please Print)

Title: _____

WITNESS: _____

Name: _____
(Please Print)

Title: _____

(SEAL)

Note: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the Project is located.

END OF SECTION 00620

SECTION 00700
General Conditions

TABLE OF CONTENTS

<u>Article</u>	<u>Title</u>	<u>Page</u>
	General	32
1	Notice of Award	32
2	Execution of Contract Documents	32
3	Contract Security	33
4	Insurance	33
5	Indemnification	34
6	Notice to Proceed	34
7	Termination of Work for Default	35
8	Termination for Convenience of the Owner	35
9	Assignments	35
10	Subcontracting	36
11	Authority of the PM/CM	37
12	Separate Contracts	37
13	Laws and Regulations	37
14	Taxes	38
15	Notice and Service Thereof	38
16	Patents	38
17	Land and Rights-of-Way	39
18	Products	39
19	Supervision of Work	40
20	Interruption of Facility Operations	40
21	Protection of Work, Property and Persons	40
22	Protection of the Environment	41
23	Protection, Location and Relocation of Utilities	42
24	Schedules, Reports and Records	42
25	Drawings and Specifications	42
26	Surveys	43
27	Testing, Inspection and Rejection of Work	43
28	Contract Time and Liquidated Damages	44
29	Changes in the Contract	45
30	Payments and Completion	48

GENERAL: The provisions of these General Conditions are intended, but are not limited to, providing general conditions of agreement and provisions toward the awarding of the Contract, the obligations of the successful Bidder and requirements for execution and administration of the Contract. IN ANY EVENT, PROVISIONS IN THIS SECTION ARE SUBJECT TO AND GOVERNED BY PROVISIONS IN THE SUPPLEMENTARY CONDITIONS, AS APPLICABLE.

ARTICLE 1 - NOTICE OF AWARD OF CONTRACT

After receipt of Bids, the Owner shall notify the successful Bidder of the award of the Contract as stipulated in the Supplementary Conditions.

ARTICLE 2 - EXECUTION OF CONTRACT DOCUMENTS

Within 15 days of notification of Award of Contract, the Owner will furnish the Contractor with conformed copies of Contract Documents for execution by the Contractor and the surety.

Within 10 days after receipt, the Contractor shall return all the Documents properly executed by the Contractor and the surety. Attached to each Document shall be an original power-of-attorney for the person executing the Bonds for the surety and certificates of insurance for the required insurance coverage.

Within 30 days after receipt of the conformed Documents executed by the Contractor and the surety with the power-of-attorney and certificates of insurance, the Owner will complete the execution of the Documents. Distribution of the completed Documents will be made upon execution by the Owner.

Should the Contractor and/or the surety fail to properly execute the Documents within the specified time, the Owner will have the right to proceed on the Bid Bond accompanying the Bid.

If the Owner fails to execute the Documents within the time limit specified, the Contractor will have the right to withdraw the Bid without penalty. In such event the Owner will have no liability to the Contractor under these Documents or otherwise.

Should either party require an extension of any of the time limits stated above, this shall be done only by mutual agreement between both parties.

ARTICLE 3 - CONTRACT SECURITY

The Contractor shall furnish separate Performance and Payment Bonds each in a sum equal to the amount of the Contract Price, the Performance Bond conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the Contract Documents, and the Payment Bond conditioned upon the prompt payment by the Contractor to all persons supplying labor and products in the prosecution of the Work provided by the Contract Documents. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State where the Project is located and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these Bonds shall be borne by the Contractor. If at any time a surety on any such Bond is declared bankrupt or loses its right to do business in the State where the Project is located or is removed from the list of Surety Companies accepted on Federal Bonds, the Contractor shall, within 10 days after notice from the Owner to do so, substitute an acceptable Bond (or Bonds) in such form and sum and signed by such other surety as may be satisfactory to the Owner. The premium on such Bond (or Bonds) shall be paid by the Contractor. No further progress payments shall be deemed due, nor shall be made, until the new surety furnishes an acceptable Bond to the Owner.

The person executing the Bond on behalf of the surety shall file with the Bond a general power of attorney, unlimited as to amount and type of Bond covered by such power of attorney and certified to by an official of said surety.

ARTICLE 4 - INSURANCE

The Contractor shall not commence any work under this Contract until all insurance, as stipulated in the Supplementary Conditions, has been obtained and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence any work on subcontractor's contract until all similar insurance required of the subcontractor has been so obtained and approved by the Contractor.

ARTICLE 5 - INDEMNIFICATION

The Contractor shall indemnify and hold harmless the Owner, the PM/CM, the Designer and their agents and employees from and against all claims, damages, losses and expenses including claims consultants' and attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting thereof; and is caused in whole or in part by willful act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

In any and all claims against the Owner, the PM/CM, the Designer, or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under worker's compensation acts, disability benefit acts or other employee benefits acts.

This indemnification and hold harmless obligation shall extend to cover any and all claims not covered by the Owner's Protective Liability Insurance, the requirements of which are specified in Article 4 of the Supplementary Conditions.

ARTICLE 6 - NOTICE TO PROCEED

The Notice to Proceed will be issued, following the pre-construction conference, within 10 days of the execution of the Contract Agreement by the Owner. The time may be extended by mutual agreement between the Owner and the Contractor. If the Notice to Proceed has not been issued within the 10 day period or within the period mutually agreed upon, the Contractor may terminate the Contract Agreement without further liability on the part of either party.

ARTICLE 7 - TERMINATION OF WORK FOR DEFAULT

(a) The Work may be terminated if:

- (1) The Contractor is adjudged bankrupt or insolvent.
- (2) The Contractor makes a general assignment for the benefit of creditors.
- (3) A trustee or receiver is appointed for the Contractor or for any of Contractor's property.
- (4) The Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws.
- (5) The Contractor repeatedly fails to supply sufficient skilled workmen, materials or equipment.
- (6) The Contractor fails to make satisfactory progress toward timely completion of the Work.
- (7) The Contractor repeatedly fails to make prompt payments to subcontractors or material suppliers for labor, materials or equipment.
- (8) The Contractor disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the Work.
- (9) The Contractor fails to comply with directives of the PM/CM.
- (10) The Contractor otherwise violates any provision of the Contract Documents.

- (b) The Owner may, without prejudice to any other right or remedy and after giving the Contractor and surety a minimum of 10 days from delivery of a written notice, terminate the services of the Contractor and take possession of the Project and of all products thereon owned by the Contractor, and finish the Work by whatever method the Owner may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor and/or surety shall pay the difference to the Owner. Such costs incurred by the Owner will be determined by the PM/CM and incorporated in a Change Order.
- (c) Where the Contractor's services have been so terminated by the Owner, said termination will not affect any right of the Owner against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the Contract Documents.

ARTICLE 8 - TERMINATION FOR CONVENIENCE OF THE OWNER

If, for any reason other than those provided for under Article 7, the Owner elects to discontinue, in whole or part, the Work under this Contract, the Owner may, after 10 days from delivery of a written notice to the Contractor and the PM/CM, terminate, in whole or in part, the Contractor's performance of the Work under this Contract. The notice of termination shall specify the extent to which performance of the Work under the Contract is terminated.

In the event of such termination by the Owner, the Contractor shall be entitled to payment for the Work at the jobsite acceptably performed up to the time of the termination and reimbursement for such costs as are reasonably incurred by the Contractor due to the termination and not otherwise compensated. The Contractor shall also be entitled to profit on the amounts payable to the Contractor, but such profit shall be limited to 6 percent of such amounts. The Contractor will not be entitled to any payment, including any anticipated profit, on Work not performed and will not be entitled to any compensation for other economic loss arising out of or resulting from such compensation or damages of any nature.

ARTICLE 9 - ASSIGNMENTS

The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior liens of all persons, firms, and corporations for services rendered or materials supplied for the performance of the Work called for under this Contract.

ARTICLE 10 – SUBCONTRACTING

- a) The Contractor shall not subcontract the complete Work, or any part thereof, and shall not award any work to any subcontractor without prior written approval of the Owner. Owner approval will not be given except upon the basis of written statements containing such information as the Owner may require. At the pre-construction conference, the Contractor shall submit all subcontractors that the Contractor plans to use on the Project. Any changes or additional subcontractors should be submitted at least 14 days prior to the needed approval.
- (b) The Contractor shall utilize the services of specialty subcontractors on those parts of the Work which, under normal contracting practices, are best performed by specialty subcontractors, as required by the Owner in the Owner's sole discretion, at no additional cost to the Owner.

If the Contractor desires to perform specialty work, the Contractor shall submit a request to the Owner, accompanied by evidence that the Contractor's own organization has successfully performed the type of work in question, is presently competent to perform the type of work, and the performance of the work by specialty subcontractors will result in materially increased costs or inordinate delays.

- (c) The Contractor shall be fully responsible to the Owner for the acts and omissions of the Contractor's subcontractors and of persons either directly or indirectly employed by the Contractor. The Contractor shall be fully responsible to the Owner for the acts and omissions of independent contractors or independent subcontractors of the Contractor and

of persons indirectly employed by the Contractor as the Contractor is for the acts and omissions of persons directly employed by the Contractor.

- (d) The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.
- (e) Nothing contained in this Contract shall create any contractual relation between any subcontractor and the Owner.

ARTICLE 11 - AUTHORITY OF THE PM/CM

The PM/CM will act as the Owner's representative during the construction period. The Owner will decide questions which may arise as to quality and acceptability of products furnished and Work performed. The Owner will interpret the intent of the Contract Documents in a fair and unbiased manner. The PM/CM will make visits to the site and determine if the Work is proceeding in accordance with the Contract Documents. The PM/CM will judge as to the accuracy of quantities submitted by the Contractor in partial payment estimates which these quantities represent. The decisions of the PM/CM will be final and conclusive.

ARTICLE 12 - SEPARATE CONTRACTS

- (a) The Owner reserves the right to let other contracts in connection with this Project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their products and the execution of their work, and the Contractor and other contractors shall properly connect and coordinate their work with each other. If the proper execution or results of any part of the Contractor's work depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the PM/CM any defects in such work that render it unsuitable for such proper execution and results.
- (b) The Owner may perform additional work related to the Project with Owner's own forces. The Contractor shall afford the Owner reasonable opportunity for the introduction and storage of products and the execution of work, and shall properly connect and coordinate Contractor's work with work performed by Owner's own forces.
- (c) If the performance of additional work by other contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof will be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such additional work by the Owner or others involves the Contractor in additional expense or entitles the Contractor to an extension of the Contract Time, the Contractor may make a claim therefor as provided in Article 29.

ARTICLE 13 - LAWS AND REGULATIONS

The Contractor's attention is directed to the fact that all applicable federal, state, county and city laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout, and they will be deemed to be included in the Contract as though written out in full herein. The Contractor shall keep fully informed of all laws, ordinances and regulations of the federal, state, county, city and municipal governments or authorities in any manner affecting those engaged or employed in the Work or the materials used in the Work or in any way affecting the conduct of the Work and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency should be discovered in these Contract Documents herein referred to, in relation to any such law, ordinance, regulation, order or decree, the Contractor shall herewith report the same, in writing, to the Owner. The Contractor shall at all times observe and comply with all such existing and future laws, ordinances and regulations, and shall protect and indemnify the Owner, the PM/CM, the Designer and their agents against the violation of any such law, ordinance, regulation, order or decree, whether by the Contractor or by the Contractor's employees.

ARTICLE 14 - TAXES

The Contractor shall pay all sales, consumer, use and other similar taxes required by the law of the place where the Work is performed. The Owner will be responsible for any sales or use tax due on products furnished by the Owner to the Contractor to be incorporated into the Work.

ARTICLE 15 - NOTICE AND SERVICE THEREOF

- (a) All notices, demands, requests, instructions, approvals, and claims shall be in writing.
- (b) Any notice to or demand upon the Contractor will be sufficiently given if delivered at the office of the Contractor specified in the Bid (or at such other office as the Contractor may from time to time designate to the Owner in writing), or if delivered by the United States Mail in a sealed, postage-prepaid envelope, or delivered by facsimile transmission, followed by written confirmation, in each case addressed to such office.
- (c) All papers required to be delivered to the Owner shall be delivered as stipulated in the Supplementary Conditions.
- (d) Any such notice or demand shall be deemed to have been given to the Owner or made as of the time of actual delivery to Owner.

ARTICLE 16 - PATENTS

- (a) The Contractor shall hold and save the Owner, the PM/CM, the Designer and their agents harmless from liability of any kind, including cost and expenses, reasonable attorney's fees, for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Work, including its use by the Owner.
- (b) If the Contractor uses any design, process, device or materials covered by letters, trademarks, patent or copyright, the Contractor shall provide for such use by suitable agreement between the Owner and the holder of such patented or copyrighted design, device or material. The Contract prices shall include royalties or costs arising from the use of such design, device or materials, in any way involved in the Work. The Contractor and the Contractor's sureties shall indemnify and save harmless the Owner, the PM/CM, the Designer and their agents from claims for infringement by reason of the use of such patented or copyrighted design, process, device or materials or any trademark or copyright in connection with Work agreed to be performed under this Contract, and shall indemnify the Owner, the PM/CM, the Designer and their agents for any cost, expense, damage and reasonable attorney's fees which it may be obliged to pay by reason of such infringement, at any time during the prosecution of the Work or after completion of the Work.

ARTICLE 17 - LAND AND RIGHTS-OF-WAY

The Owner will provide, as indicated in the Contract Documents and prior to the Notice to Proceed, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the Contractor. The Contractor shall confine work and all associated activities to the easements and other areas designated for the Contractor's use. The Contractor shall comply with any limits on construction methods and practices which may be required by easement agreements.

If, due to some unforeseen reason, the necessary easements are not obtained, the Contractor shall receive an equitable extension of Contract Time and/or an equitable increase in the Contract Price to cover the Contractor's additional costs as a result thereof, provided the Owner is notified immediately of the claim. The Contractor's claim therefor shall be handled as provided for under Article 29.

Should additional temporary easements for ingress or egress be required by the Contractor for more suitable access to the Work, these easements shall be obtained by the Contractor, at no additional cost to the Owner.

Additional requirements shall be as stipulated in the Supplementary Conditions.

ARTICLE 18 - PRODUCTS

- (a) Products shall be so stored in accordance with the manufacturer's recommendations to insure the preservation of their quality and fitness for the Work. Stored products to be incorporated in the Work shall be located so as to facilitate prompt inspection.
- (b) Manufactured products shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

- (c) Products shall be furnished in accordance with shop drawings and/or samples submitted by the Contractor and approved by the Designer.
- (d) Products to be incorporated into the Work shall not be purchased by the Contractor or the subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

ARTICLE 19 - SUPERVISION OF WORK

The Contractor shall supervise and direct the Work. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

The supervisor shall have full authority to act on behalf of the Contractor and to execute the orders or directions of the PM/CM without delay. The supervisor shall have full authority to promptly supply products, tools, plant equipment and labor as may be required. The supervisor's authority shall be such that all communication given to the supervisor shall be as binding as if given to the Contractor.

The Contractor shall employ only competent and skilled personnel. The Contractor shall, upon demand from the PM/CM, immediately remove any superintendent, foreman or workman whom the PM/CM or Owner may consider incompetent or undesirable.

ARTICLE 20 - INTERRUPTION OF FACILITY OPERATIONS

The Contractor shall provide the Owner with written notice at least five days prior to any interruption in facility operations required by construction activity. The notice shall include the date and time of the scheduled interruption; the length of time the interruption will be in effect; the procedures to be followed in effecting the interruption; a complete identification of all those processes, equipment and operations to be affected; and all other information the Owner may require. The Contractor shall provide any equipment, piping, auxiliary power or other means necessary to sustain facility operations or function for interruptions which have not been identified by the Specifications, or when interruptions must exceed the time allowed by the Specifications.

Additional requirements, if any, shall be as stipulated in the Supplementary Conditions.

ARTICLE 21 - PROTECTION OF WORK, PROPERTY AND PERSONS

- (a) The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all products to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- (b) The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction, promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). The Contractor shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection.
- (c) The Contractor shall remedy all damage, injury or loss to any property, improvements or facilities caused, directly or indirectly, in whole or in part, by the Contractor or any of the Contractor's subcontractors or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. The property, improvements or facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the Work. In case of failure on the part of the Contractor to restore such property, or make good such damages or injury, the Owner may, after 48 hours written notice, proceed to repair, rebuild, or otherwise restore such property, improvements or facilities as may be deemed necessary. The cost thereof will be deducted from any monies due or which may become due the Contractor under this Contract.

- (d) In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the PM/CM or Owner, shall act to prevent threatened damage, injury or loss.
- (e) Completed Work and stored products shall be suitably protected during unseasonable weather, to allow Work to proceed in a timely fashion. Work planned, or in progress, should be performed to minimize impact of adverse weather.

ARTICLE 22 - PROTECTION OF THE ENVIRONMENT

- (a) The Contractor shall be responsible for taking all measures required to minimize all types of pollution associated with the undertaking of the proposed Work, and shall abide by the requirements of all governmental agencies having jurisdiction over the Work or Contractor's Project operations.
- (b) Any area used or involved in the Project that is disturbed by the Contractor, shall be restored to original or better condition, even though such area is outside the limits of that specified for grading, grassing or landscaping.

ARTICLE 23 - PROTECTION, LOCATION AND RELOCATION OF UTILITIES

The Contractor shall notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor shall protect from damage all existing improvements or utilities at, or in proximity to, the site of the Work, and shall repair or restore any damage to such facilities resulting from failure to exercise reasonable care in the performance of Work. If the Contractor fails or refuses to repair any such damage promptly, the Owner may have the Work performed and charge the cost thereof to the Contractor. Prior to the construction or installation of any proposed facility or pipeline, the Contractor shall expose all existing utilities true to their vertical and horizontal location, within the vicinity of the Work. In order to avoid conflicts between existing and proposed facilities or utilities, the Contractor shall either relocate the existing or proposed utility on a temporary or permanent basis, or shall take whatever means necessary to protect the existing facilities or utilities during the installation of proposed utilities, as approved by the Owner. No separate payment will be made for the relocation of existing utilities or for any work associated with the protection of existing facilities or utilities.

ARTICLE 24 - SCHEDULES, REPORTS AND RECORDS

The Contractor shall submit to the Owner progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed as stipulated in the Supplementary Conditions.

ARTICLE 25 - DRAWINGS AND SPECIFICATIONS

The Drawings, Specifications, Contract Documents, and all supplemental documents, are considered essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to define, describe and provide for all Work necessary to complete the Project in an acceptable manner, ready for use, occupancy, or operation by the Owner.

The PM/CM will furnish the Contractor five copies of the Contract Documents, one copy of which the Contractor shall have available at all times on the Project site. Any additional copies will be furnished at additional cost.

In case of conflict between the Drawings and Specifications, the Specifications will govern. Figure dimensions on Drawings will govern over scale dimensions, and detailed Drawings will govern over general Drawings.

In cases where products or quantities are omitted from the Specifications, the description and quantities shown on the Drawings will govern.

Any materially differing site condition as between what is shown on the Drawings and Specifications and actually found on site shall be immediately reported to the PM/CM, in writing, prior to the commencement of Work at the site. Failure of the Contractor to notify the PM/CM, in writing, of the differing site condition prior to performance of Work at the site shall constitute a waiver of any claim for additional monies. Any Change Order necessitated by the differing site condition shall be processed as provided under Article 29.

Any ambiguities or need for clarification of the Drawings or Specifications shall be immediately reported in writing to the PM/CM. Any such ambiguity or need for clarification will be handled by the PM/CM, in writing, as authorized by Article 11. No clarification of the Drawings and Specifications hereunder by the PM/CM will entitle the Contractor to any additional monies unless a Change Order has been processed as provided by Article 29 hereof.

Any work done by the Contractor following a discovery of such differing site condition or ambiguity or need for clarification in the Contract Drawings and Specifications, prior to a written report to the PM/CM, shall not entitle the Contractor to additional monies and shall be done at the Contractor's risk.

ARTICLE 26 - SURVEYS

The Owner will furnish a land survey to establish a base line for locating the principal component parts of the Work, as shown in the Contract Documents. A bench mark will be established adjacent to the Work. From this information, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all detailed surveys needed for construction, such as alignment, slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

ARTICLE 27 - TESTING, INSPECTION AND REJECTION OF WORK

- (a) **Testing of Materials:** Unless otherwise specifically provided for in the Specifications, the inspection and testing of products to be incorporated in the Work at the site shall be made by bureaus, laboratories, or agencies approved by the Owner; the cost of such inspection and testing shall be paid by the Contractor. The Contractor shall furnish evidence, satisfactory to the Owner, that the products have passed the required tests prior to their incorporation into the Work. The Contractor shall promptly segregate and remove rejected products from the site of the Work.
- (b) **Inspection:** The Contractor shall furnish the Owner with every reasonable facility for ascertaining whether or not the Work performed and products used are in accordance with the requirements and intent of the Specifications and Contract Documents. No Work shall be done or products used without suitable inspection by the Owner or the Owner's representative. Failure to reject any defective Work or product shall not in any way prevent later rejection when such defect is discovered, or obligate the Owner to final acceptance.
- (c) **Authority and Duties of the Resident Inspector:** The Resident Inspector will be authorized to inspect all Work done and all products furnished, including preparation, fabrication and manufacture of the products to be used, but the Resident Inspector will not be authorized to alter or waive any requirements of the Contract Documents. The Resident Inspector may reject products or suspend the Work until any question at issue can be referred to and decided by the Owner. The responsibility of the Contractor is not lessened by the presence of the Resident Inspector.
- (d) **Rejection of Work and Materials:** All products furnished and all Work done that is not in accordance with the Drawings or Specifications or that is defective will be rejected. All rejected products or Work shall be removed immediately. If rejected products or Work is not removed within 48 hours, the PM/CM will have the right and authority to stop the Work immediately and will have the right to arrange for the removal of said rejected products or Work at the cost and expense of the Contractor. All rejected products or Work shall be replaced with other products or Work which conforms with the Drawings and Specifications.
- (e) **Contractor's Responsibilities:** Inspection of the Work will not relieve the Contractor of any obligations to fulfill the Contract and defective Work shall be made good regardless of whether such Work has been previously inspected by the Owner and accepted or estimated for payment. The failure of the Owner to reject improper Work shall not be considered a waiver of any defect which may be discovered later, or for Work actually defective.

ARTICLE 28 - CONTRACT TIME AND LIQUIDATED DAMAGES

The Contract Time and Liquidated Damages shall be defined in the Instructions to Bidders.

The Contractor shall proceed with the Work at a rate of progress which will insure completion within the Contract Time. It is expressly understood and agreed by and between the Contractor and the Owner, that the Contract Time for the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions, and other factors prevailing in the locality of the Work.

If the Contractor shall fail to perform the Work required within the Contract Time, or extended Contract Time if authorized by Change Order, then the Contractor shall pay to the Owner the full amount of liquidated damages specified in the Contract Documents for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

The Contractor shall not be charged with liquidated damages or any excess cost when the delay in performance of the Work is due to the following and the Contractor has promptly given written notice of such delay to the Owner and PM/CM:

- (a) To any preference, priority or allocation order duly issued by the Owner.
- (b) To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God or of the public enemy, acts of the Owner, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and,
- (c) To any delays of subcontractors occasioned by any of the causes specified in paragraphs (a) and (b).

ARTICLE 29 - CHANGES IN THE CONTRACT

- (a) Changes in the Work: The Owner may at any time, as the need arises, order changes within the scope of the Work without invalidating the Contract Agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an equitable adjustment will be authorized by Change Order.

The Owner, also, may at any time, by issuing a field order, make changes in the details of the Work. These changes by field order will not affect Contract Time or Contract Price. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Owner, unless the Contractor believes that such field order entitles Contractor to a change in Contract Price or Contract Time or both, in which event Contractor shall give the PM/CM immediate, written notice thereof and if required by the Owner, an immediate estimate of the direct cost of Work as outlined in (b) below, after the receipt of the ordered change, and the Contractor shall not execute such changes pending the receipt of an executed Change Order or further written instruction from the Owner.

Should the Contractor encounter, or the Owner discover, during the progress of the Work, subsurface or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, or unknown conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Drawings and Specifications, the Owner shall immediately be notified in writing of such conditions before they are disturbed. The Owner will thereupon promptly investigate the conditions.

If the Owner finds that conditions do so materially differ, or are of an unusual nature, and upon written request of the Contractor, an equitable adjustment will be authorized by Change Order.

If the Contractor does not immediately notify the Owner in writing of the belief that a field order, additional work by other contractors or the Owner, or subsurface, latent or unusual unknown conditions entitles the Contractor to a Change Order, no consideration for time or money will be given the Contractor.

The Owner may, with the Contractor's concurrence, elect to postpone the issuance of a Change Order until such time that a single Change Order of substantial importance can be issued incorporating several changes. In such cases, the Owner will indicate this intent for each change in the Contract in a written response to the Contractor's request for a change, following agreement by the Owner and Contractor on the change's scope, price and time.

- (b) Changes in Contract Price: The Contract Price may be changed only by a Change Order. The value of any Work covered by a Change Order for increase or decrease in the Contract Price will be determined by one or more of the following methods, in the order of precedence listed below:
- (1) By estimating the number of unit quantities of each part of the Work which is changed (either increased or decreased) and then multiplying the estimated number of such unit quantities by the price Bid (which price shall include the Contractor's overhead and profit) for a unit quantity thereof.
 - (2) The Owner will fix the total lump sum value of the change in the Work of the Contractor following the Contractor's submittal, within a reasonable time, of an estimate of the direct cost of the Work. The direct cost estimate will be added to, or deducted from, the Contract Price (which price will include the Contractor's overhead and profit as outlined below). If the Contractor does not submit a cost estimate of the Work in a reasonable time or if the Owner and Contractor do not reach agreement on the cost, the Owner may fix the total lump sum value at a reasonable amount. On any lump sum change which involves a net credit to the Owner, no allowance for overhead and profit will be figured.
 - 3) By ordering the Contractor to proceed with the Work and to keep and present, in such form as the Owner may direct, a correct account of the cost of the change together with all vouchers therefor. The cost hereunder will only include an allowance for overhead and profit as outlined below.

For the Work performed in item (2) or (3) above, payment will be made for the documented actual direct cost of the following:

- (aa) Labor, including foremen, for those hours they are assigned and participating in the Work covered by the change order (actual direct payroll cost of wages). The Contractor shall furnish, if required by the Owner, certified payrolls to verify wages. All labor related costs will be included in a 30 percent markup of the cost of direct payroll wages. This refers to the Contractor's specific labor wages.
- (bb) Material delivered and used on the designated Work, including sales tax, if paid for by the Contractor and as verified by original invoices or otherwise verifiable to the Owner's acceptance.
- (cc) Rental, or ownership cost of equipment, including necessary transportation of equipment, having a purchase value in excess of \$300.00. Rental or ownership cost will be allowed for only those hours during which the equipment is required on the project site. Cost allowances will not exceed the rates defined as follows: the hourly rate, for equipment not used exclusively in the change to the scope of work, will be the monthly rate, as printed in the current Rental Blue Book for Construction Equipment published by Dataquest, divided by 176; the rate, for equipment used exclusively for those tasks identified in the change to the scope of work, will be the daily, weekly or monthly rate, used singularly or in combination, which will provide the lowest total cost. The rates will be modified by the Rate Adjustment Table factors to reflect a depreciation allowance indexed to the year a machine was originally manufactured and sold. The rates will be adjusted to account for regional differences in annual use hours, cost of labor, freight, taxes, etc. The amount by which basic rates will be increased or decreased is shown on the adjustment maps included in the "Blue Book".

The equipment use period will begin only at the time equipment is unloaded at the site of the changed work, will include each day that the equipment is required at the site of the changed work and will terminate at the end of the day on which the use of such equipment becomes unnecessary, plus

reasonable transportation time. The maximum time to be paid per day will not exceed eight hours unless the equipment is in operation for a longer time. The time which will be paid for per day, for equipment not used exclusively in the change to the scope of work, will be the hours which the equipment was actually in operation on the changed work.

In addition to the actual costs in items (aa) through (cc) above, there will be, for the Contractor actually performing the work, a fixed fee of 16 percent for bond, insurance, overhead and profit added to the cost of Items (aa), (bb) and (cc), above.

If all or a portion of the Change Order is performed by a subcontractor, payment will be made for the documented actual direct cost as outlined in (aa), (bb) and (cc), above. A fixed fee of 16 percent for bond, insurance, overhead and profit will be added to the cost of (aa), (bb) and (cc) of the subcontractor's work only.

A fixed fee of 10 percent will be added to the subcontractor's Work for the Contractor's administrative handling of portions of the Work that are performed by an approved subcontractor. No additional fixed fee will be allowed for the Contractor's or a subcontractor's administrative handling of Work performed by a subcontractor's subcontractor, unless by written permission from the Owner. All other costs not specifically listed above are considered to be included in the fixed fee.

- (4) The Contractor shall, when required by the Owner, furnish the Owner with an itemized breakdown of the quantities and prices used in computing the value of any change that might be ordered, in a printed format, and with sufficient detail as required by the Owner.
- (c) Changes in Contract Time: The Contract Time may be changed only by a Change Order. Changes in the Work described in (a) and any other claim made by the Contractor for a change in the Contract Time will be evaluated by the Owner with the assistance and input of the PM/CM and if the conditions warrant, an appropriate adjustment of the Contract Time will be made.

The Owner, when making these evaluations will take into consideration the amount and scope of Work which has been changed and will evaluate if the change in Work has affected the critical path as currently accepted on the progress schedule such that it would delay the completion of the Project. If after these evaluations have been made and in the sole opinion of the Owner, the Contractor is due an extension of time, then it will be granted by a Change Order and the Owner will pay the associated cost due the Contractor for direct field costs, only as outlined under Changes in Contract Price (aa) and (cc), exclusive of Item (bb), based on any delays to the overall Project. Extensions of time granted as a result of weather will not result in a change in Contract Price.

ARTICLE 30 - PAYMENTS AND COMPLETION

- (a) Contract Price: The Contract Price is either a lump sum or the sum of the unit prices stated in the Contract Agreement, for each item multiplied by the actual quantities installed of each item, and is the total amount payable by the Owner to the Contractor for the performance of the Work set forth in the Contract Documents.

It is understood that the Contractor shall provide and pay for all products, labor (including labor performed after regular working hours, on Sundays, or on legal holidays), equipment, tools, water, light, power, sewer, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, place into operation, and deliver the Work.

It is further understood that the Contractor's proposed construction schedule is based on a normal 40 hour, 5 day work week, less recognized holidays. If the Contractor desires to work in excess of this limit, the Contractor shall submit a written request to the Owner a minimum of five days prior to the desired work date. The Contractor shall be responsible for any additional expenses incurred by the Owner as a result of the extended work hours, including resident inspection overtime. The cost associated with resident inspector overtime will be deducted from the Contractor's monthly payment request.

- (b) Breakdown of Cost: Before the first application for payment the Contractor shall submit to the PM/CM a breakdown of cost for the various portions of the Work, including quantities if required by the PM/CM, aggregating the total Contract Price prepared in such form as specified or as the PM/CM and the Contractor may agree upon and supported by such data to substantiate its correctness as the PM/CM may reasonably require.

This schedule of values, when approved by the PM/CM, will be used only as a basis for the Contractor's application for payment; however, the payment schedule will correlate directly with the Overall Project Schedule (OPS) cost information, when applicable.

- (c) Progress Payments: At the end of each calendar month, the Contractor shall submit to the PM/CM an itemized application for payment supported by such other substantiating data as the PM/CM may reasonably require covering Work completed through the 20th day of the month. Progress payments shall be submitted to the PM/CM no later than the 25th of the month. Any progress payment submitted by the Contractor after the 5th of the month will be included in the following month's payment.

Application for payment may include, at the Contractor's option, the cost of products not yet incorporated into the Work which have been delivered to the site or to other storage locations authorized and approved by the PM/CM. The Owner reserves the right to accept or reject pay requests for stored materials, and to limit payments to those stored materials which, in the PM/CM's judgment, are necessary for continuing satisfactory Project progress.

Payment for stored products will be subject to the following conditions being met or satisfied:

- (1) The products shall be received in a condition satisfactory for incorporation in the Work, including manufacturer's storage and installation instructions.
- (2) The products shall be stored in accordance with the manufacturer's recommendations and in such manner that any and all manufacturer's warranties will be maintained and that they will not be damaged due to weather, construction operations or any other cause.
- (3) An invoice from the manufacturer shall be furnished for each item on which payment is requested. The request may include reimbursement for cost of delivery, limited to common carrier rates, to the site, but will not include the Contractor handling, on or off site, or for storage expense.
- (4) The Contractor shall, on request of the PM/CM, furnish written proof from the supplier of payment (less retention equal in percentage to that being retained by the Owner) for the products no later than 30 days after receipt of payment for same from the Owner.
- (5) Shop drawings, product data and samples, showing "No Exceptions Taken", has been received from the Contractor for that specific equipment or material.

The Contractor warrants that title to all Work and products covered by an Application for Payment, whether incorporated into the Project or not, will pass to the Owner upon the receipt of such payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances (except retention equal in percentage to that being retained by the Owner which may be withheld from suppliers and subcontractors to guarantee completion and performance).

- (d) Certificate for Payment: If the Contractor has made application for payment as provided above, the PM/CM will issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the PM/CM determines to be properly due, or the PM/CM will state, in writing, itemized and specific reasons for withholding a Certificate as provided herein.

After the PM/CM has issued a Certificate for Payment, the Owner will pay to the Contractor the amount covering Work completed plus stored products, less retention and less previous payments made.

No certificate for a progress payment, nor any progress payment, nor any partial or entire use of occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

- (e) Retention: The Owner will retain the following amounts from each properly certified estimate:
- (1) Until the value of the Work completed, including stored materials, is at least 50 percent of the Contract amount, 10 percent of the value of all Work satisfactorily completed, including stored materials.
 - (2) When the value of the completed Work totals at least 50 percent of the Contract amount, the Owner will discontinue retaining additional amounts provided the Work is progressing satisfactorily and there is no specific cause for retaining a larger sum. The total amount retained will be at least 5 percent of the Contract amount, adjusted for Change Orders, until the date of final payment.
 - (3) The Owner may elect to reinstate retention of 10 percent of the value of the Work completed if at any time the Contractor fails to make satisfactory progress or if there is other specific cause. Satisfactory progress is identified as conforming to the construction progress schedule as required in Article 24, as modified by the Supplementary Conditions.

No form of collateral in lieu of cash will be acceptable as retainage.

Amounts retained by the Contractor from payments due to suppliers and subcontractors (expressed as a percentage) shall not exceed that being retained by the Owner.

- (f) Payments Withheld: The PM/CM may decline to approve an Application for Payment and may withhold certificate, in whole or in part, as may be necessary to protect the Owner from loss because of:
- (1) Failure of the Contractor to make payments properly to subcontractors or for labor or products.
 - (2) Unsatisfactory prosecution of the Work by the Contractor either due to quality of the Work or if the Contractor is behind the currently approved construction schedule.

When the above reasons for nonpayment are corrected, then payment will be made for amounts withheld because of such reasons, not later than the next payment.

Completion and Final Acceptance shall be as stipulated in the Supplementary Conditions.

END OF SECTION 00700

SECTION 00800
Supplementary Conditions

GENERAL

The provisions in this Section of the Specifications shall govern in the event of any conflict between this Section and the General Conditions.

ARTICLE 1 NOTICE OF AWARD OF CONTRACT

The Rockdale County Procurement Office and/or Evaluation Committee make a recommendation for award. The Board of Commissioners will make the actual award of the contract and has the authority to award the contract to a company different than the company recommended by the Procurement Office and/or Evaluation Committee. Rockdale County reserves the right to make no awards, multiple awards, one award for all items; or whatever the County deems to be in its best interest.

Article 1 Notice of Award of Contract, of the General Conditions, is hereby modified to include the following:
Within 90 days after receipt of Bids, the Owner will notify the successful Bidder of the award of the Contract.

Should the Owner require additional time to award a Contract, the time may be extended by the mutual agreement between the Owner and the successful Bidder. If an award of Contract has not been made within 90 days from the Bid date or within the extension mutually agreed upon, the Bidder may withdraw the Bid without further liability on the part of either party.

ARTICLE 4 INSURANCE

The Company shall maintain in full force and effect the following insurance during the term of the Agreement.

Coverage	Limits of Liability
Workers' Compensation	Statutory
Employers' Liability	\$1,000,000.00
Bodily Injury Liability	\$1,000,000.00 each occurrence
except Automobile	\$1,000,000.00 aggregate
Property Damage Liability	\$1,000,000.00 each occurrence
except Automobile	\$1,000,000.00 aggregate
Personal & Advertising Injury Limit	\$1,000,000.00
Products / Completed Ops.	\$2,000,000.00 aggregate
Automobile Bodily Injury	\$1,000,000.00 each person
Liability	\$1,000,000.00 each occurrence
Automobile Property Damage	\$1,000,000.00 each occurrence
Liability	
Contractor's Pollution Liability (with 1 year extended reporting period)	
Each Occurrence	\$1,000,000.00
Aggregate	\$2,000,000.00
Environmental Impairment Liability (with 1 year extended reporting period)	
Each Occurrence	\$1,000,000.00
Aggregate	\$2,000,000.00
Excess Umbrella Liability	\$1,000,000.00

All insurance shall be provided by an insurer(s) acceptable to the County, and shall provide for thirty (30) days prior notice of cancellation to the County. Upon contract award, Contractor shall deliver to the County a certificate or policy of insurance evidencing Contractor's compliance with this paragraph. Contractor shall abide by all terms and conditions of the insurance and shall do nothing to impair or invalidate the coverage.

Rockdale, GA shall be named as Additional Insured under any General Liability, Business Auto and Umbrella Policies using ISO Additional Insured Endorsement forms CG 2010 or its equivalent. Coverage shall apply as Primary and non-contributory with Waiver of Subrogation in favor of Rockdale County, Georgia.

The insurance carrier must have a minimum rating of A or higher as determined by the rating firm A.M. Best.

Certificates to contain policy number, policy limits and policy expiration date of all policies issued in accordance with this contract.

ARTICLE 13 - LAWS AND REGULATIONS

Article 13 Laws and Regulations, of the General Conditions is hereby modified to include the following:

Article 13, following first paragraph, add:

Where professional engineering work is required in connection with any of the components required by the Contract, all Bidders and component suppliers must insure that there is full compliance with all applicable laws of the state of Georgia and any other state governing professional engineering. The Owner and PM/CM do not warrant that the name of an entity listed as an acceptable manufacturer is or will be in compliance with said laws.

ARTICLE 15 NOTICE AND SERVICE THEREOF

Article 15 Notice and Service Thereof, of the General Conditions is hereby modified to include the following:

(c) All papers required to be delivered to the Owner shall, unless otherwise specified in writing to the Contractor, be delivered to the Rockdale County Board of Commissioners, 943 Court Street, Conyers, Georgia 30012, Attn: Norman Wheeler, Chairman, Board of Commissioners.

Any notice to or demand upon the Owner shall be sufficiently given if delivered to the Office of said Chairman if delivered by the United States Mail in a sealed, postage prepaid envelope, or delivered by facsimile transmission, followed by written confirmation, in each case addressed to said Chairman or to such other representative of the Owner or to such other address as the Owner may subsequently specify in writing to the Contractor for such purposes.

(e) The Contractor shall file all "Notices of Commencement" required for this Project in accordance with O.C.G.A. §44 14 361.5 et.seq. and §36 82 104 et.seq., as applicable. The Contractor shall respond to all requests for copies of a Notice of Commencement. Should the Owner or PM/CM receive such a request, this request will be forwarded to the Contractor for further handling. The name and address of the Owner shall be as stated in paragraph (c) of this Article. The name and general description of the Project shall be as stated in the Invitation to Bid.

ARTICLE 24 SCHEDULES, REPORTS AND RECORDS

Article 24 Schedules, Reports and Records, of the General Conditions, is hereby modified to include the following:

(a) The Contractor shall submit to the Owner progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed as stipulated in the various sections of these Specifications.

(b) Immediately after execution of the Contract by the Owner, and before the first partial payment is made, the Contractor shall deliver to the Owner a construction progress schedule in form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the Progress Schedule.

(c) An updated schedule and an updated Schedule of Submittals shall be presented with each partial payment request. Lack of an updated schedule and/or an updated Schedule of Submittals will delay processing of the pay request until receipt of the updated schedule and/or an updated Schedule of Submittals.

(d) If the schedule reflects a completion date prior to the completion date established by the Contract Agreement, this shall afford no basis to claim for delay should the Contractor not complete the Work prior to the projected completion date. Instead all "float" between the completion date in the Contractor's schedule and the completion date established in the Contract Agreement shall belong to and be exclusively available to the Owner. Should a change order be executed with a revised completion date, the

progress schedule shall be revised to reflect the new completion date.

(e) The Contractor shall maintain on the Project site, a complete set of up to date Record Documents.

(f) Project Coordination Meetings: The General Contractor shall participate in Project Coordination Meetings to be held on the site monthly, or more often if conditions warrant, to establish the current state of completion and revise the schedule as necessary. The Project Coordination Meeting will be conducted by the PM/CM.

(g) Contractor's Responsibilities

(1) Implement the detailed Near Term Schedule of activities to the fullest extent possible between Project Coordination Meetings.

(2) The Contractor shall prepare and provide one copy of the Contractor's Daily Report to the PM/CM by 10:00 a.m. of the day following the Report date. This Daily Report will contain, as a minimum, the weather conditions; number of workers by craft, including supervision and management personnel on site; active and inactive equipment on site; work accomplished by CPM activity item; problems; and visitors to the jobsite.

(3) If a current activity or series of activities on the OPS is behind schedule and if the late status is not due to an excusable delay for which a time extension would be forthcoming, the Contractor shall attempt to reschedule the activity to be consistent with the Overall Project Schedule so as not to delay any of the Contract milestones. The Contractor agrees that:

a. The Contractor shall attempt to expedite the activity completion so as to have it agree with the OPS. Such measures as the Contractor may choose shall be made explicit during the Project Coordination Meeting.

b. If, within two weeks of identification of such behind schedule activity, the Contractor is not successful in restoring the activity to an on schedule status, the Contractor shall:

1. Carry out the activity with the scheduled crew on an overtime basis until the activity is complete or back on schedule.

2. Increase the crew size or add shifts so the activity can be completed as scheduled.

3. Commit to overtime or increased crew sizes for subsequent activities, or some combination of the above as deemed suitable by the PM/CM.

These actions shall be taken at no increase in the Contract amount.

(4) Maintain a current copy of all construction schedules on prominent display in the Contractor's field office at the Project site.

(5) Cooperate with the Owner or Owner's representative in all aspects of the Project Scheduling System. Failure to implement the Project Scheduling System or to provide specified schedules, diagrams and reports, or to implement actions to re establish progress consistent with the OPS may be causes for withholding of payment.

ARTICLE 30 PAYMENTS AND COMPLETION

Article 30 Payments and Completion, of the General Conditions, is hereby modified to include the following:

Completion: ALL WORK REQUIRED BY THE CONTRACT DOCUMENTS, CONTRACT DRAWINGS AND SPECIFICATIONS MUST BE COMPLETED BEFORE THE FINAL INSPECTION IS PERFORMED. This includes, but is not limited to, the following:

(1) Performing tests as described in the detailed Specifications.

(2) Removing temporary plugs, bulkheads, bypasses, etc., and diverting flow into the facility when approved by the PM/CM.

(3) Restoration of the work area.

Upon completion of all work required, the Contractor shall submit completed Record Drawings to the PM/CM and request, in writing, that the final inspection be performed. The PM/CM will arrange for final inspection of the work by the Owner and Designer. If the PM/CM finds the work of the Contractor complete and acceptable in accordance with the provisions of the Contract Documents and that the Record Drawings accurately depict the complete work, PM/CM will recommend to the Owner that the job be accepted and that final payment be made.

In the event that the final inspection reveals deficiencies in meeting the Contract requirements, the Contractor shall complete all remaining items of work, and make adjustments found to be necessary. Upon receipt of written notice from the Contractor that the work is complete and ready for re inspection, the PM/CM will arrange a final inspection.

The Contractor will be notified, in writing, by the Owner of the final acceptance of the work. The date of final acceptance shall be the termination date for the Contractor's liability for the physical properties of the facilities and the beginning of the warranty period.

Before final payment can be made, the Contractor must certify, in writing, to the Owner that all payrolls, materials bills, and other indebtedness connected with the work have been paid. If requested by the PM/CM, the Contractor shall provide release of lien documentation from subcontractors or suppliers.

Final payment will not be made if there is disputed indebtedness or if there are liens upon the property.

If upon completion of all work there is disputed indebtedness or there are liens upon the property, semi final payment may, be made, at the Owner's option, in accordance with the following provisions:

(1) The Owner will retain an amount equal to the disputed indebtedness and/or liens upon the property including all related cost and interest in connections with said disputed indebtedness and liens which the Owner may be compelled to pay upon and subsequent adjudication.

2) The Contractor shall certify to those items of work not disputed that all payables, materials bills and other indebtedness connected with the work have been paid or otherwise satisfied.

The making of the final payment shall constitute a waiver of all claims by the Owner, other than those for faulty work covered by and appearing within the warranty period.

The acceptance of final payment shall constitute a waiver of all claims by the Contractor, except those previously made, in writing, and still unsettled.

(h) Prompt Payment Clause

(1) Owner and Contractor agree that all partial payments and final payments shall be subject to the Georgia Prompt Pay Act, as originally enacted and amended, and as set forth in O.C.G.A. §§ 13-11-1 through 13-11-11, except as provided below to the extent authorized by law:

a. Interest Rate: For purposes of computing interest on late payments, the rate of interest shall be one-half percent per month or a pro-rata fraction thereof on the unpaid balance as may be due.

b. Payment Periods:

1. When the Contractor has performed in accordance with the provisions of these Contract Documents, the Owner shall pay the Contractor within 45 days of receipt by the Owner or the Owner's representative of any properly completed Application for Payment, based upon work completed or service provided pursuant to the terms of these Contract Documents.

2. When a subcontractor has performed in accordance with the provisions of its subcontract and the subcontract conditions precedent to payment have been satisfied, the Contractor shall pay to that subcontractor and each subcontractor shall pay to its subcontractor, within ten days of receipt by the Contractor or subcontractor of each periodic or final payment, the full amount received for such subcontractors work and materials based on work completed or service provided under the subcontract, less retainage expressed as a percentage, but such retainage shall not exceed that retainage being held by the Owner, provided that the subcontractor has provided or provides such satisfactory reasonable assurances of continued performance and financial responsibility to complete its work as the Contractor in its reasonable discretion may require, including but not limited to a payment and performance bond.

c. Interest on Late Payment: Except as otherwise provided in these Contract Documents and/or in O.C.G.A. § 13-11-5, if a periodic or final payment to the Contractor is delayed by more than the time allotted in Paragraph b. of this Prompt Payment Clause or if a periodic or final payment to a subcontractor is delayed more than ten days after receipt of periodic or final payment by the Contractor or subcontractor, the Owner, Contractor, or subcontractor, as the case may be, shall pay interest to its Contractor, or subcontractor beginning on the day following the due dates as provided in Paragraph b. of this Prompt Payment Clause at the rate of interest as provided herein. Interest shall be computed per month or a pro-rata fraction thereof on the unpaid balance. There shall be no compounded interest. No interest is due unless the person or entity being charged interest receives "Notice" as provided in Paragraph d. of this Prompt Payment Clause. Acceptance of progress payments or final payment shall release all claims for interest on said payments.

d. Notice of Late Payment and Request for Interest: Any person or entity asserting entitlement to interest on any periodic or final payment pursuant to the provisions of this Prompt Payment Clause shall provide "notice" to the person or entity being charged interest of the charging party's claim to interest on late payment. "Notice" shall be in writing, served by U.S. Certified Mail - Return Receipt Requested at the time the properly completed Application for Payment is received by the Owner or Owner's representative, and shall set forth the following:

1. A short and concise statement that interest is due pursuant to the provisions of the Georgia Prompt Pay Act and this Prompt Payment Clause;
 2. The principal amount of the periodic or final payment which is allegedly due to the charging party;
- and
3. The first day and date upon which the charging party alleges that said interest will begin to accrue, pursuant to the provisions of the Georgia Prompt Pay Act and this Prompt Payment Clause.

These "Notice" provisions are of the essence; therefore, failure to comply with any requirement as set forth in this Prompt Payment Clause precludes the right to interest on any alleged late payment to which said "Notice" would otherwise apply.

(2) Integration with the Georgia Prompt Pay Act: Unless otherwise provided in these Contract Documents, the parties hereto agree that these provisions of this Prompt Payment Clause supersede and control all provisions of the Georgia Prompt Pay Act (O.C.G.A. §§ 13-11-1 through 13-11-11 (1994)), as originally enacted and as amended, and that any dispute arising between the parties hereto as to whether or not the provisions of this contract or the Georgia Prompt Pay Act control will be resolved in favor of these Contract Documents and its terms.

END OF SECTION 00800

DIVISION 1 – GENERAL REQUIREMENTS**SECTION 01010
Summary of Work****1.01 DESCRIPTION**

- A. The Work to be performed under this Contract shall consist of furnishing all labor, materials, tools, equipment and incidentals and performing all work required for the ONSITE SODIUM HYPOCHLORITE GENERATION SYSTEM REPLACEMENT.
- B. All Work described above shall be performed as specified in the Contract Documents.

1.02 PROJECT LOCATION

The project shall be completed at Rockdale County Water Treatment Plant at Gees Mill Road.

1.03 QUANTITIES

The Owner reserves the right to alter the quantities of work to be performed or to extend or shorten the improvements at any time when and as found necessary, and the Contractor shall perform the work as altered, increased or decreased. Payment for such increased or decreased quantity will be made in accordance with the Instructions to Bidders. No allowance will be made for any change in anticipated profits nor shall such changes be considered as waiving or invalidating any conditions or provisions of the Contract and Bond.

1.04 SEQUENCE OF WORK

The contractor shall install the dilution panel and all associated piping, ensure that it is fully functioning and 0.8% sodium hypochlorite is available, prior to the demolition of the existing sodium hypochlorite generators. Plant water may be temporarily used as the water source.

1.05 PARTIAL OWNER OCCUPANCY

The existing facilities to which these improvements are being made will continue operation during the period of construction.

END OF SECTION 01010

SECTION 01025 MEASUREMENT AND PAYMENT

1.01 SCOPE

- A. The Bid lists each item of Work for which payment will be made. No payment will be made for any items other than those listed in the Bid.
- B. Required items of Work necessary for the satisfactory completion of the Work, which are not specifically listed in the Bid, and not specified in this Section to be measured or included in one of the items listed in the Bid, shall be considered incidental to the Work. All costs thereof, including Contractor's overhead costs and profit and all mobilization costs for the Contract duration shall be included in the unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.
- No separate or future payments shall be made for MOBILIZATION except as specifically shown in the Bid.
- C. Work includes furnishing all plant, labor, equipment, tools, power and materials, and performing all operations required to complete the Work satisfactorily, as specified and as indicated in the Specifications.

1.02 DESCRIPTIONS

- A. Measurement of an item of Work will be by the unit indicated in the Bid.
- B. Final payment quantities shall be determined from the Record Drawings. The Record Drawing quantities shall be determined by a survey after the completion of all required work. The survey shall conform to Article 24 - Schedules, Reports and Records as specified in Section 00800, Supplementary Conditions. The precision of measurement for final payment quantities shall match the precision shown for that item in the Bid.

1.03 PAYMENT

- A. Payment will include all necessary and incidental related work not specified to be included in any other item of work listed in the Bid.
- B. Unless otherwise stated in individual sections of the Specifications or in the Bid, no separate payment will be made for any item of work, materials, parts, equipment, supplies or related items required to perform and complete the work. The costs for all such items required shall be included in the price bid for item of which it is a part.
- C. Payment will be made by extending unit prices multiplied by quantities provided and then summing the extended prices to reflect actual work. Such price and payment shall constitute full compensation to the Contractor for furnishing all plant, labor, equipment, tools and materials not furnished by the Owner and for performing all operations required to provide to the Owner the entire Project, complete in place, as specified and as indicated on the Drawings.

1.04 CASH ALLOWANCES**A. General**

1. The Contractor shall include in the Bid Total all allowances stated in the Contract Documents. These allowances shall cover the net cost of the services provided by a firm selected by the Owner. The Contractor's handling costs, labor, overhead, profit and other expenses contemplated for the original allowance shall be included in the items to which they pertain and not in allowances.
2. No payment will be made for nonproductive time on the part of testing personnel due to the Contractor's failure to properly coordinate testing activities with the work schedule or the Contractor's problems with maintaining equipment in good working condition. The Contractor shall make all necessary excavation and shall supply any samples of materials necessary for conducting compaction and density tests.
3. No payment shall be provided for services which fail to verify required results.

B. Should the net cost be more or less than the specified amount of the allowance, the Contract will be adjusted accordingly by change order. The amount of change order will not recognize any changes in handling costs at the site, labor, overhead, profit and other expenses caused by the adjustment to the allowance.

C. Documentation

1. Submit copies of the invoices with each periodic payment request from the firm providing the services.
2. Submit results of services provided which verify required results.

END OF SECTION 01025

SECTION 01060

Regulatory Requirements

1.01 SCOPE

- A. Permits and Responsibilities: The Contractor shall, without additional expense to the Owner, be responsible for obtaining all necessary licenses and permits, including building permits, and for complying with any applicable federal, state, county and municipal laws, codes and regulations, in connection with the prosecution of the Work.
- B. The Contractor shall take proper safety and health precautions to protect the Work, the workers, the public and the property of others.
- C. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the Work, except for any completed unit of construction thereof which may heretofore have been accepted.

END OF SECTION 01060

SECTION 01091

Codes and Standards

1.01 DESCRIPTION

- A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code or standard, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the time of advertisement for Bids. This shall include the furnishing of materials, testing of materials, fabrication and installation practices. In those cases where the Supplier's quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent which is indicated or intended.
- B. The inclusion of an organization under one category does not preclude that organizations' standards from applying to another category.
- C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.
- D. All material and equipment, for which a UL Standard, an AGA or NSF approval or an ASME requirement is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.
- E. The standards which apply to this Project are not necessarily restricted to those organizations which are listed in Article 1.02.

1.02 STANDARD ORGANIZATIONS

A. Piping and Valves

ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
DIPRA	Ductile Iron Pipe Research Association
FCI	Fluid Controls Institute
MSS	Manufacturers Standardization Society
NCPI	National Clay Pipe Institute
NSF	National Sanitation Foundation
PPI	Plastic Pipe Institute
	Uni-Bell PVC Pipe Association

B. Materials

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

C. Painting and Surface Preparation

NACE	National Association of Corrosion Engineers
SSPC	Steel Structures Painting Council

D. Electrical and Instrumentation

AEIC	Association of Edison Illuminating Companies
AIEE	American Institute of Electrical Engineers
EIA	Electronic Industries Association
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
TIA	Telecommunications Industries Association
UL	Underwriter's Laboratories
VRCI	Variable Resistive Components Institute

E. Aluminum

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association

F. Steel and Concrete

ACI	American Concrete Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
CRSI	Concrete Reinforcing Steel Institute
NRMA	National Ready-Mix Association
PCA	Portland Cement Association
PCI	Pre-stressed Concrete Institute

G. Welding

ASME	American Society of Mechanical Engineers
AWS	American Welding Society

H. Government and Technical Organizations

AIA	American Institute of Architects
APHA	American Public Health Association
APWA	American Public Works Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
CFR	Code of Federal Regulations
CSI	Construction Specifications Institute
EDA	Economic Development Administration
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FmHA	Farmers Home Administration
FS	Federal Specifications
IAI	International Association of Identification
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
NBFU	National Board of Fire Underwriters
(NFPA)	National Fluid Power Association
NBS	National Bureau of Standards
NISO	National Information Standards Organization
OSHA	Occupational Safety and Health Administration

SI	Salt Institute
SPI	The Society of the Plastics Industry, Inc.
USDC	United States Department of Commerce
WEF	Water Environment Federation

I. General Building Construction

AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AITC	American Institute of Timber Construction
APA	American Parquet Association, Inc.
APA	American Plywood Association
BHMA	Builders Hardware Manufacturers Association
BIFMA	Business and Institutional Furniture Manufacturers Association
DHI	Door and Hardware Institute
FM	Factory Mutual Fire Insurance Company
HPMA	Hardwood Plywood Manufacturers Association
HTI	Hand Tools Institute
IME	Institute of Makers of Explosives
ISANTA	International Staple, Nail and Tool Association
ISDSI	Insulated Steel Door Systems Institute
IWS	Insect Screening Weavers Association
MBMA	Metal Building Manufacturers Association
NAAMM	National Association of Architectural Metal Manufacturers
NAGDM	National Association of Garage Door Manufacturers
NCCLS	National Committee for Clinical Laboratory Standards
NFPA	National Fire Protection Association
NFSA	National Fertilizer Solutions Association
NKCA	National Kitchen Cabinet Association
NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
RMA	Rubber Manufacturers Association
SBC	SBCC Standard Building Code
SDI	Steel Door Institute
SIA	Scaffold Industry Association
SMA	Screen Manufacturers Association
SPRI	Single-Ply Roofing Institute
TCA	Tile Council of America
UBC	Uniform Building Code

J. Roadways

AREA	American Railway Engineering Association
DOT	Department of Transportation
SSRBC	Standard Specifications for Construction of Transportation Systems, Georgia Department of Transportation

K. Plumbing

AGA	American Gas Association
NSF	National Sanitation Foundation
PDI	Plumbing Drainage Institute
SPC	SBCC Standard Plumbing Code

L. Refrigeration, Heating, and Air Conditioning

AMCA	Air Movement and Control Association
ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
CGA	Compressed Gas Association
CTI	Cooling Tower Institute
HEI	Heat Exchange Institute
IAR	International Institute of Ammonia Refrigeration
NB	National Board of Boilers and Pressure Vessel Inspectors
PFMA	Power Fan Manufacturers Association
SAE	Society of Automotive Engineers
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SMC	SBCC Standard Mechanical Code
TEMA	Tubular Exchangers Manufacturers Association

M. Equipment

AFBMA	Anti-Friction Bearing Manufacturers Association, Inc.
AGMA	American Gear Manufacturers Association
ALI	Automotive Lift Institute
CEMA	Conveyor Equipment Manufacturers Association
CMAA	Crane Manufacturers Association of America
DEMA	Diesel Engine Manufacturers Association
MMA	Monorail Manufacturers Association
OPEI	Outdoor Power Equipment Institute, Inc.
PTI	Power Tool Institute, Inc.
RIA	Robotic Industries Association
SAMA	Scientific Apparatus Makers Association

END OF SECTION 01091

SECTION 01200
Project Meetings**1.01 SCOPE**

- A. Work under this Section includes all scheduling and administering of pre-construction and progress meetings as herein specified and necessary for the proper and complete performance of this Work.
- B. Scheduling and Administration by PM/CM:
 - 1. Prepare agenda.
 - 2. Make physical arrangements for the meetings.
 - 3. Preside at meetings.
 - 4. Record minutes and include significant proceedings and decisions.
 - 5. Distribute copies of the minutes to participants.

1.02 PRECONSTRUCTION CONFERENCE

- A. The PM/CM shall schedule the preconstruction conference prior to the issuance of the Notice to Proceed.
- B. Representatives of the following parties are to be in attendance at the meeting:
 - 1. Owner.
 - 2. PM/CM.
 - 3. Design Engineer.
 - 4. Contractor and superintendent.
 - 5. Major subcontractors.
 - 6. Representatives of governmental or regulatory agencies when appropriate.
- C. The agenda for the preconstruction conference shall consist of the following as a minimum:
 - 1. Distribute and discuss a list of major subcontractors and a tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel and emergency telephone numbers.
 - 4. Processing of field decisions and change orders.

5. Adequacy of distribution of Contract Documents.
6. Schedule and submittal of shop drawings, product data and samples.
7. Pay request format, submittal cutoff date, paydate and retainage.
8. Procedures for maintaining record documents.
9. Use of premises, including office and storage areas and Owner's requirements.
10. Major equipment deliveries and priorities.
11. Notifications to Owner.
12. Safety and first aid procedures.
13. Security procedures.
14. Housekeeping procedures.
15. Work hours.

1.03 PROJECT COORDINATION MEETINGS

- A. Schedule regular meetings monthly or more often as directed by the PM/CM.
- B. Hold called meetings as the progress of the Work dictates.
- C. The meetings shall be held at the location indicated by the PM/CM.
- D. Representatives of the following parties are to be in attendance at the meetings:
 1. PM/CM.
 2. Contractor and superintendent.
 3. Major subcontractors as pertinent to the agenda.
 4. Owner's representative as appropriate.
 5. Engineers representation as required by PM/CM.
 6. Representatives of governmental or other regulatory agencies as appropriate.
- E. The minimum agenda for progress meetings shall consist of the following:

1. Review and approve minutes of previous meetings.
2. Review work progress since last meeting.
3. Note field observations, problems and decisions.
4. Identify problems which impede planned progress.
5. Review off-site fabrication problems.
6. Review Contractor's corrective measures and procedures to regain plan schedule.
7. Review Contractor's revision to the construction schedule as outlined in the Supplementary Conditions.
8. Review submittal schedule; expedite as required to maintain schedule.
9. Maintenance of quality and work standards.
10. Review changes proposed by Owner for their effect on the construction schedule and completion date.
11. Complete other current business.

END OF SECTION 01200

SECTION 01300
Submittals**1.01 SCOPE**

- A. Wherever submittals are required hereunder, all such submittals by the Contractor shall be submitted to the Owner.
- B. Within 15 days after the date of commencement as stated in the Notice to Proceed, the Contractor shall submit the following items to the Owner for review:
 - 1. A preliminary progress schedule indicating proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents.

1.02 SHOP DRAWINGS

- A. Wherever called for in the Contract Documents, or where required by the Owner, the Contractor shall furnish to the Owner for review, six (6) copies, plus one reproducible copy, of each shop drawing submittal. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, list, graphs, catalog sheets, data sheets, and similar items. Whenever the Contractor is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the appropriate branch and in the state wherein the project is to be built, unless otherwise directed.
- B. Verify that the material or equipment described in each submittal conforms to all requirements of the Specifications and drawings. Where the detailed Specifications require specific submittal data, submit all data at the same time.
- C. Except as may otherwise be indicated herein, the Owner will return prints of each submittal to the Contractor with its comments noted thereon, within 10 calendar days following their receipt by the Owner. It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the Owner by the second submission of a submittal item.
- D. If 3 copies of a submittal are returned to the Contractor marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.
- E. If 3 copies of a submittal are returned to the Contractor marked "MAKE CORRECTIONS NOTED," formal revision and resubmission of said submittal will not be required.
- F. If a submittal is returned to the Contractor marked "AMEND-RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the Owner.
- G. If a submittal is returned to the Contractor marked "REJECTED-RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of, said revised submittal to the Owner.

- H. Fabrication of an item shall be commenced only after the Owner has reviewed the pertinent submittals and returned copies to the Contractor marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED." Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the contract requirements.
- I. All Contractor shop drawings submittals shall be carefully reviewed by an authorized representative of the Contractor, prior to submission to the Owner. Each submittal shall be dated, signed, and certified by the Contractor, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the Owner of any Contractor submittals will be made for any items which have not been so certified by the Contractor. All non-certified submittals will be returned to the Contractor without action taken by the Owner, and any delays caused thereby shall be the total responsibility of the Contractor.

1.03 EFFECT OF ACCEPTANCE OF CONTRACTOR INFORMATION

- A. Acceptance by the Owner of any drawings, method of work, or any information regarding materials or equipment the Supplied proposes to provide shall not relieve the Supplied of his responsibility for any errors therein and shall not be regarded as an assumption of risk or liability by the Owner, or by any officer or employees thereof, and the Supplied shall have no claim under the contract on account of the failure or partial failure or inefficiency of any plan or method of work or material or equipment so accepted. Such acceptance shall be considered to mean merely that the Owner has no objection to the Supplier using, upon his own full responsibility, the plan or method of work proposed, or providing the materials or equipment proposed.
- B. Approval of shop drawings by the Owner is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. The Contractor is responsible for dimensions which shall be confirmed and correlated at the job site, fabrication process and techniques of construction, coordination of his work with that of all other trades and the satisfactory performance of his work.

1.04 DEVIATIONS FROM CONTRACT

- A. If the Contractor proposes to provide material or equipment which does not conform to all of the Specifications and Drawings, the transmittal form accompanying the submittal copies shall indicate under "comments" the deviations.

1.05 PRODUCT DATA AND SAMPLES

- A. Where required in the Specifications and as determined by the Owner, test specimens or samples of materials, appliances and fittings to be used or offered for use in connection with the work shall be submitted to the Owner at the Contractor's expense, with information as to their sources, with all freight charges prepaid, and in such quantities and sizes as may be required for proper examination and tests to establish the quality or equality thereof, as applicable.
- B. All samples and test specimens are to be submitted in ample time to enable the Owner to make any tests or examinations necessary, without delay to the work. The Contractor will be held responsible for any loss of

time due to the neglect or failure to deliver the required samples to the Owner as specified.

- C. Samples may also to be taken during the course of the work, as required by the Owner.
- D. Laboratory tests and examinations that the Owner elects to make will be made at no cost to the Contractor, except that, if a sample of any material or equipment proposed for use by the Contractor fails to meet the Specifications, the cost of testing subsequent samples will be borne by the Contractor.
- E. All tests required by the Specifications to be performed by an independent laboratory are to be made, and the samples therefore furnished shall be at the sole expense of the Contractor.
- F. Material used in the work is to conform with the submitted samples and test certificates as approved by the Owner.

1.06 CONTRACTOR'S SCHEDULES

- A. Within 7 calendar days after the Commencement Date in the Notice to Proceed, the Contractor shall furnish the Owner a schedule showing the dates that manufacturing and assembly is to start and shipment is to commence. This schedule shall be developed and followed to ensure the timely review and approval' of shop drawings, and delivery of the equipment. The schedule shall be subject to the Owner's review and Contractor resubmittal of the schedule shall be as required by the Owner.

1.07 OWNER'S MANUAL

- A. The Supplier shall submit technical operation and maintenance information for each item of mechanical and electrical equipment in an organized manner in the Owner's MANUAL. It shall be written so that it can be used and understood by the Owner's operation and maintenance staff. The Owner's manual information shall also be submitted in electronic format using compact discs (CD), with each part of manual included as an individual pdf file. All individual equipment sheets shall be submitted on CD as individual pdf files.
- B. The Owner's MANUAL shall be subdivided by "Parts." "Parts" shall conform to the following (as applicable):
 1. Part 1 - Equipment Summary: A summary table shall indicate the equipment name, equipment number, and process area in which the equipment is installed.
 2. Part 2 - Operational Procedures: Manufacturer-recommended procedures on the following shall be included in Part 2:
 - Installation
 - Adjustment
 - Startup
 - Location of controls, special tools, equipment required, or related instrumentation needed for operation
 - Operation procedures
 - Calibration Shutdown
 - Troubleshooting Disassembly/ Reassembly

- Realignment
- Testing to determine performance efficiency
- Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices
- List of all electrical relay settings including alarm and contact settings

3. Part 3 - Preventive Maintenance Procedures: Preventive maintenance procedures shall include all manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by leaving the equipment in place.

Schedules: Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature ranges, shall be covered.

4. Part 4 - Parts List: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest vendor and parts warehouse shall be included.

Drawings: Cross-sectional or exploded view drawings shall accompany the parts list.

5. Part 5 - Wiring Diagrams: Part 5 shall include complete internal and connection wiring diagrams for electrical equipment items.

6. Part 6 - Shop Drawings: This part shall include approved shop or fabrication drawings, complete with dimensions.

7. Part 7 - Safety: This part describes the safety precautions to be taken when operating and maintaining the equipment or working near it.

8. Part 8 - Documentation: All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this part.

9. Part 9 - Spare Parts: This part shall contain spare parts information for all mechanical, electrical, and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall be limited to those spare parts which each manufacturer recommends be maintained by the Owner in inventory at the plant site. Each manufacturer or vendor shall indicate the name, address, and telephone number of its nearest outlet of spare parts to facilitate the Owner in ordering. The Supplier shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents.

- C. The Supplier shall submit to the Owner 3 identical Owner's MANUALS a minimum of 60 calendar days prior to the scheduled startup of the Equipment.

END OF SECTION 01300

SECTION 01310

Construction Schedules

1.01 SCOPE

- A. The work under this Section includes preparing, furnishing, distributing, and periodic updating of the construction program/schedules as specified herein.
- B. The purpose of the schedule is to demonstrate that the Contractor can complete the overall Project within the Contract Time, and meet all required interim milestones.

1.02 QUALITY ASSURANCE

The Project Schedule shall be developed using Microsoft Project 2000 by Microsoft Corporation for scheduling or other approved method/program. Coordinate with the PM/CM to insure compatibility of software and computer systems.

1.03 SUBMITTALS

- A. Project Schedule
 - 1. Submit the Project Schedule within 5 days after date of the Notice to Proceed.
 - 2. The PM/CM will review schedule and will return the reviewed copy within 5 days after receipt.
 - 3. If required, resubmit within five days after receipt of a returned review copy.
- B. Updating: Submit an update of the schedule with each request for payment.
- C. Submit the number of copies required by the Contractor, plus four copies to be retained by the PM/CM.

1.04 APPROVAL

Approval of the Contractor's construction program and revisions thereto, shall in no way relieve the Contractor of any duties and obligations under the Contract. Such approval is limited to the format of the schedule and does not in any way indicate approval of, or concurrence with, the Contractor's means, methods and ability to carry out the Work.

1.05 PRELIMINARY PROJECT SCHEDULE (PPS)

- A. The Project Schedule shall be a bar chart or time scaled network diagram showing the Contractor's proposed operations.

1.08 UPDATING

- A. Written Narrative Report: Provide a written narrative report with each update including:
 - 1. A status review of the Project.

2. A discussion of problem areas including current and anticipated delay factors and their impact.
 3. Direct action taken, or proposed, and its effect.
 4. A description of revisions including:
 - a. Their effect on the schedule due to the change of scope.
 - b. Revisions in duration of activities.
 - c. Other changes that may affect the schedule.
 5. A listing of behind-schedule materials and equipment procurement activities.
 6. A listing of any significant changes in the activities and restraints occurring since the last update and why the changes were made.
- B. Critical Work List: Provide a listing of critical work to be performed prior to the next Project Coordination Meeting, specifically listing what must be done during the next 30 days to stay on the critical path schedule.
- C. At each Project Coordination Meeting, the Contractor shall present for discussion the most current update of the schedule.

END OF SECTION 01310

SECTION 01320

Construction Photographs

1.01 SCOPE

- A. The Contractor shall furnish all equipment and labor materials required to provide the Owner with construction photographs of the Project.
- B. Negatives shall become the property of the Owner and none of the photographs herein shall be published without express permission of the Owner.

1.02 PRE AND POST CONSTRUCTION PHOTOGRAPHS

- A. Prior to the beginning of any work, the Contractor shall take project photographs of the work area to record existing conditions.
- B. Following completion of the work, another recording shall be made showing the same areas and features as in the pre-construction photographs.
- C. All conditions which might later be subject to disagreement shall be shown in sufficient detail to provide a basis for decisions.
- D. The Contractor shall coordinate the taking of pre and post-construction photographs with the PM/CM. The PM/CM shall observe the taking of the photographs.
- E. The pre-construction photographs shall be submitted to the PM/CM within 20 calendar days after the date of receipt by the Contractor of Notice to Proceed. Post-construction photographs shall be provided prior to final acceptance of the project.

1.03 PROGRESS PHOTOGRAPHS

- A. Photographs shall be taken to record the general progress of the Project during each pay period. Photographs shall be representative of the primary work being performed at that time.
- B. The photographs shall include the date and time marking of the recording. All photographs shall be labeled on a tab connected to the bottom of the photo to indicate date and description of work shown.
- C. A minimum of 10 photographs shall be submitted with each request for payment. The view selection will be as agreed to with the PM/CM. Two prints of each photograph or digital copies via CD disc shall be submitted to the PM/CM.

1.04 SUBMITTALS

- A. A CD disc is an acceptable method for submitting the photographs.
- B. Construction photographs shall be submitted with each payment request. Failure to include photographs may be cause for rejection of the payment request.

END OF SECTION 01320

SECTION 01340

Shop Drawings, Product Data and Samples

PART 1 GENERAL

1.01 SCOPE

- A. The work under this Section includes submittal to the PM/CM of shop drawings, product data and samples required by the various sections of these Specifications.
- B. Submittal Contents: The submittal contents required are specified in each section.
- C. Definitions: Submittals are categorized as follows:
 - 1. Shop Drawings
 - a. Shop drawings shall include technical data, drawings, diagrams, procedure and methodology, performance curves, schedules, templates, patterns, test reports, calculations, instructions, measurements and similar information as applicable to the specific item for which the shop drawing is prepared.
 - b. Provide newly-prepared information, on reproducible sheets, with graphic information at accurate scale (except as otherwise indicated) or appropriate number of prints hereof, with name or preparer (firm name) indicated. The Contract Drawings shall not be traced or reproduced by any method for use as or in lieu of detail shop drawings. Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by the Designer to be used in connection with the Work.
 - c. Drawings shall be presented in a clear and thorough manner. Details shall be identified by reference to sheet and detail, specification section, schedule or room numbers shown on the Contract Drawings.
 - d. Minimum assembly drawings sheet size shall be 24 x 36-inches.
 - e. Minimum detail sheet size shall be 8-1/2 x 11-inches.
 - f. Minimum Scale:
 - (1) Assembly Drawings Sheet, Scale: 1-inch = 30 feet.
 - (2) Detail Sheet, Scale: 1/4-inch = 1 foot.
 - 2. Product Data
 - a. Product data includes standard printed information on materials, products and systems, not specially prepared for this Project, other than the designation of selections from among available choices printed therein.
 - b. Collect required data into one submittal for each unit of work or system, and mark each copy to show which choices and options are applicable to the Project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked and special coordination requirements.

3. Samples
 - a. Samples include both fabricated and un-fabricated physical examples of materials, products and units of work, both as complete units and as smaller portions of units of work, either for limited visual inspection or, where indicated, for more detailed testing and analysis.
 - b. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples, not less than three units, where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where the Designer's selection is required. Prepare samples to match the Designer's sample where indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations and compliance with standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Designer. The Designer will note "test" samples, except as otherwise indicated, for other requirements, which are the exclusive responsibility of the Contractor.
4. Miscellaneous submittals related directly to the Work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the Work but not processed as shop drawings, product data or samples.

1.02 SPECIFIC CATEGORY REQUIREMENTS

- A. General: Except as otherwise indicated in the individual work sections, comply with general requirements specified herein for each indicated category of submittal. Submittals shall contain:
 1. The date of submittal and the dates of any previous submittals.
 2. The Project title.
 3. Numerical submittal numbers, starting with 1.0, 2.0, etc. Revisions to be numbered 1.1, 1.2, etc.
 4. The Names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 5. Identification of the product, with the Specification section number, permanent equipment tag numbers and applicable Drawing No.
 6. Field dimensions, clearly identified as such.
 7. Relation to adjacent or critical features of the Work or materials.
 8. Applicable standards, such as ASTM or Federal Specification numbers.

9. Notification to the PM/CM in writing, at time of submissions, of any deviations on the submittals from requirements of the Contract Documents.
10. Identification of revisions on resubmittals.
11. An 8 x 3-inch blank space for Contractor and Designer stamps.
12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
13. Submittal sheets or drawings showing more than the particular item under consideration shall have all but the pertinent description of the item for which review is requested crossed out.

1.03 ROUTING OF SUBMITTALS

- A. Submittals and routine correspondence shall be routed as follows:
 1. Supplier to Contractor (through representative if applicable)
 2. Contractor to PM/CM
 3. PM/CM to Designer
 4. Designer to PM/CM
 5. PM/CM to Contractor and Owner
 6. Contractor to Supplier

PART 2 PRODUCTS

2.01 SHOP DRAWINGS

- A. Unless otherwise specifically directed by the PM/CM, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the item and its method of connection to the Work.

2.02 MANUFACTURER'S LITERATURE

- A. Where content of submitted literature from manufacturers includes data not pertinent to this submittal, clearly indicate which portion of the contents is being submitted for the Designer's review.
- B. Submit the number of copies which are required to be returned (not to exceed three) plus four copies which will be retained by the PM/CM.

2.03 SAMPLES

- A. Samples shall illustrate materials, equipment or workmanship and established standards by which completed work is judged.
- B. Unless otherwise specifically directed by the PM/CM, all samples shall be of the precise article proposed to be furnished.
- C. Submit all samples in the quantity which is required to be returned plus one sample which will be retained by the PM/CM.

2.04 COLORS

- A. Unless the precise color and pattern is specifically described in the Contract Documents, wherever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the PM/CM for review and selection.
- B. Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

PART 3 EXECUTION**3.01 CONTRACTOR'S COORDINATION OF SUBMITTALS**

- A. Prior to submittal for the Designer's review, the Contractor shall use all means necessary to fully coordinate all material, including the following procedures:
 - 1. Determine and verify all field dimensions and conditions, catalog numbers and similar data.
 - 2. Coordinate as required with all trades and all public agencies involved.
 - 3. Submit a written statement of review and compliance with the requirements of all applicable technical Specifications as well as the requirements of this Section.
 - 4. Clearly indicate in a letter or memorandum on the manufacturer's or fabricator's letterhead, all deviations from the Contract Documents.
- B. Each and every copy of the shop drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the PM/CM without the Contractor's stamp will be returned to the Contractor for conformance with this requirement.
- C. The Owner may backcharge the Contractor for costs associated with having to review a particular shop drawing, product data or sample more than two times to receive a "No Exceptions Taken" mark.

D. Grouping of Submittals

1. Unless otherwise specifically permitted by the PM/CM, make all submittals in groups containing all associated items.
2. No review will be given to partial submittals of shop drawings for items which interconnect and/or are interdependent. It is the Contractor's responsibility to assemble the shop drawings for all such interconnecting and/or interdependent items, check them and then make one submittal to the PM/CM along with Contractor's comments as to compliance, non-compliance or features requiring special attention.

- E. Schedule of Submittals: Within 20 days of Contract award and prior to any shop drawing submittal, the Contractor shall submit a schedule showing the estimated date of submittal and the desired approval date for each shop drawing anticipated. A reasonable period shall be scheduled for review and comments. Time lost due to unacceptable submittals shall be the Contractor's responsibility and some time allowance for resubmittal shall be provided. The schedule shall provide for submittal of items which relate to one another to be submitted concurrently.

3.02 TIMING OF SUBMITTALS

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
- B. In scheduling, allow sufficient time for the Designer's review following the receipt of the submittal.

3.03 REVIEWED SHOP DRAWINGS

A. PM/CM Review

- A. Allow a minimum of 5 days for the PM/CM's initial processing of each submittal requiring review and response, except allow longer periods where processing must be delayed for coordination with subsequent submittals. The PM/CM will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow a minimum of 2 days for reprocessing each submittal. Advise the PM/CM on each submittal as to whether processing time is critical to progress of the Work, and therefore the Work would be expedited if processing time could be foreshortened.
2. Acceptable submittals will be marked "No Exceptions Taken". A minimum of four copies will be retained by the PM/CM for PM/CM's, Designer's and the Owner's use and the remaining copies will be returned to the Contractor.
3. Submittals requiring minor corrections before the product is acceptable will be marked "Make Corrections Noted". The Contractor may order, fabricate and ship the items included in the submittals, provided the indicated corrections are made. Drawings must be resubmitted for review and marked "No Exceptions Taken" prior to installation or use of products.

4. Submittals marked "Amend and Resubmit" must be revised to reflect required changes and the initial review procedure repeated.
 5. The "Rejected - See Remarks" notation is used to indicate products which are not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial review procedure utilizing acceptable products.
 6. Only two copies of items marked "Amend and Resubmit" and "Rejected - See Remarks" will be reviewed and marked. One copy will be retained by the PM/CM and the other copy with all remaining unmarked copies will be returned to the Contractor for resubmittal.
- B. No work or products shall be installed without a drawing or submittal bearing the "No Exceptions Taken" notation. The Contractor shall maintain at the job site a complete set of shop drawings bearing the Designer's stamp.
- C. Substitutions: In the event the Contractor obtains the Designer's approval for the use of products other than those which are listed first in the Contract Documents, the Contractor shall, at the Contractor's own expense and using methods approved by the Designer, make any changes to structures, piping and electrical work that may be necessary to accommodate these products.
- D. Use of the "No Exceptions Taken" notation on shop drawings or other submittals is general and shall not relieve the Contractor of the responsibility of furnishing products of the proper dimension, size, quality, quantity, materials and all performance characteristics, to efficiently perform the requirements and intent of the Contract Documents. The Designer's review shall not relieve the Contractor of responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. The Contractor is responsible for dimensions to be confirmed and correlated at the job site. The Contractor is also responsible for information that pertains solely to the fabrication processes or to the technique of construction and for the coordination of the work of all trades.

3.04 RESUBMISSION REQUIREMENTS

- A. Shop Drawings
1. Revise initial drawings as required and resubmit as specified for initial submittal, with the resubmittal number shown.
 2. Indicate on drawings all changes which have been made other than those requested by the Designer.
- B. Project Data and Samples: Resubmit new data and samples as specified for initial submittal, with the resubmittal number shown.

END OF SECTION 01340

SECTION 01540
Job Site Security**1.01 BARRICADES, LIGHTS AND SIGNALS**

- A. The Contractor shall furnish and erect such barricades, fences, lights and danger signals and shall provide such other precautionary measures for the protection of persons or property and of the Work as necessary. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade and sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any Work under construction.
- B. The Contractor will be held responsible for all damage to the Work due to failure of barricades, signs and lights and whenever evidence is found of such damage, the Contractor shall immediately remove the damaged portion and replace it at Contractor's cost and expense. The Contractor's responsibility for the maintenance of barricades, signs and lights shall not cease until the Project has been accepted by the Owner.

END OF SECTION 01540

SECTION 01610

Transportation and Handling

1.01 SCOPE

- A. The Contractor shall provide transportation of all equipment, materials and products furnished under these Contract Documents to the Work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.
- B. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the Work.

1.02 TRANSPORTATION

- A. All equipment shall be suitably boxed, crated or otherwise protected during transportation.
- B. Where equipment will be installed using existing cranes or hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the cranes or hoisting equipment.
- C. Small items and appurtenances such as gauges, valves, switches, instruments and probes which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.03 HANDLING

- A. All equipment, materials and products shall be carefully handled to prevent damage or excessive deflections during unloading or transportation.
- B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Shafts and operating mechanisms shall not be used as lifting points. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.
- C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.
- D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

END OF SECTION 01610

SECTION 01611

Storage and Protection

1.01 SCOPE

The work under this Section includes, but is not necessarily limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the Work.

1.02 STORAGE AND PROTECTION

A. Storage

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the PM/CM.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the Owner.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these Specifications at the time that they are used in the Work.
5. Store products in accordance with manufacturer's instructions.

B. Protection

1. Use all means necessary to protect the materials, equipment and products of every section before, during and after installation and to protect the installed work and materials of all other trades.
2. All materials shall be delivered, stored and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism or other causes.
3. Substantially constructed weathertight storage sheds, with raised floors, shall be provided and maintained as may be required to adequately protect those materials and products stored on the site which may require protection from damage by the elements.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the PM/CM and at no additional cost to the Owner.

D. Equipment and products stored outdoors shall be supported above the ground on suitable wooden blocks or braces arranged to prevent excessive deflection or bending between supports. Items such as pipe, structural steel and sheet construction products shall be stored with one end elevated to facilitate drainage.

- E. Unless otherwise permitted in writing by the PM/CM, building products and materials such as cement, grout, plaster, gypsumboard, particleboard, resilient flooring, acoustical tile, paneling, finish lumber, insulation, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block and structural tile may be stored outdoors under a properly secured waterproof covering.
- F. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.03 EXTENDED STORAGE

In the event that certain items of major equipment such as air compressors, pumps and mechanical aerators have to be stored for an extended period of time, the Contractor shall provide satisfactory long-term storage facilities which are acceptable to the PM/CM. The Contractor shall provide all special packaging, protective coverings, protective coatings, power, nitrogen purge, desiccants, lubricants and exercising necessary or recommended by the manufacturer to properly maintain and protect the equipment during the period of extended storage.

END OF SECTION 01611

SECTION 01630

Substitutions and Product Options

1.01 SCOPE

This Section outlines the restrictions and requirements for substitutions, product and manufacturer options, and construction method options.

1.02 DEFINITIONS

- A. For the purposes of these Contract Documents, a "substitute item" shall be defined as one of the following:
1. A product or manufacturer offered as a replacement to a specified product or manufacturer.
 2. A product or manufacturer offered in addition to a specified product or manufacturer.
- B. For the purposes of these Contract Documents, a "substitute construction method" shall be defined as one of the following:
1. A mean, method, technique, sequence or procedure of construction offered as a replacement for a specified mean, method, technique, sequence or procedure of construction.
 2. A mean, method, technique, sequence or procedure of construction offered in addition to a specified mean, method, technique, sequence or procedure of construction.

1.03 GENERAL

- A. An item or construction method, which is offered where no specific product, manufacturer, mean, method, technique, sequence or procedure of construction is specified or shown on the Drawings, shall not be considered a substitute and shall be at the option of the Contractor, subject to the provisions in the Contract Documents for that item or construction method.
- B. For products specified only by a referenced standard, the Contractor may select any product by any manufacturer, which meets the requirements of the Specifications, unless indicated otherwise in the Contract Documents.
- C. If the manufacturer is named on the Drawings or in the Specifications as an acceptable manufacturer, products of that manufacturer meeting all requirements of the Specifications and Drawings are acceptable.
- D. Whenever the Designer's design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed first in the list of approved manufacturers in the Specifications. Any Bidder intending to furnish products of other than the first listed manufacturer, or furnish substitute items, shall
1. Verify that the item being furnished will fit in the space allowed, perform the same functions and have the same capabilities as the item specified.
 2. Include in its Bid the cost of all accessory items which may be required by the other listed substitute product,

3. Include the cost of any architectural, structural, mechanical, piping, electrical or other modifications required, and
 4. Include the cost of required additional work by the PM/CM, if any, to accommodate the item.
- E. Whenever a product specification includes minimum experience requirements which the manufacturer selected by the Contractor cannot meet, the manufacturer shall furnish the Owner with a cash deposit, or bond acceptable to the Owner in an amount equal to the cost of the product, which shall remain in effect until the experience requirement has been met.

1.04 APPROVALS

- A. Approval, of a substitution as an acceptable manufacturer, of the PM/CM is dependent on determination that the product offered
1. is essentially equal in function, performance, quality of manufacture, ease of maintenance, reliability, service life and other criteria to that on which the design is based, and
 2. will require no major modifications to structures, electrical systems, control systems or piping systems.

1.05 SUBSTITUTIONS AND OPTIONS

- A. No substitutions will be considered for the manufacturers listed in the Bid.
- B. After Notice to Proceed
1. Substitute items will be considered only if the term "equal to" precedes the names of acceptable manufacturers in the Specification.
 2. Where items are specified by referenced standard or specified as indicated in Article 1.03, Paragraph A. above, such items shall be submitted to the PM/CM for review.
 3. The Contractor shall submit shop drawings on the substitute item for the PM/CM's review in accordance with the Section 01340.
- C. Prior to Opening of Bids
1. No consideration or approvals will be made for products specified by a referenced standard, or specified as indicated in Article 1.03, Paragraph A. above. Such consideration may occur only after the Notice to Proceed.
 2. No consideration or approvals will be made for products being offered where the term "equal to" precedes the name of an approved product. Such substitution consideration may occur only after the Notice to Proceed.

END OF SECTION 01630

SECTION 01660
Testing and Startup**PART 1 GENERAL****1.01 SCOPE**

- A. Equipment testing and startup are requisite to satisfactory completion of the contract and, therefore, shall be completed within the contract time.
- B. The Supplier shall coordinate with the Contractor all work necessary for the successful operation of the Equipment.

1.02 SUPPLIER SUBMITTALS

- A. Schedule: The schedule for testing and startup shall be submitted per Section 01300 -Supplier Submittals.
- B. Testing and Startup Plan: Not less than 10 Days prior to startup, submit for review of a detailed Testing and Startup Plan. The Plan shall include schedules for Supplier's equipment certifications, schedules for submitting final Owner's Manuals, schedule for training the Owner's personnel, list of Owner furnished supplies, electrical testing, and detailed schedule of operations to achieve successful OSHGS testing, startup, and performance and acceptance testing. The Plan shall include test checklists and data forms for each item of equipment and shall address coordination with the Owner's staff. The Contractor and Owner shall revise the Plan as necessary based on review comments.
- C. Records and Documentation: Submit documentation that the equipment has been properly installed, is in accurate alignment, is free from undue stresses from connecting piping and anchoring, and has operated satisfactorily under full load conditions.

PART 2 PRODUCTS NOT USED**PART 3 EXECUTION****3.01 TESTING AND INSPECTION**

- A. The Contractor shall provide the services of an experienced and authorized representative of each item of Equipment who shall visit the site of the Work and inspect, check, adjust if necessary, and approve the installation of Equipment. In each case, the Contractor shall arrange to have the representative revisit the project as often as necessary until any and all trouble is corrected and the Equipment installation and operation are satisfactory to the Owner.
- B. The Contractor shall coordinate the scheduling of all operations testing with the Owner. The Contractor is advised that the Owner's operating personnel will witness operations testing and that the Contractor's representative shall be required to instruct the Owner's operating personnel in correct operation and maintenance procedures. Prior to scheduling any operations testing, the Contractor shall have previously furnished the Owner's Manuals required under Section 01300.
- C. The Contractor shall notify the Owner at least 3 days in advance for testing installed Equipment.

3.02 START-UP

- A. The startup of the OSHGS equipment requires the combined technical expertise of the Supplier, Contractor, subcontractors, and the Owner. The Contractor shall provide the effective coordination of all parties necessary for successful startup.
- B. The Supplier shall provide operating personnel for the duration of the startup.
- C. The startup shall not be commenced until all required equipment tests have been completed to the satisfaction of the Owner.
- D. All defects in materials or workmanship supplied by Contractor which appear during this test period shall be immediately corrected by the Contractor.
- E. During the startup, the Contractor shall provide the services of authorized representative of the equipment Supplier, in addition to those services required under operations testing, as necessary, to correct faulty equipment operation.
- F. During the startup, the Contractor shall keep records of the operations, in accordance with the instructions of the Owner.

3.03 SUPPLIES

- A. The Contractor shall furnish:
 - 1. Electrical power
 - 2. Other necessary materials not listed for the Owner to furnish

END OF SECTION 01660

SECTION 01700
Project Closeout**1.01 CLOSEOUT TIMETABLE**

- A. The Owner shall establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than two weeks prior to beginning any of the foregoing items, to allow the Supplier and their authorized representatives sufficient time to schedule attendance at such activities..

1.02 FINAL SUBMITTALS

- A. The Contractor, prior to requesting final payment, shall obtain and submit the following items to the Owner:
1. Written guarantees, where required.
 2. Owner's Manuals as specified in Section 01300 – Supplier Submittals.
 3. Recommended spare parts; special tools.
 4. Certificates indicating that all tests and activities required by Section 01660 -Testing and Startup have been successfully completed to the satisfaction of the Owner.
 5. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.03 MAINTENANCE AND GUARANTEE

- A. The Contractor shall comply with the maintenance and guarantee requirements contained in Contract Documents.
- B. If the Equipment fails to perform as warranted, the Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Supplier fails to make such repairs or replacements promptly, the Owner reserves the right to do the work and the Contractor and his surety shall be liable to the Owner for the cost thereof.

END OF SECTION 01700

SECTION 01710
Cleaning**PART 1 GENERAL****1.01 SCOPE**

This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

1.02 QUALITY ASSURANCE

- A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.
- B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.03 HAZARDOUS MATERIAL AND WASTE

- A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in approved landfills as applicable.
- B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.
- C. Burning or burying rubbish and waste materials on the site shall not be allowed.
- D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.04 DISPOSAL OF SURPLUS MATERIALS

Unless otherwise shown on the Drawings, specified or directed, the Contractor shall legally dispose off the site all surplus materials and equipment from demolition and shall provide suitable off-site disposal site, or utilize a site designated by the Owner.

PART 2 PRODUCTS**2.01 CLEANING MATERIALS AND EQUIPMENT**

Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

Use only the cleaning materials, methods and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the PM/CM.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

A. General

1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.
2. Daily, completely remove all scrap, debris and waste material from the job site.
3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Restack materials stored on site weekly.
3. At all times maintain the site in a neat and orderly condition which meets the approval of the PM/CM.

C. Structures

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by using a hand-held broom.
3. As required preparatory to installation of successive materials, clean the structures or pertinent portions as recommended by the manufacturer of the successive material.
4. Following the installation of finish floor materials, clean the finish floor daily. "Clean", for the purpose of this paragraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the PM/CM, may be injurious to the finish floor material.
5. Schedule cleaning operation so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

3.02 FINAL CLEANING

- A. Definitions: Unless otherwise specifically specified, "clean" for the purpose of this Article shall be interpreted as the level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.

- B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.01 above.
- C. Site: Unless otherwise specifically directed by the PM/CM, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.
- D. Structures
 1. Remove all traces of soil, waste material, splashed material, and other foreign matter to provide a uniform degree of exterior cleanliness. Visually inspect all exterior surfaces and remove all traces of soil, waste material, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the PM/CM may require light sandblasting or other cleaning at no additional cost to the Owner.
 2. Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges and other foreign matter. Remove all paint droppings, spots, stains and dirt from finished surfaces.
 3. Clean all glass inside and outside.
 4. Polish all surfaces requiring the routine application of buffed polish. Provide and apply polish as recommended by the manufacturer of the material being polished.
- E. Post-Construction Cleanup: All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, shall be removed as directed by the PM/CM.
- F. Restoration of Landscape Damage: Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. The PM/CM will decide what method of restoration shall be used.
- G. Timing: Schedule final cleaning as approved by the PM/CM to enable the Owner to accept the Project.

3.03 CLEANING DURING OWNER'S OCCUPANCY

Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the PM/CM in accordance with the Supplementary Conditions of the Contract Documents.

END OF SECTION 01710

**SECTION 01720
Record Documents****PART 1 GENERAL****1.01 SCOPE**

- A. The work under this Section includes, but is not necessarily limited to, the compiling, maintaining, recording and submitting of project record documents as herein specified.
- B. Record documents include, but are not limited to:
 - 1. Drawings;
 - 2. Specifications;
 - 3. Change orders and other modifications to the Contract;
 - 4. Field orders or written instructions, including Requests for Information (RFI) and Clarification Memorandums;
 - 5. Reviewed shop drawings, product data and samples;
 - 6. Test records.
- C. The Contractor shall maintain on the Project site throughout the Contract Time an up to date set of Record Drawings.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Storage
 - 1. Store documents and samples in the Contractor's field office, apart from documents used for construction.
 - 2. Provide files and racks for storage of documents.
 - 3. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with format of these Specifications.

- C. Maintenance
 - 1. Maintain documents in a clean, dry, legible condition and in good order.
 - 2. Do not use record documents for construction purposes.
 - 3. Maintain at the site for the Owner one copy of all record documents.
- D. Make documents and samples available at all times for inspection by PM/CM.
- E. Failure to maintain the Record Documents in a satisfactory manner may be cause for withholding of a certificate for payment.

1.03 QUALITY ASSURANCE

- A. Unless noted otherwise, Record Drawings shall provide dimensions, distances and coordinates to the nearest 0.1 foot.
- B. Unless noted otherwise, Record Drawings shall provide elevations to the nearest 0.01 foot for all pertinent items constructed by the Contractor.

1.04 RECORDING

- A. Label each document "PROJECT RECORD" in neat, large printed letters.
- B. Recording
 - 1. Record information concurrently with construction progress.
 - 2. Do not conceal any work until required information is recorded.

1.05 RECORD DRAWINGS

- A. Record Drawings shall be reproducible, shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared. The Contractor will be provided paper sepias of the Drawings, or it may elect to provide reproducible drawings via another method. Reproducible shall be defined as being translucent so as to allow a blueline print to be produced.
- B. Legibly mark drawings to record actual construction, including:
 - 1. All Construction
 - a. Changes of dimension and detail.
 - b. Changes made by Requests for Information (RFI), field order, clarification memorandums or by change order.
 - c. Details not on original Drawings.

2. Site Improvements, Including Underground Utilities
 - a. Horizontal and vertical locations of all exposed and underground utilities and appurtenances, both new facilities constructed and those utilities encountered, referenced to permanent surface improvements.
 - b. Location of and dimensions of roadways and parking areas, providing dimensions to back of curb when present.
 - c. The locations shall be referenced to at least two easily identifiable, permanent landmarks (e.g., power poles, valve markers, etc.) or benchmarks.
3. Structures
 - a. Depths of various elements of foundation in relation to finish first floor datum or top of wall.
 - b. Location of internal and buried utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.

1.06 SPECIFICATIONS

- A. Legibly mark each section to record:
 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 2. Changes made by Requests for Information (RFI), field order, clarification memorandums, or by change order.

1.07 SUBMITTAL

- A. At contract closeout, deliver Record Documents to the PM/CM for the Owner.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
 1. Date
 2. Project title and number
 3. Contractor's name and address
 4. Title and number of each record document
 5. Signature of Contractor or Contractor's authorized representative

END OF SECTION 01720

SECTION 01740
Warranties and Bonds**PART 1 GENERAL****1.01 PROJECT MAINTENANCE AND WARRANTY**

- A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.
- B. The Contractor shall warrant for a period of one year from the date of Owner's written acceptance of certain segments of the Work and/or Owner's written final acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the warranty period.
- C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.
- D. In the event of multiple failures of major consequences prior to the expiration of the one year warranty described above, the affected unit shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new 12 month warranty against defective or deficient design, workmanship, and materials shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken housings, piping, or vessels, excessive deflections, bent or broken shafts, broken or chipped gear teeth, premature bearing failure, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over-or under-lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of the one year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be disassembled, inspected, modified or replaced as necessary and rewarranted for one year.
- E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.

- F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.
- G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.
- H. In the event the Contractor fails to proceed to remedy the defects upon notification within 15 days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.
- I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.
- J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

END OF SECTION 01740

DIVISION 3 – CONCRETE**SECTION 03000
Reinforced Concrete****PART 1 GENERAL****1.01 WORK INCLUDED**

Concrete, forms, placing of sleeves, pipes, and anchor bolts, finishing, curing, and all equipment and incidentals necessary to do all the concrete work as shown on the drawings or specified.

1.02 REFERENCE STANDARDS

All work hereunder shall comply with the following except as called for otherwise herein:

- A. ACI Standard 301- Latest Revision Specifications for Structural Concrete for Buildings.
- B. ACI Standard 318 - Latest Revision Building Code Requirements for Reinforced Concrete.
- C. ACI Standard 306R - Latest Revision Cold Weather Concreting.
- D. ACI Standard 305R - Latest Revision Hot Weather Concreting.
- E. ACI Standard 304R - Latest Revision Guide for Measuring, Mixing, Transporting and Placing Concrete.

1.03 SUBMITTALS

- A. Shop Drawings: Submit complete Shop Drawings including:
 - 1. Location of all proposed construction joints, keying, and water stops.
 - 2. Location of all openings, depressions, construction and control joints, trenches, sleeves, inserts, and other items affecting the reinforcement and placing of concrete.
- B. Product data: Submit complete product data on the following:
 - 1. Complete materials list of items proposed to be furnished and installed under this section.
 - 2. Complete information on cement source of supply, physical and chemical characteristics, transportation and intermediate terminating procedures for mill-to-site handling, and site storage procedures.
 - 3. Complete information on aggregate procurement, processing, and storage.
 - 4. Complete information on proposed batching and mixing equipment and procedures, including water chilling or other devices or systems to reduce mix temperatures.

5. Complete information on concrete handling equipment proposed to be used, including capacities, for chutes, pumps, tremies, buckets, and all other equipment.
 6. Complete description of proposed curing materials and methods.
 7. Complete mix designs.
 8. Remolded joint filler.
 9. Waterstops.
 10. Wedge inserts.
 11. Expansion bolts.
 12. Anchor bolts.
 13. Foundation bolts.
 14. Admixtures.
 15. Hardening and dust-proofing compounds.
 16. Form ties.
 17. Any gang forming information.
- C. Do not begin concrete production until all products and mix designs have been reviewed and approved by the Engineer.

1.04 CLASSIFICATION

- A. The following classes of concrete are included in these specifications and shall be used where specified herein or called for on the plans:

	Class "A" Concrete	Class "B" Concrete
Cement content - Minimum number of sacks (94 lb.) per cubic yard	6	5
Maximum water to cement ratio (gal. Water per sack cement)	5.1	6.5
Entrained air	3% - 6%	3% - 6%
Minimum Superplasticizer content per 100 lbs. of cement	45 oz.	0 oz.
Minimum 7 day compressive strength	2,400 psi	1,400 psi
Minimum 28 day compressive strength	4,000 psi	2,500 psi

- B. In the absence of contrary designation, concrete used for all construction shall be Class "A."

PART 2 PRODUCTS

2.01 CEMENT

Unless otherwise specified or shown on the plans, concrete shall be made with the Portland cement conforming to A.S.T.M. Specification C-150, Type I. The lightest colored Portland cement, competitively available shall be used, and the same brand of cement shall be used throughout the entire project. High early strength Portland cement shall conform to A.S.T.M. Standard Specification #C-150, Type III.

2.02 AGGREGATES

A. General: All aggregates shall conform to requirements of ASTM C 33.

B. Fine Aggregate

1. The fine aggregate shall consist of clean, hard, durable, uncoated particles of sand. It shall be free from dust mica, shale, alkali, organic matter, loam, soft or flaky particles.
2. Deleterious Substances - The fine aggregate shall contain not more than one percent (1%) by weight of clay lumps of more than three percent (3%) by weight of material removed by decantation.
3. Grading - Fine aggregate shall conform to the following requirements:

<u>Total Passing</u>	<u>Percent by Weight</u>
3/8" sieve	100
No. 4 sieve	95 - 100
No. 16 sieve	45 - 95
No. 50 sieve	10 - 30
No. 100 sieve	2 - 8

4. Tests - Fine aggregate shall be subjected to the Colorimetric test for organic impurities and if it produces a color darker than the standard, it shall be rejected. It shall conform in all other respects to A.S.T.M. Designation C-33.

C. Coarse Aggregate

1. Composition and Quality - Coarse aggregate shall be washed gravel or crushed stone and shall consist of hard, tough, uncoated, durable particles. It shall contain no vegetable matter or soft, flaky, thin, or elongated particles. Deleterious substances shall not exceed the following amounts:

Soft fragments	0.20%
Coal and lignite	0.25%
Clay lumps	0.25%
Material passing No. 200 Sieve	1.50%
Thin or elongated pieces (length greater than 5 times the average thickness)	10.00%

The percentage of wear, by the Los Angeles test, shall not exceed 45.

2. Grading - Coarse aggregate shall be well graded between the limits specified below, and shall conform to the limits shown in the following table:

<u>Total Passing</u>	<u>Percent by Weight</u>
2" Sieve	100
1-1/2" Sieve	90 - 100
1" Sieve	55 - 80
3/4" Sieve	35 - 70
1/2" Sieve	20 - 45
3/8" Sieve	10 - 30
No. 4 Sieve	0 - 15
No. 16 Sieve	0 - 1

2.03 WATER

The water used in mixing concrete shall be fresh, clean, potable and free from oil, acid, alkali, organic matter, and deleterious amounts of chloride ion.

2.04 CONCRETE ADMIXTURES

- A. Admixtures shall conform to ASTM C494; Type F for high range water-reducing and Type G for high range water-reducing/set-retarding. Air entraining agents shall conform to ASTM C260. When more than one admixture is used the two products shall be compatible and have a single manufacturer.

- B. All Class "A" Concrete shall contain a (Daracem - 100 or an alternate approved by the Engineer) high range water-reducing agent. The dosage of the high range water reducing agent shall be at least 8 oz./100 lbs. of cement, but shall not produce a plasticized slump greater than 8". The high range water reducing agent shall be added at the site prior to concrete placement.
- C. Admixtures, if not specified, may be used only upon written approval of the Engineer and shall be used only as recommended by the Manufacturer. Admixtures shall, when added to the mixture, produce a concrete of specified strength in both 7 and 28 day tests. Documentary evidence of acceptability will be required when new or unknown admixtures are proposed for usage.
- D. Admixtures shall be Grace Construction Products or an alternate approved by the Engineer.

2.05 FORM WORK

- A. Forms shall result in a final structure which conforms to the shape, lines, and dimensions of the members as required by the plans and specifications, and shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape. Forms and their supports shall be designed so that previously placed structure will not be damaged.

Form ties shall be so designed that when the forms are removed no metal shall be within 1-1/2 inches of the finished surface. Form ties shall have an approved type waterstop that is an integral part of the tie and made of the same material as the tie. Gang form ties shall be filled from one end with a compressible plug a minimum of 1 1/2 inches from the edge of wall, shall have a bentonite plug in the center of the wall and all voids filled with non-shrink grout. Removal of forms and shores - no construction loads exceeding the dead load plus live load shall be supported on any unshored portion of the structure under construction. No construction loads shall be supported on, nor any shoring removed from, any part of the structure under construction except when that portion of the structure in combination with the remaining forming and shoring system has sufficient strength to support safely its weight and the loads placed thereon. This strength may be demonstrated by job-cured test specimens and by a structural analysis considering the proposed loads in relation to these test strengths and the strength of the forming and shoring system. Such analysis and test data shall be furnished by the contractor to the Engineer when so required. In no case shall forms for walls or columns be removed in less than 36 hours. Form work supporting weight of concrete, such as beams and slabs shall remain until the concrete has attained a minimum of the 28 day design strength.

- B. The design and engineering of the form work, as well as its construction, shall be the responsibility of the Contractor. Except as specifically called for otherwise herein, all form work shall meet the "ACI Standard Recommended Practice for Concrete Form work (ACI 347 - Latest Revision)".
- C. Chamfer: Unless shown otherwise, form chamfers with 3/4" x 3/4" strips, accurately formed and surfaces to produce uniformly straight lines and tight edge joints on exposed concrete. Extend terminal edges to required limit and miter chamfer strips at changes in direction. All exposed corners shall be chamfered.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before the placing of any concrete, the footing trenches shall be drained of water and mud film removed and any loose dirt lifted out. Any flow of water shall be diverted by side drains to a sump, or removed by other approved methods, while the concrete is being placed.
- B. Before placing concrete in any forms, the forms shall be cleaned, and all debris shall be removed. All reinforcing shall be checked to be sure that no reinforcing is touching the form or pan sides.
- C. Before placing any concrete, it shall be determined that all work that is to be built into the concrete work is located and installed. All such items shall be placed so as not to interfere with the reinforcing steel.
- D. Wood board forms shall be soaked with water just before the concrete is poured.
- E. Special measures shall be taken in both severe cold and hot weather and shall be in accordance with ACI Recommended Practice (ACI 306 - Latest Revision and ACI 605 - Latest Revision).
- F. Before placing any new concrete on or against concrete which has set, the existing surfaces shall be thoroughly roughened and cleaned of all foreign matter and "Laitance." Forms shall be retightened and the existing surfaces slushed with a coat of grout. The new concrete shall be placed immediately after grouting, and the work shall be performed in such manner as to insure complete bonding of newly poured concrete to the existing work.

Grout for construction joints shall consist of a mixture of neat cement and water, and shall be applied to the old concrete surface immediately before the new concrete is poured. Grout for setting column bases, wall plates, and beams shall be composed of one part Portland Cement two parts sand, and sufficient water to produce the consistency required.

- G. Where excavations exceeding a depth of five feet are prescribed to be made to install the foundations or any part of the structure, or any retaining walls on the site, the back slope of such excavation shall be at an incline not exceeding one vertical to one and one-half horizontal unless such back slope is sheeted and braced. If sheeting and bracing is to be provided, such sheeting and bracing shall be designed by an Engineer registered in the project state. The cost of such design work shall be paid for by the Contractor.

3.02 MIXING AND DELIVERY

- A. Machine Mixing: All mixing of concrete shall be done in a batch mixer of approved design, which will insure a uniform distribution of the material throughout the mass, so that the mixture is uniform in color and homogenous. The entire content of the mixer drum shall be discharged before recharging. All material to be mixed per batch shall not exceed the manufacturers' rated capacity of the mixer.
- B. Time of Mixing: The mixing of each batch shall continue not less than one and one-half (1-1/2) minutes after all the materials, including water, are in the mixer, during which time the mixer shall rotate at a peripheral speed of about two hundred feet per minute.

- C. **Mixing at Central Plant:** Concrete mixed in a central plant, shall be conveyed to the work in approved mixer trucks which mix the concrete in route to the work. Plant layout and equipment shall meet the approval of the Engineer. Loading tickets shall be initialed and the time of loading stamped thereon. The loading tickets shall be handed to the resident inspector on the work before the load is placed, and no concrete will be accepted which has been in the mixer truck more than one and one-half (1-1/2) hours after the water has been added. In all other respects, ready-mixed concrete shall conform to A.S.T.M. Specification C-94.
- D. Waste concrete shall be deposited and mix trucks washed out only in areas designated by the owner or the engineer.

3.03 SLUMP

- A. The maximum slump allowed for the various types of construction are as follows:

<u>Type of Construction</u>	<u>Maximum Slump</u>
Reinforced Foundation Walls & Footings	4"
Slabs, Beams, Reinforced Walls & Columns	4"
Heavy Mass Construction	2"
All Concrete Plasticized by Admixtures	8"

- B. Slump tests shall be made at the discretion of the Engineer, and concrete having greater slump than specified shall not be incorporated into the work. The Contractor shall furnish slump test cones conforming to the provisions of ASTM C-143.

3.04 PLACING CONCRETE

- A. All concrete shall be placed in daylight, and any portion of the concrete work started shall be started so that it can be completed in daylight. No concrete shall be placed until the foundation, forms, false-work, and the placing of the steel have been approved by the Engineer. Approval by the Engineer in no manner relieves the Contractor of his obligation to produce finished concrete as required by the plans and specifications.
- B. The concrete shall be placed in such a manner as to avoid the possibility of segregation or separation of the aggregates, or the displacement of the reinforcement steel. The concrete shall be placed as near its final resting place as possible. If pipes, troughs, or chutes are used in placing the concrete, they shall be so arranged and used that the concrete is not separated, and shall be kept clean and free of hardened concrete at all times. Troughs and chutes shall be either made of metal or shall be metal lined, and shall extend as nearly as possible to the point of deposit. In walls and columns, the concrete shall not be dropped more than five feet (5') without the use of a tremie. Concrete shall be placed in continuous horizontal layers, approximately 10" to 12" thick, and the batches shall follow each other so closely that each one is placed and compacted before the preceding one has taken an initial set. Succeeding layers shall be placed before the underlying layer has become set, and shall be compacted in a manner that will

entirely break up and obliterate the tendency to produce a cold joint between layers. Concrete in beams, girders, columns and walls shall be well spaded at the form surface and all concrete shall be compacted by an approved mechanical type vibrator having a frequency of not less than 3,000 vibrations per minute. The Contractor shall provide the necessary number of vibrators to properly execute the work, and shall have on the job at all times necessary spare vibrators to be used in case of mechanical failure. Construction joints shall be made only at the location as shown on the plans, except by approval of the Engineer.

- C. In making construction joints, the previous work shall be cleaned of all "laitance," and other objectionable material, and shall be brushed with a thin mixture of Portland cement and water immediately before the new concrete is placed.
- D. The operation of placing and compacting the concrete, shall be conducted so as to form a compact, dense, impervious artificial stone of uniform texture, with smooth faces on exposed surfaces. Any section of concrete that is porous, or has been plastered, or is otherwise defective, shall be removed and replaced, in whole or in part, entirely at the contractor's expense, as directed by the Engineer.
- E. Depositing Concrete Under Water: Concrete shall not be exposed to the action of water before setting, or deposited in the water, except upon the approval of the Engineer, and under his supervision.
- F. Cold Weather Placing
 1. Comply with ACI 306 to protect all concrete work from physical damage and reduced strength which would be caused by frost, freezing actions, or low temperatures. No concrete shall be placed when the atmosphere temperature is below 40 degrees F.
 2. If the temperature drops below 40 degrees F. after the concrete has been placed, the Contractor shall provide adequate means for maintaining concrete temperature of not less than 45 degrees F. for a period of five (5) days after the concrete is placed. The contractor shall assume all risk connected with placing concrete in cold weather, and any unsatisfactory work will be rejected. Recording thermometers shall be supplied by the contractor as required by the Engineer.
- G. Hot Weather Placing: When hot weather conditions exist which would seriously impair the quality and strength of concrete, place the concrete as follows:
 1. Maintain concrete temperature at time of placement below 90 degrees F. Use chilled mixing water or chopped ice to control concrete temperature, provided the water equivalent of the ice is calculated to the total amount of water.
 2. Cover reinforcing steel with water-soaked burlap if the steel becomes too hot. Steel temperature shall not exceed the ambient air temperature immediately prior to placement of concrete.
 3. Wet forms thoroughly prior to placement of concrete.
 4. Use set-control admixtures in the mix subject to approval of the Engineer.

3.05 PROTECTION AND CORRECTIVE WORK

- A. Workmen shall not walk on concrete during placing or finishing with any earth or foreign matter footwear.
- B. All freshly placed concrete shall be protected from damage or injury due to water, falling objects, persons or anything that might mar or injure the finish surface of the concrete. Any surfaces that are damaged shall be removed and replaced with fresh concrete at the expense of the Contractor.
- C. Care shall be taken in the removal of the forms not to damage the surface of the concrete. Immediately after the forms are removed, all damaged or imperfect work shall be patched. If in the opinion of the Engineer, the patching does not restore the work to the quality specified, the Contractor shall remove and rebuild the work at his expense.
- D. Where concrete or concrete work does not conform to these specifications and where patching is not approved by the Engineer or low strength concrete is not permitted to remain in place, procedures and plans covering all work to be rebuilt shall be submitted by the Contractor to the Engineer before removal and rebuilding is begun. The cost of such plans, as well as the cost of removal and rebuilding shall be at the Contractor's expense.

3.06 FINISHING

Floors, including slabs on ground, shall be finished as follows:

- A. The surfaces of all concrete shall be worked with a wood float in a manner which will compact the concrete and produce a surface free of depressions or inequalities of any kind. Test for grade (of level) and correct by removing excess or adding and compacting additional concrete.
- B. All interior floor slabs shall receive steel trowel finish as follows: After screeding, slab shall be wood floated to a smooth, plane surface. When concrete has hardened, to prevent excess fines from working to surface, steel trowel to a smooth surface free from defects. A second steel troweling shall be done producing a plane, hard, dense, finished surface. Interior slabs shall also receive a hardening and dust proofing treatment of a colorless aqueous solution of zinc or magnesium fluosilicate applied in strict accordance with manufacturer's recommendations.
- C. Troweling shall not begin until all surface water has disappeared. The drying of the surface moisture before troweling must proceed naturally and must not be hastened by sacking or dusting on of dry sand and cement.
- D. After exterior floors, platforms and steps requiring a broom finish are struck off smooth with a wood float and received a trowel finish, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use a fiber bristle broom.

- E. Exposed concrete surfaces shall be finished as follows:
1. The exterior surfaces of all concrete shall be thoroughly worked during the placing operation, by the use of a concrete spade of approved type. The working shall force all coarse aggregate from the faces, and work mortar against the forms to produce a smooth finish, free from water and air pockets, or honeycomb. As soon as the concrete has set sufficiently to permit, the forms shall be carefully removed and all depressions resulting from removal of the metal spacers, and all other holes and rough places, shall be carefully pointed with a mortar composed of one part cement and two parts sand. The surface film of all such pointed surfaces shall be carefully removed before setting occurs. The cement in the mortar used for pointing and filling holes shall be of the same brand as the cement incorporated in the concrete work.
 2. Surface shall be rubbed smooth with carborundum brick or other abrasive within 36 hours after forms are removed. Surfaces shall be wetted and rubbed until a uniform color and texture is produced. No cement grout or slush shall be used other than the cement paste drawn from the green concrete itself by the rubbing process.
- G. Unless otherwise directed the following schedule shall be used for concrete finishing:
- | | |
|---------------------------|--|
| Sidewalks: | Rough (Broomed) |
| Exposed Exterior Walls: | Medium (Rubbed) |
| Interior Structure Walls: | Fine (Rubbed) |
| Additional Wall Finish: | ThoroCoat applied per manufacturer's recommendations |
| Slabs - Interior: | Smooth (Troweled) |
| Slabs - Exterior: | Medium (Fine broomed) |

Coordinate the required finish with the Engineer prior to application.

3.07 CURING

- A. Curing Materials
1. Liquid curing and sealing compounds shall conform to ASTM C 309, Type 1.
 2. Sheet materials shall conform to ASTM C 171.
 3. Burlap cloth made from jute and weighing approximately 9 oz. per sq. yd for moist curing shall conform to AASHTO M 182 and shall use two layers.
 4. Compounds shall be a combination sealer-hardener and dust-proofer.

B. Procedure

Freshly placed concrete shall be protected from wash caused by rain and flowing water. Concrete shall not be allowed to dry out from the time it is placed until seven (7) days thereafter. Curing shall be accomplished by the use of an approved membrane compound to seal the water in the concrete except for surfaces which are to receive future concrete, or mortar. The membrane shall be of a type which will retain ninety-seven (97%) percent of the moisture at a temperature of 135 degree F., with a relative humidity of thirty percent (30%) in the first twenty-four (24) hours. It shall be applied in accordance with the manufacturer's recommendations and in sufficient thickness to effectively hold the water in the concrete, and must have a record of successful use for at least two years.

3.08 JOINTS

A. Construction Joints:

1. Construction joints will not be permitted except as may be shown on the Drawings and on the Contractor's approved placement schedule.
2. If construction joints necessary for the progress of the Work are not shown on the Drawings, show them in complete detail on the Shop Drawings.
3. Provide keyways at least 1-1/2" deep where shown on the plans.

B. Isolation joints in slabs on grade:

Provide isolation joints in slabs on grade at points of contact between slabs on grade and vertical surfaces where indicated.

3.09 WATER TIGHTNESS

All structures for holding or carrying water, or pits below grade shall be watertight. Where the order of work requires "cold" joints (slab/wall intersections etc.), an approved, rigid waterstop shall be secured to the form work and remain imbedded in the concrete to form a watertight joint with the adjacent pour. Waterstop shall be expandable center bulb type 6 in. wide x 1/4 in. thick minimum unless otherwise specifically shown on the Plans.

3.10 TESTING OF CONCRETE

- A. Testing of concrete will be done under the direction of a laboratory approved by the Engineer. Tests to be paid for by the Contractor.
- B. Samples for strength tests will be taken not less than one per day nor less than once per one hundred (100) cubic yards and on less yardage when required by the Engineer. The tests shall be made in accordance with the procedure set forth in A.S.T.M. C172 for "Standard Method of Making and Storing Compression Test Specimens of Concrete in the Field", and C-39 for "Standard Methods of Test for Compressive Strength Concrete." Tests shall be made by a recognized laboratory approved by the Engineer.

Three certified copies of test results are to be furnished the Engineer with each test. Each test shall consist of at least four specimens, two for field control and two for laboratory control. Each set of four cylinders shall have a numerical designation and each cylinder an alphabetical sub-designation. Thus the first set of four cylinders shall be numbered 1A, 1B, 1C, and 1D.

- C. If the evaluation of the compressive test indicates the concrete has failed to meet the specified strength, core tests shall be made of the in-place concrete. The location and number of such tests to be at the Engineers direction. Tests shall be paid for by the Contractor.
- D. If the core tests fail to verify the strength specified, the Engineer shall effect one of the following procedures:
 - 1. Have the Contractor remove and reconstruct that portion of the structure found to be defective.
 - 2. Accept the concrete in place and issue a change order as set forth in the General Conditions of these specifications.
- E. Tests to determine the entrained air content will be made at the job site. Frequency of testing shall be at the Engineer's discretion as necessary to ensure proper air content. The testing apparatus shall be furnished by the Contractor, concrete supplier or testing laboratory at no cost to the Owner, and testing will be performed by the Contractor in the presence of the Engineer.

END SECTION 03000

SECTION 03200
Concrete Reinforcement**1.00 DESCRIPTION**

- A. Work Included: Provide complete, in place, all steel required for reinforcement of cast-in-place concrete as shown on the drawings.

1.01 SUBMITTALS

- A. Shop Drawings: Submit complete shop drawings of all material proposed to be furnished and installed under this Section.
1. Show schedules, stirrup spacing, diagrams of bent bars and arrangement and assemblies.
 2. Make Shop Drawings in accordance with ACI 315.
- B. Mill Certificates: Accompanying the Shop Drawings, submit steel producer's certificates of mill analysis, tensile and bend tests for reinforcing steel.

1.02 PRODUCT HANDLING

- A. Delivery: Deliver reinforcement to the job site bundled, tagged and marked. Use tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.
- B. Storage: Store reinforcement above the surface of the ground on wooden platforms or other supports in a manner which will prevent damage and accumulation of dirt and excessive rust. The surface of the ground beneath all stored reinforcement shall be covered with plastic sheeting to further assure isolation from dirt and dust.

2.00 MATERIALS

- A. Reinforcing bars: Comply with ASTM A615-Latest Revision.
- B. Welded wire fabric: Comply with ASTM A185-Latest Revision.
- C. Supports for reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place:
1. Use wire bar type supports complying with CRSI recommendations, unless otherwise indicated. Do not use wood, brick and other unacceptable materials.
 2. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support legs.
 3. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with either hot-dip galvanized or plastic protected legs.

2.01 FABRICATION

- A. General: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI Manual. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.
- B. Unacceptable Materials: Reinforcement with any of the following defects will not be permitted in the work.
 - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 - 2. Bend or kinks not indicated on Drawings or final Shop Drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.

3.01 INSPECTION

Examine the foundation, formwork and the conditions under which concrete reinforcement is to be placed, and correct conditions which would prevent proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General
 - 1. Comply with the specified standards for details and methods of reinforcement placement and supports, and as herein specified.
 - 2. Clean reinforcement to remove loose rust and mill scale, earth and other materials which reduce or destroy bond with concrete.
 - 3. Position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required.
 - 4. Place reinforcement to obtain the minimum coverage for concrete protection. Arrange, space and securely tie bars and bar supports together with 16 gage wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
 - 5. Install welded wire fabrics in as long lengths as practicable. Lap adjoining pieces at least one full mesh.
 - 6. Provide sufficient numbers of supports and of strength to carry reinforcements. Do not place reinforcing bars more than 2" beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

- B. Splices: Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying. See splice schedule on Drawings. Bars marked continuous shall be lapped as required by splice schedule, and at corners, corner bars shall be provided.

3.03 BAR COVER

Reinforcing bars shall be fabricated, tied and supported to ensure a protective concrete cover as shown on the structural drawings.

END OF SECTION 03200

SECTION 03600
Non-Shrink Grout

1.00 DESCRIPTION

Work included:

Provide and install non-shrink grout, wherever "grout" is required by these Specifications or is noted on the Contract Plans, including all labor, materials, equipment, tools and energy necessary to accomplish the grouting work.

2.00 MATERIALS

A. Non-Shrink/Non-Metallic Grout (Type "A")

Grout shall be factory mixed containing natural aggregates formulated to be used at any consistency from extremely fluid to damp pack (plastic). The grout shall be similar in finished appearance to concrete and mortar. The grout shall be free of gas producing agents, oxidizing catalysts and inorganic accelerators.

The compressive strength of the grout in-place, when placed in a plastic consistency, shall meet or exceed the following:

4,000 psi	at	1 Day
6,000 psi	at	3 Days
7,500 psi	at	7 Days
9,500 psi	at	28 Days

Grout placed in a fluid consistency shall have an in-place 28-day compressive strength of at least 5,000 psi.

The following products are acceptable for Type "A" grout:

1. SonogROUT, by Sonneborn-Contech, Minneapolis, Minnesota (612835-3434).
2. 588 Grout, by W.R. Meadows of Georgia, Atlanta, Georgia (404/691-5358).
3. UPCON high flow grout by UPCO Division, Emhart Chemical Group, Cleveland, Ohio (216/881-0033).

B. Non-Shrink/Metallic Aggregate Grout, Type "B"

Grout shall be factory mixed, containing specially graded and processed ferrous metallic aggregate and graded natural aggregates with a cementitious system formulated to be used at any consistency from extremely fluid to damp pack. The grout shall be free of gas producing agents, oxidizing agents and organic accelerators.

The compressive strength of the grout in-place when placed in a plastic consistency shall meet or exceed the following:

4,000 psi	at	1 day
6,000 psi	at	3 days
8,000 psi	at	7 days
10,000 psi	at	28 days

Grout placed in a fluid consistency shall have an in-place 28-day compressive strength of not less than 7,000 psi.

The following products are acceptable for Type "B" grout.

1. Ferrolith G-NC by Sonneborn-Contech, Minneapolis, Minnesota (612/835-3434).
2. Embeco 636 grout by Master Builders, Cleveland, Ohio (216/831-5500).

3.00 EXECUTION

A. GROUTING SCHEDULE

Grouting under this Contract shall be done in accordance with the applicable items in the following schedule, unless noted otherwise:

Grouting Applications	Grout Type
Anchor bolts and dowels in cast or drilled holes	"B"
Column base plates	"A" or "B"
Bearing plates	"A" or "B"
Aluminum handrails	"A"
Machinery bases	"B"

B. GROUT CONSISTENCY

Grout may be placed in a damp pack (plastic) or flowable (fluid) consistency to suit job conditions and as specified herein.

Grout shall be placed in a damp pack (plastic) consistency wherever possible to provide the highest strength grout.

Damp pack (plastic) grout shall be used for vertical surfaces, with holes having at least one surface dimension less than the hole depth and for holes left by removal of fasteners and form ties.

Damp pack (plastic) grout may be used for column base plates, bearing plates, machinery bases and precast concrete elements where either horizontal dimension of the element being grouted is less than 16 inches.

Flowable or fluid grout shall be used for all other applications.

C. SURFACE PREPARATION

1. General

Concrete surfaces to receive grout shall be rough and reasonably level. Laitance shall be removed to sound concrete. The surfaces, including bolt holes, shall be saturated with water for 24 hours prior to grouting, unless otherwise recommended by the grouting manufacturer.

Where grout is to be used to repair damaged concrete surfaces, the damaged or honeycombed concrete shall be removed to sound concrete by chipping.

Metal surfaces to receive grout shall be de-rusted, cleaned of oil, grease and other deleterious substances by means of appropriate solvents, wire brushing or a combination of both.

2. Formwork.

Forms shall be provided for grout placed at a flowable or fluid consistency.

Forms shall be strong, tight and shall be braced so they will not leak or buckle under the weight of fluid grout. On the placing side, forms shall slant at a 45 degree angle, and grout shall be poured directly on the slanted face. On other sides, the form shall be placed 1/2 inch or more away from base of the bedplate and one inch or more higher than the underside of the plate.

Provide air relief openings to avoid entrapment of air.

D. GROUT PREPARATION, PLACEMENT AND CURING

Grout shall be mixed to proper consistency, placed and cured as instructed by the grout manufacturer. A paddle type mortar mixer or other suitable mechanical mixer shall be used, unless otherwise allowed.

Any nearby vibrating machinery or equipment should be shut down to avoid disturbing the bonding or initial set of freshly placed grout.

Mixing water temperature shall not be less than 40 degrees F nor exceed 80 degrees F, unless more stringent conditions are required by the grout manufacturer.

Grout shall be placed at a temperature of 65 to 75 degrees and maintained at this temperature range for 24 hours, and above 40 degrees F thereafter until the grout strength exceeds 4,000 psi.

Grout used for concrete surface repair and patchwork shall be applied to a small area and allowed to cure to determine color compatibility.

END OF SECTION 03600

DIVISION 11 – EQUIPMENT**SECTION 11510
Onsite Sodium Hypochlorite Generation System****PART 1 GENERAL****1.01 SUMMARY****A. Scope**

1. This Section covers the work necessary by the Contractor, On-site Sodium Hypochlorite Generation System (OSHGS) Supplier, and Owner, to furnish, install, test and make ready for operation an On-site Sodium Hypochlorite Generation System. The Generation System includes, but is not limited to, the sodium hypochlorite generator skids with integral piping, valves, system control cabinet with PLC, commercial strength hypochlorite dilution panel, piping, valves, ancillary equipment as specified herein, installation, related testing, start-up and training services.
2. The Contractor shall furnish the following components of the Generation System:
 - a. Sodium Hypochlorite Generation cells
 - b. Interconnect piping, valves, solenoid control valves and accessories
 - c. Control cabinet, PLC, VFD's and associated equipment
 - d. Hydrogen dilution blower(s) and air flow sensor, plus Passive Venting of hydrogen gas at each electrolytic cell.
 - e. Conduit, wire, boxes, etc., required for interconnection of system components supplied by Supplier
 - f. Heat Exchanger
 - g. Commercial strength hypochlorite dilution panel
 - h. Networking communication components
 - i. UPS with maintenance bypass
3. The Contractor shall install the OSHGS, as specified in the plans and in this specification. The contractor shall be responsible for connecting all conduit, wire, pipe, etc. for the OSHGS supplied equipment to the Owner's equipment to provide a complete and fully operational OSHGS.
4. The Contractor shall inspect the installation of the Generation System and any errors shall be corrected by the Contractor. Following the correction of all errors, the Supplier shall provide a Certification of Proper Installation for the Generation System.
5. The Contractor shall submit Shop Drawings required for the fabrication and installation of the Generation System equipment. The Shop Drawings shall be submitted to the Owner for review and approval in accordance with Specifications.
6. The Contractor shall be responsible for programming the Generation System package control software.

7. The Contractor shall deliver to the Owner all PLC and HMI codes for future reference prior to final acceptance.
8. The Contractor shall make all necessary changes to the existing SCADA panel as well as changing the program for control of new system.
9. The Contractor shall perform functional, performance and start-up testing of the Generation System. The Contractor shall notify the Supplier at least 14 days before the scheduled date for performing these tests and shall coordinate testing requirements and scheduling with the Owner.
10. The Contractor shall submit an Operation and Maintenance Manual and Maintenance Summary Forms for the Generation System. The O&M Manual and Forms shall be reviewed by the Contractor and issued to the Owner for review and approval.
11. The Contractor / Supplier shall train Owner's personnel and provide detailed instructions in the operation of the Generation Equipment.

B. General

1. All electrical, mechanical, metal, painting and instrumentation work included herein shall conform to the applicable Sections or Divisions of this project except as otherwise shown or specified. The OSHGS shall be shipped as one self-contained unit with all factory piping and wiring complete to input and output, flanged, threaded, etc. connections located at easily accessible points on the skid.
2. The On-Site Sodium Hypochlorite Generation System Supplier shall warrant and support all of the components listed above as if they were components of its own manufacture regardless of the source. The Supplier shall supply all component pieces and shall maintain an overall "single source responsibility" for the complete system. As is practical, the Supplier will take responsibility for the design and implementation of the equipment at the water treatment plant and will immediately bring to the Owner's attention any portion of the design which may have a negative impact to the performance of the on-site sodium hypochlorite generation system.
3. The Contractor/Supplier will certify within 30 days of contract award that the proposed plans and specifications are complete and adequate to support acceptable system operation.

1.02 RELATED REQUIREMENTS

- A. It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals and entities performing or furnishing any of Contractor's Work.

1.03 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.

A. The following references apply:

1. American National Standards Institute (ANSI).
2. American Society for Quality Control (ASQC).
3. American Society of Mechanical Engineers (ASME).
4. American Society for Testing Materials (ASTM).
5. American Water Works Association (AWWA).
6. British Standards Institute (BSI).
7. Canadian Standards Association (CSA).
8. The Chlorine Institute (CI).
9. Confinement of Substances Hazardous to Health (COSHH).
10. European National Standard (EN).
11. Institute of Electrical and Electronics Engineers (IEEE).
12. International Standards Organization (ISO).
13. Member States of the European Council (EC).
14. Mine Safety and Health Administration (MSHA).
15. National Electrical Code (NEC).
16. National Electrical Manufacturers Association (NEMA).
17. National Fire Code (NFC).
18. National Institute of Occupational Safety & Health (NIOSH).
19. Occupational Safety and Health Administration (OSHA).
20. Standard Fire Code (SFC).

21. Uniform Fire Code (UFC).
22. Water Environment Federation (WEF).
23. Underwriters Laboratory (UL)
24. National Sanitation Foundation International (NSF)

1.04 DESIGN AND PERFORMANCE CRITERIA

A. Process Design:

1. Design Criteria:

Description	DESIGN CRITERIA
OSGH Generator Equipment	
Capacity per Skid as Free Available Chlorine (FAC)	500 ppd
Capacity per Skid with one cell out of service	400 ppd
Total Quantity of Generator Skids	One (1)
Total System Capacity as Free Available Chlorine (FAC)	500 ppd
Feed Water	
Design Minimum Feed Water Temperature	50°F
Design Maximum Feed Water Temperature	85°F
Design Water Hardness As Total CaCO ₃	100 ppm
Design Minimum Pressure of Feed Water Available	40 psig
End-Product System Performance Requirements	
Concentration of Sodium Hypochlorite Solution	0.8% 8,000 ppm +/- 0.05%
Salt Required to Produce 1 lb of Free Available Chlorine (FAC)	3.0 lbs maximum
Power Required to Produce 1 lb of Free Available Chlorine (FAC)	2.0 kW maximum
Water Required to Produce 1 lb of Free Available Chlorine (FAC)	15 gallons
The electrolytic system shall generate an aqueous solution of a minimum concentration of 0.8 percent ($\pm 0.05\%$) by weight sodium hypochlorite expressed as chlorine. The minimum capacity shall be demonstrated to be equal to the capacity specified while not exceeding the maximum raw material quantities.	

The electrolytic cell shall consume a maximum of 3.0 lbs. of salt per pound of chlorine equivalent output, using solar salt containing no organic binders, flow control agents or resin cleaning material, and meeting the following specifications:

Constituent	Limit
Sodium chloride:	
- dry basis	96.3% minimum
- wet basis	93.3% minimum
Calcium Sulfate	0.30% maximum
Magnesium Chloride	0.06% maximum
Calcium Chloride	0.10% maximum
Magnesium Sulfate	0.02% maximum
Insolubles	0.10% maximum
Moisture (as H ₂ O)	3.00% maximum
Lead	0.0007% maximum
Copper	0.0003% maximum
Iron (as Fe)	0.002% maximum

2. The electrolytic cell shall consume a maximum of 2.0 A.C. kilowatt hours of electricity per pound of chlorine equivalent output.
3. The electrolytic cell shall consume a maximum of 15.0 gallons of water per pound of chlorine equivalent output. The raw water supply to the softener shall be free of organics and suspended solids.
4. Hydrogen Management
 - a. The generators shall have no waste products associated with its use other than hydrogen gas, which is to be vented to the atmosphere. Passive Venting and Hydrogen Dilution blowers will be used to purge the residual hydrogen out of the system and storage tanks.
 - b. Each generator shall be designed to allow passive venting of the waste hydrogen produced from each cell or cell compartment to eliminate the possibility of inadvertently pressurizing the cell and causing failure.
 - c. Under no circumstance shall waste hydrogen be allowed to flow from one cell or cell compartment to the next. All hydrogen shall immediately be released from each cell pack.
 - d. Minimum passive venting capability from each electrolytic cell pack shall be 4.0 square inches for every 100 pounds of chlorine production.
5. The generator shall be built and configured to allow one of the five electrolytic cells to be removed (replaced with a pipe spool) and still run at 80% production capacity with only minor adjustments to the required generator controls.

6. The sodium hypochlorite generator assembly shall be factory tested for a minimum of 8 hours and proper operating parameters confirmed prior to shipment. QA/QC certification shall document that unit test settings are noted.

1.05 SUBMITTALS

A. Shop Drawings- Submit for approval the following:

1. Supplier's literature, illustrations, Specifications and bill of materials for each component of the system. Data shall include a complete description in sufficient detail to permit comparison with the technical Specifications.
2. Dimensions, materials, size, weight and performance data.
3. Drawings showing fabrication, assembly, installation and wiring diagrams. Wiring diagrams shall consist of, at a minimum, control schematics, including coordination with other electrical control devices operating in conjunction with the sodium hypochlorite generator feed system hypochlorite generator feed system.
4. Motor Data: For each motor furnish a certified motor data sheet for the actual motor or for a previously manufactured electrically duplicate motor which was tested.
5. Pump Data: For each pump furnish a performance certification indicating: head, capacity, efficiency and horsepower.
6. A list of any and all parameters, ratings or other characteristics where the proposed sodium hypochlorite generator system deviates from the requirements set forth in these Specifications.
7. Affidavits of compliance with referenced standards and codes including NSF 61 certification for equipment in contact with potable water.
8. Supplier's standards for sodium hypochlorite generator and feed system equipment.
9. Process Control and Instrumentation:
 - a. Hardware Submittal
 - 1) Bill of Materials.
 - 2) Data sheets for all instruments provided.
 - 3) Catalog cuts for all process control and instrumentation equipment.
 - 4) Detailed control panel drawings including assembly/layout drawings and heating/cooling calculations.
 - 5) Instrument installation, mounting, and anchoring details
 - b. Detailed schematic drawings for all control equipment.
 - c. Detailed loop drawings. Submittal of generic diagrams will not be acceptable. Loop drawings shall contain all of the minimum and optional content required by the paragraphs 5.2 and 5.3 of the standard.
 - d. Point-to-point interconnection wiring diagrams.
 - e. Panel wiring and piping diagrams.
 - f. English-language loop descriptions.

- g. Instrument index with ranges and set points.
- h. A fully documented functional block diagram PLC program listing including the I/O list and housing configuration for each PLC.
- i. Each function block logic must be associated with a complete English language narrative describing the function and operation of said rung.
- j. Color copies of all proposed operator interface screens.
- k. Detailed factory testing procedure.
- l. Training plan submittal.
- m. O&M Manual.

B. Operation and Maintenance Data: Submit six (6) copies of complete Operation and Maintenance manuals in accordance with the requirements described below:

1. Required Operation Data

- a. Complete, detailed operating instructions for each piece of equipment
- b. Explanations for all safety considerations relating to operations
- c. Recommended spare parts lists

2. Required Maintenance Data

- a. Maintenance data shall include all information and instructions required by plant personnel to keep equipment properly cleaned, lubricated and adjusted so that it functions economically throughout its full design life.
- b. Explanation with illustrations as necessary for each maintenance task.
- c. Recommended schedule of maintenance tasks.
- d. Lubrication charts and tables of alternate lubricants.
- e. Troubleshooting instructions.
- f. List of maintenance tools and equipment.
- g. Name, address and phone number of manufacturer and manufacturer's local service representative.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

- 1. The OSHGS Supplier shall have at least 3 years experience in the design and manufacture of equipment of similar capacity and service capability to the equipment described herein. As part of their submittal package, the system manufacturer shall submit the following:
 - a. Evidence that equipment of similar design has been in successful operation in at least fifteen (15) separate installations within the continental United States.
 - b. The Sodium hypochlorite generator shall be a pre-assembled skid and factory tested to assure compliance with all operational requirements. No field assembly or wiring will be permitted with the exception of external conduits.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Delivery, storage, and handling as specified in this specification and in Section 01611.
- B. All equipment and materials shall be inspected against approved Shop Drawings at time of delivery. Equipment and materials damaged or not meeting requirements of the approved Shop Drawings shall be immediately returned to the Supplier for replacement or repair.
- C. Equipment and materials shall be stored in a dry location and protected from the elements according to the Supplier's instruction.
- D. Equipment and materials shall be handled in an approved manner according to the Supplier's instructions.

1.08 WARRANTY

- A. Prior to acceptance of the sodium hypochlorite generation system, provide written warranty from the system manufacturer that includes the following statements:
 - 1. System Supplier shall inspect the installation during and after completion and provide written certification that the sodium hypochlorite generation system is free from faults and defects and is in conformance with the Contract Documents.
 - 2. OSHGS Supplier must provide the following after sales services:
 - a. Must provide a 24-hour 365-day toll free service hot line.
 - b. Next day technician availability.
 - c. Same day or overnight parts availability.
 - d. Must provide evidence of spare parts availability on this system such as electrolytic cells, rectifiers, control cabinets, metering pumps.
 - 3. Sodium hypochlorite generator system will remain free of defects for a period of three (3) years from the date of final acceptance.
 - 4. If the equipment requires repair or replacement during the three (3) year warranty period as a result of ordinary wear and tear under normal conditions, the OSHGS Supplier will repair or replace such equipment as required without cost (including shipping, handling and labor) to the Owner.
 - 5. The electrolytic cells including cell housing body shall have a three (3) year full replacement warranty and a prorated straight-line replacement warranty for years 4 to 7 from the date of final acceptance (Warranty includes complete cell, including electrodes and housing).
 - 6. The Supplier shall guarantee the minimum performance of the system for electrical consumption, salt usage, and water usage for a minimum of three (3) years following final acceptance of installation.

PART 2 PRODUCTS

2.01 SERVICE CONDITIONS

A. Feed Points:

1. Under normal operating condition, sodium hypochlorite generated on-site (0.8 percent) will be injected into the process.
2. Under emergency conditions commercially available sodium hypochlorite (10-12 percent solution) can be added if required via a commercial strength hypochlorite dilution panel provided by the Supplier as part of the OSHGS.

2.02 MANUFACTURERS

A. On-Site Hypochlorite Generation System:

1. MicrOclor System as furnished by Process Solutions, Inc. or approved equal (as determined by the Owner)

The MicrOclor system is the basis of design. The drawings within the contract documents depict the MicrOclor layout. If an alternate design is to be provided by the Contractor, the bidding Contractor is responsible for providing the design of the alternate system and must provide the complete alternate design at the time of bid submission. The design must be complete and sealed by a Registered Professional Engineer in the State of Georgia. The Contractor will be responsible for all additional costs associated with any alternate design proposed.

2.03 ON-SITE SODIUM HYPOCHLORITE GENERATION SYSTEM

- A. Provide one (1) NSF 61 Certified sodium hypochlorite generators, capable of producing 500 pounds per day Free Available Chlorine (FAC) as 7,500 gallons per day of 0.8% sodium hypochlorite. The 500 lbs/day generator shall be factory skid mounted on a stainless steel skid.
- B. All electrical equipment and enclosures shall be built and certified to UL 508 standards and shall possess the appropriate label.
- C. Each electrolytic cell shall be arranged so that it can be completely drained, in place.
- D. The generator package shall be mounted in the general location shown on the drawings and shall be factory wired, plumbed and mounted on a self-contained skid assembly.
- E. The generator package shall consist of the electrolytic cell(s), electrolyte management system, rectifier cabinet, control panel containing system controls, water softeners with flow meter and all necessary interconnecting wiring and hardware.

- F. The generator package shall have the following redundant interlocked safety features:
1. Cell high temperature switch.
 2. Cell low level switch, for each cell.
 3. Water flow sensor.
 4. Cell over voltage switch.
 5. Transformer high temperature switch.
 6. Automatic voltage and current regulation.
- G. The rack mounted flow control panel on each generator shall consist of a water rotameter, water sensor, brine rotameter and a positive displacement multi diaphragm pump with variable speed drive. The variable speed drive shall respond to a 4-20 mA signal generated by the PLC algorithm in order to maintain constant current relative to variable water temperature or flow rate.
- H. The generator skid shall be supplied with a 4-20 mA electrolyte temperature sensor that shall function to return a linear signal proportional to 0-100°C, which shall allow continuous operation up to 130°F without interruption. Under no circumstance shall bimetallic “snap” switches be permitted.
- I. The process shall operate in a batch environment allowing for consistent hypochlorite concentrations and greatest efficiencies.
- J. The commercial strength sodium hypochlorite dilution panel shall include an eductor, a rotameter for potable water, a rotameter for 12% sodium hypochlorite, an outlet check valve and all other valving, piping, and equipment necessary for emergency service.

2.04 ON-SITE SODIUM HYPOCHLORITE GENERATOR**A. General:**

1. One (1) NSF-61 certified, on-site hypochlorite generation system for a total capacity of 500 lbs/day FAC. Includes a stainless steel skid with electrolytic cells, rectifier/power supplies, variable speed brine pump, and Allen-Bradley MicroLogix 1400 PLC controls.
2. AC/DC Rectifier/Transformer: 480 VAC, 3 phase input.
3. Operating amperage is 75 percent of Full Load Amperage (FLA).
4. Number of dedicated 480V, 3 Phase circuits required: One (1) 100 Amps.
5. One 208V, one phase 30 amp circuit to control panel
6. See Electrical Drawings for additional requirements including but not limited to additional Inputs/Outputs to the PLC, 120V power to external instruments, Fiber/Ethernet Switch for interface with plant SCADA system, etc.

B. Generator Skid:

1. Each generation system shall be pre-piped, wired, and skid mounted. The OSHGS skid frame shall be constructed of 304 stainless steel tube. Horizontal and vertical tube sections shall be of 125-inch wall thickness and have a depth no greater than fifty (50) inches by a width not exceeding eighty-six (86) inches. The skid frame shall be configured to allow easy access to all components. All vertical and horizontal frame connections shall be welded. The completed frame with all mounted components shall comply with the UBC structural requirements for seismic zone four.
2. The skid frame shall support as a minimum the following mounted equipment:
 - a. Generator electrolytic cells.
 - b. Water and brine rotameter.
 - c. Control panel.
 - d. Interconnect pipes valves and fittings.
 - e. Interconnect conduit and wiring.
 - f. Water flow sensor.
 - g. Variable speed brine pump.
 - h. Heat exchanger

C. Transformer Rectifier (Full Wave DC Rectification):

1. The 6 Pulse D.C. Rectifier will consist of a fully isolated three phase step down transformer and bridge rectifier. D.C. voltage output will be fixed with multiple primary taps for + 5 to 10 percent voltage correction. Under no circumstance will switching rectifiers or phase angle fired SCR voltage correction be permitted. D.C. ripple will be less than 4 percent with a power factor of 99 percent or better.
2. The transformer rectifier will be a fixed voltage unit where the current will be allowed to float as a function of electrolyte conductivity.
3. Constant current will be achieved via an active feedback loop where rectifier amperage is measured and reported to the PLC. The control algorithm calculates the appropriate amount of brine to mix with the incoming water so as to maintain constant current.
4. Rectifier efficiency will be 93 percent or greater.
5. Each transformer/rectifier will also house a 4-20 mA D.C. current transducer and NEMA 4X digital display of amperage.
6. The rectifier cabinet and base frame will be constructed of 304 stainless steel and will be of a modular design. All internal wiring connections and components will be easily accessible by removing the front access panel. This is a standalone unit mounted next to skid.
7. The transformer enclosure will be removable from the skid assembly as one piece, allowing for unobstructed access to the transformer.
8. For safety reasons, under no circumstances can water/liquids handling and/or cells be located immediately above the power supplies.

D. Electrolytic Cells:

1. The electrolytic cells shall be constructed of clear acrylic materials, allowing for full visual inspection of the electrodes from all angles.
2. Each electrolytic cell shall be constructed utilizing DSA coated titanium anodes and titanium cathodes. The cells are to be configured in a vertical format with a recirculating loop provided for each cell. This recirculating loop will allow the passive removal of hydrogen from each cell via the upper hydrogen vent. Under no circumstance will hydrogen be allowed to be driven from one cell or cell loop to the next.
3. The cells must operate at atmospheric pressure while purging hydrogen gas passively at the top of the cell.

4. The electrodes shall be titanium and the anodes coated with a mixed metal oxide catalytic coating for maximum electrical efficiency and longevity. They shall be vertically oriented solid flat plate construction to maximize the high velocity gas lift between electrodes, which will minimize scaling. Expanded metal electrodes shall not be allowed.
5. Each cell loop shall also incorporate an optical level sensor so as to preclude any possibility of exposing an active electrode surface.
6. All D.C. cable connections shall be direct to the outermost electrode for both anode and cathode. High current bus configurations will not be allowed to penetrate the electrode housing.
7. The wetted cell components shall consist only of the electrodes and acrylic cell body. No internal baffles, spacers, or connecting hardware will be allowed.
8. Maximum allowable cell current density shall be no more than 1.25 amps per square inch. The OSHGS Supplier shall provide calculations showing all relevant cell data. Data shall include electrode area measurements, and current flows. Electrode service factor shall be expressed as amps per square inch of active electrode surface.
9. The generator shall be built and configured to allow one of the five electrolytic cells to be removed (replaced with a pipe spool) and still run at 80 percent production capacity with only minor adjustments to the required generator controls.
10. Cells shall utilize titanium bolting hardware.

E. Control System:

1. The OSHGS Supplier shall provide a control system consisting of one (1) local generator control panel. The local control panels shall be mounted on the generator skids in a NEMA 4X, 304 SST enclosure.
2. All controls and operations logic specified herein and as shown on the instrumentation loop diagrams required for the system shall be programmed in a Programmable Logic Controller (PLC). Contractor shall be responsible for all SCADA integration and programming related to the new OSHGS.
3. The control panel shall display all relevant operating parameters and/or alarm conditions.
4. The control panel cabinet will be UL 508 approved and house the operator interface terminal (OIT), PLC, VFDs, hydrogen blower controls, and terminal strips to fully support the functions of generator operation, tank level and metering pump proportional control.

5. The OIT shall have the following features as a minimum:
 - a. Context sensitive help screens for each alarm parameter.
 - b. NEMA 4-by-6 inch color touch screen.
 - c. Serial communications port for PLC connection.
6. The control cabinet logic will function at the PLC level where operating parameters will be measured, corrected, scaled, reported and controlled. The OIT will serve as the operator interface, data input screen, and alarm log.
7. The generator PLC and display will control and monitor all functions and operational parameters including, but not limited to, the following:
 - a. Redundant cell level switches.
 - b. Process temperature control.
 - c. Rectifier control.
 - d. DC amperage.
 - e. Hypochlorite tank levels.
 - f. Blower controls.
 - g. Alarm history.
 - h. Security protection.

2.05 WATER PREFILTERS

- A. Two (2) wall mounted cartridge type filter housings each holding a 10” cartridge for dirt, rust, and particulate matter from softener’s feed water.
- B. 1 1/2-inch NPT inlet/outlet.
- C. Includes filter housing mounting bracket that must be non-metallic construction.
- D. Filter Cartridges are 50 micron, disposable cartridges.
- E. Four (4) Pressure Gauges to measure pressure drop across filters.

2.06 FEED WATER CHILLING AND HEATING

- A. Generator feed water temperature is Min / Max: 50 to 85 degrees Fahrenheit.
- B. Heat Exchanger:
 - 1. A titanium and PVC heat exchanger will be provided on the MICROCLOR rack capable of raising the incoming cold water temperature a minimum of 15°F.
 - 2. The process will function to bleed waste heat from the product hypochlorite to the incoming cold water.
 - 3. A bypass valve will be provided for seasonal adjustment. Additionally, a flushing valve and drain will be provided.
 - 4. All wetted components and fasteners will be titanium and all internal gasketing will be viton.
 - 5. The heat exchanger will not require power or control circuitry and will function in a completely passive fashion. If the OSHGS manufacturer requires a heater, they must provide information with the bid as to the additional electrical power and replacement parts cost impact for the installation.

2.07 HYDROGEN SAFETY MANAGEMENT

- A. The hydrogen dilution system shall dilute the hydrogen concentration to below 25 percent of LEL or 1 percent by volume.
- B. Hydrogen dilution to be two-step process.
 - 1. Passive vent with at each electrolytic cell. NOTE: For operator safety, the cells are operated at atmospheric pressure, so that hydrogen gas cannot be contained or pressurized. Pressurized cells can be dangerous.
 - 2. Forced draft blowers at the OSHGS skid
- C. Each hydrogen dilution blower shall generate a minimum flow of 300 scfm The hydrogen dilution system design shall incorporate the following safety features:
 - 1. Blower current sensing.
 - 2. Differential pressure switch positioned in the dilution ductwork vent stack.
 - 3. Software controlled safety interlocks to detect control system sequence failure.

D. A Hydrogen Gas Room Monitor/Detector shall be provided.

1. The hydrogen gas monitoring system shall continuously measure and display gas concentration and provide alarms when preset limits are exceeded. Transmitter will send signal to local controller or PLC.
2. Enclosure: NEMA 4X.
3. Display: Two line, 8 character alphanumeric LCD display.
4. Output Signal: Linear 4-20 mA.
5. Manufacturer and Model: Conspec Controls Model CN06.

NOTE: Under no circumstance will the above Hydrogen Safety Management requirements be relaxed or modified as it is a critical operator safety feature and core to the generator design.

2.08 BULK HYPOCHLORITE DILUTION PANEL

A. Provide one (1) hypochlorite dilution panel to dilute 10-12% commercial hypochlorite solution to 0.8% for emergency operation. The panel shall be placed in a fiberglass box and mounted on the containment wall as indicated in the drawings. The fiberglass box dimensions shall be large enough to accommodate the dilution panel. The dilution panel shall include the following:

1. Two (2) rotameters
2. Two (2) flow control valves, manually operated
3. One (1) Mazzei Venturi
4. Various schedule 80 PVC piping and fittings

2.09 ACID CELL CLEANING CART

- A. Pre-assembled mobile cart including acid cleaning tank and centrifugal pump.
- B. Cart pre-wired and ready for 120 VAC, single phase plug in connection to electrical receptacles.
- C. Cart pre-piped and ready for use with schedule 80 PVC piping and valves.
- D. Discharge hose, quick couplers and appurtenances for transfer of acid to and from electrolytic cells.

2.10 SPARE PARTS

- A. The OSHGS Supplier shall furnish, one set of the following spare parts for each installation, with each onsite sodium hypochlorite generator system:
1. Two (2) electrolytic cell level sensors.
 2. Two (2) electrolytic cell temperature sensors.
 3. One (1) variable speed brine pump.
- B. Spare parts shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location until transferred to the Owner at the completion of the contract.
- C. Furnish an initial supply of all greases and lubricants required to start operations. Supply an amount of these materials equivalent to one year of continuous operation.
- D. All spare parts and replacement parts (except cells), must be available locally at Grainger and Ryan Herco type supply houses.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. The Owner shall inspect all equipment and materials against approved Shop Drawings at time of delivery. Equipment and materials damaged or not meeting requirements of the approved Shop Drawings shall be immediately returned to the OSHGS Supplier for replacement or repair.
- B. Equipment and materials shall be stored in a dry location and protected from the elements according to the OSHGS Supplier's instructions.
- C. Equipment and materials shall be handled in an approved manner according to the OSHGS Supplier's instructions.

3.02 START-UP AND TEST

- A. Start-up and Test according to this section and Section 01660.
- B. System Supplier and Contractor shall verify that structures, equipment, pumps and motors are compatible for an efficient system.
- C. Contractor and system Supplier shall make equipment adjustments required to place system in proper operating condition.
- D. Test the sodium hypochlorite feed system for proper operation in the presence of the Owner per requirements of this section. Testing is to include, but not be limited to, validation of the following performance criteria:

1. Sodium hypochlorite concentration produced
 2. Electrical efficiency (kWh/lb equivalent chlorine produced)
 3. Salt consumption (lbs salt/lb equivalent chlorine produced)
 4. Water consumption (gal water/lb equivalent chlorine produced).
- E. Contractor is to furnish all testing equipment and devices required.
- F. If the sodium hypochlorite feed system fails to meet any of the specified performance requirements, Contractor shall modify and/or replace defective equipment until it meets specified requirements. Re-test system to verify satisfactory operation.
- G. Sodium hypochlorite generation system manufacturer's field services:
1. Retain, for a period of not less than five (5) days onsite, factory trained representatives of the manufacturer of each component with demonstrated ability and experience in the installation and operation of the equipment to perform the services listed below:
 - a. Service/Inspection during installation.
 - b. Inspect the completed installation and prepare an inspection report.
 - c. Test, calibrate and adjust all components for optimum performance.
 - d. Assist in initial start-up and field testing.
 - e. Instruct Owner's personnel in the operation and user maintenance of all components. Conduct a training seminar at the site.
 - f. Supervise the correction of any defective or faulty work before and after acceptance by Owner.
 - g. All supplier onsite work hours shall be coordinated with the Owner.
 2. Testing - The equipment shall not be considered ready for testing until the following conditions are satisfied:
 - a. Related Owner's O&M Manual and final shop drawing have been accepted by the Owner.
 - b. All required electrical tests and electrical adjustments have been completed to the satisfaction of the Owner.
 - c. All safety devices and equipment are installed, fully functional, adjusted, and tested.

END OF SECTION 11510

DIVISION 15 – MECHANICAL**SECTION 15050
Piping Systems****PART 1 GENERAL****1.01 DESCRIPTION****A. SCOPE**

- A. **GENERAL:** This section specifies systems of process piping and general requirements for piping systems. Detailed specifications for the components listed on the Piping System Specification Sheets are found in other sections of Division 15. This section shall be used in conjunction with those sections.

Contractor shall provide all piping and ancillary devices as shown, specified and required to provide a fully functional system.

PART PRODUCTS**2.01 PIPING MATERIALS**

Unless otherwise specified, piping materials, including pipe, gaskets, fittings, connection and joint assemblies, linings and coatings, shall be selected from those listed on the piping system specification sheets. Piping materials shall conform to detailed specifications for each type of pipe and piping appurtenance specified in other sections off Division 15.

2.02 PRODUCT DATA

Product data on piping materials shall be provided in accordance with Section 01300 where specified.

Piping layout drawings prepared by the Contractor shall be transmitted to the RWR a minimum of two (2) weeks prior to construction.

PART 3 EXECUTION**3.01 INSTALLATION****A. LOCATION**

Piping shall be provided as specified except for adjustments to avoid architectural and structural features and shall be coordinated with electrical construction.

B. PIPE SUPPORT, ANCHORAGE AND SEISMIC BRACING

- A. **GENERAL:** Piping shall be supported by anchor brackets, guides, saddles or hangers.
- B. **PIPING CONNECTIONS TO MACHINES:** Piping at machine connections shall be aligned in all planes to permit insertion of bolts at bolted connections or coupling screwed connections without using jacks, come-a-longs or other mechanical means to align field piping with the connections at the machines. Bolts shall not be forced into mating flange bolt holes and shall be capable being withdrawn using finger pressure alone. The use of 'dutchmen' mitered sections or similar specials to achieve the required alignment with machine connections is strictly prohibited.

3.02 PIPING IDENTIFICATION

A. PIPE CODING

After application of the coating and insulation systems, exposed piping, interior and exterior, and piping in ceiling spaces, pipe trenches, pipe chases and valve boxes shall be identified with plastic markers. Legend markers and directional arrows shall be located at each side of walls, floors, and ceilings, at one side of each piece of equipment, at piping intersections, and at approximately 50-foot centers.

3.03 TESTING

A. GENERAL

Upon completion of piping, but prior to application of insulation on exposed piping, the Contractor shall test the piping systems. Pressures, media and test durations shall be as specified in paragraph 3.06 below. Equipment which may be damaged by the specified test conditions shall be isolated. Testing shall be performed using calibrated test gages and calibrated volumetric measuring equipment to determine leakage rates. Each test gage shall be selected so that the specified test pressure falls within the upper half of the gage's range. Unless otherwise specified, the Contractor shall notify the County twenty-four (24) hours prior to each test.

Unless otherwise specified, testing, as specified herein, shall include existing piping systems which connect with new pipe systems. Existing pipe shall be tested to the nearest existing valve. Any piping which fails the test shall be repaired. Repair of existing piping will be considered and paid for as extra work.

Where testing existing chlorine systems to the nearest isolation valve, Contractor shall provide a tee in the line adjacent to the valve. The branch outlet on the tee shall be valved and used for cleaning, pressure testing, draining, and drying the line. Unless otherwise indicated, the existing chlorine system shall not be shut down during testing or connecting the tee and valve. Prior to placing the line in service, the valve on the branch outlet shall be plugged or sealed with a blind flange or threaded plug. Contractor shall be responsible for all damage to the existing system as a result of this work.

B. LIQUID SYSTEMS

Leakage shall be zero at the specified test pressure throughout the specified duration for the following systems: exposed piping, buried insulated piping, and buried or exposed piping carrying liquid chemicals. Unless otherwise specified, leakage from other buried liquid piping systems shall be less than 0.02 gallon per hour per inch diameter per one hundred (100) feet of buried piping.

3.04 CLEANING AND FLUSHING

A. GENERAL

Piping systems shall be cleaned following completion of testing and prior to connection to operating, control, regulating or instrumentation equipment. The Contractor may, at his option, clean and test sections of buried or exposed piping systems. Use of this procedure, however, will not waive the requirement for a full pressure test of the completed system. Unless specified otherwise, piping twenty-four (24) inches in diameter and smaller shall first be cleaned by pulling a tightly fitting cleaning ball or swab through the system. Piping larger than twenty-four (24) inches in diameter may be cleaned manually or with a cleaning ball or swab.

B. TEMPORARY SCREENS

Upon completion of the cleaning, the Contractor shall connect the piping systems to related process equipment. Temporary screens, provided with locator tabs which remain visible from the outside when the screens are in place, shall be inserted in pipelines at the suction of pumps and compressors in accordance with the following table:

Equipment suction or piping size, inches	Maximum screen opening, inches
0 – 1	1/16
1-1/4 – 3	1/4
3-1/2 – 6	1/2
Over 6	1

The Contractor shall maintain the screens during testing, initial start-up, and initial operating phases of the commissioning process. In special cases, screens may be removed as required for performance tests. The Contractor shall remove the temporary screens and make the final piping connections after the screens have remained clean for at least twenty-four (24) consecutive hours of operation. Systems handling solids are exempted.

C. LIQUID SYSTEMS

After completion of cleaning, liquid systems, unless otherwise specified, shall be flushed with clean water. With temporary screens in place, the liquid shall be circulated through the piping system using connected equipment for a minimum period of fifteen (15) minutes and until no debris is collected on the screens.

Potable water piping systems shall be flushed and disinfected in accordance with AWWA C651.

3.05 PIPING SPECIFICATION SHEETS

Piping and valves for groupings of similar plant processes or types of service lines are specified on individual piping specification sheets. Piping services are grouped according to the chemical and physical properties of the fluid conveyed and/or by the temperature or pressure requirements. Each grouping of services is identified by a piping system number. Piping services specified and on the drawings are alphabetically arranged by designated service symbols as shown in Table A. Table A also indicates the system number, fluid category, and pipe marker background color of each service.

Table A. Piping Services

Symbol	Service	System	Fluid Category	Pipe Marker Background Color
A	Air	19	Air	Green
D	Drain	24	Drain/Vent	Green
SHC	Sodium Hypochlorite	19	Chemical	Yellow
BRN	Brine	19	Chemical	Yellow
PW, SFW	Plant Water, Softened Water	10	Water	Blue
VNT	Chemical Vent	19	Vent	Yellow

SYSTEM 10

Piping Symbol/Service:	SFW – Softened Water PW – Plant Water
Test Requirements: Pressure: Duration	125 psig 120 minutes
Gasket Requirements: Flange: Push-on/Mech Cpl:	Compressed gasketing consisting of organic fibers (Kevlar) and neoprene binder Nitrile or Neoprene
<u>Exposed Pipe and Valves:</u> (See drawings for pipe size and valve type)	
(3" and smaller) Pipe: Valves:	<u>PVC</u> ; ASTM D1784, Class 12454-B, NSF certified, ASTM D1785, Sch. 80. Pipe and fittings exposed to sunlight shall be painted. Ref. spec Section 15064. <u>Conn</u> ; plain end, solvent weld – with appropriate solvent, flanged for valves 3 inch and larger. <u>Ftgs</u> ; PVC, Sch. 80, solvent weld. <u>Ball</u> ; Jamesbury Fig. 351, Nibco T-580, or equal. <u>Globe</u> ; Crane 7TF or 17TF, Lunkenheimer 123 or 214, or equal. <u>Swing check</u> ; Crane 137, Lunkenheimer 230, or equal. <u>Pressure Regulating Valves</u> : 2 inches and smaller shall be direct acting, spring-operated type. Valves less than 2" shall be Cash-Acme E-41 series 3, Watts 223, or equal, with separate Y-pattern strainer.
Remarks:	

SYSTEM 19

Piping Symbol/Service:	BRN – Brine SHC – Sodium Hypochlorite (See remark 1) A – Air VNT – Chemical Vent
Test Requirements: Pressure: Duration	150 psig 120 minutes
Gasket Requirements: Flange: Push-on/Mech Cpl:	PTFE bonded EPDM, full-face gaskets, ANSI B16.1. N/A
<u>Exposed Pipe and Valves:</u> (See drawings for pipe size and valve type)	
(All Sizes) Pipe:	<u>PVC</u> ; ASTM D1784, Class 12454-B, NSF certified, ASTM D1785, Sch. 80. Pipe and fittings exposed to sunlight shall be painted. Ref. spec Section 15064. <u>Conn</u> ; plain end, solvent weld – with appropriate solvent, flanged for valves 3 inch and larger. <u>Ftgs</u> ; PVC, Sch. 80, solvent weld.
(4" and less) Valves:	<u>Diaphragm</u> ; PVC body, Chemtrol Series PD, Posacon 677, Asahi/America, or equal with EPDM or PTFE diaphragm. <u>Ball Valve</u> ; PVC body, PTFE seats, Hayward or equal. <u>Swing check</u> ; Crane 137, Lunkenheimer 230, or equal. <u>Pressure Regulating Valves</u> : 2 inches and smaller shall be direct acting, spring-operated type. Valves less than 2" shall be Cash-Acme E-41 series 3, Watts 223, or equal, with separate Y-pattern strainer.
Remarks:	
<ol style="list-style-type: none"> 1. For SHC service, the following shall apply: <ol style="list-style-type: none"> a. Sodium Hypochlorite service may be listed as SHC b. Undrilled Ball valves are not permitted on SHC service. Valves shall be diaphragm valves or ball valves specially drilled for hypochlorite service. c. Diaphragm valves 4 inches and smaller shall be provided with PTFE diaphragms; valves 5 inches and larger shall be provided with Hypalon or PDVF linings with PTFE diaphragms. d. All wetted parts shall be compatible with the chemicals they are exposed to or the gases they emit. 2. The hydrogen vent piping shall be clear PVC where indicated on the drawings. 	

SYSTEM 24

Piping Symbol/Service:	D – Drain
Test Requirements: Pressure: Duration	In accordance with Section 712, Uniform Plumbing Code. In accordance with Section 712, Uniform Plumbing Code.
Gasket Requirements: Flange: Push-on/Mech Cpl:	Compressed gasketing consisting of organic fibers (Kevlar) and neoprene binder Nitrile or Neoprene
<u>Exposed Pipe and Valves:</u> (See drawings for pipe size)	
(3" and smaller) Pipe: Valves:	<u>PVC</u> ; ASTM D2665, Sch 40. <u>PVC flexible tube</u> None

END OF SECTION 15050

SECTION 15064
Plastic Pipe

PART 1 GENERAL

1.01 DESCRIPTION

A. SCOPE

This section specifies polyvinylchloride, chlorinated polyvinylchloride, polyethylene, and polypropylene pipe and fittings.

B. PIPE DESIGNATIONS

For use in the Piping System Specification Sheets in Section 15050 and in this section, the following plastic pipe designations are defined:

Designation	Definition
PVC	Polyvinylchloride
CPVC	Chlorinated polyvinylchloride
PE	Polyethylene
PP	Polypropylene

1.02 QUALITY ASSURANCE

A. REFERENCES

This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM D1248	Polyethylene Plastics Molding and Extrusion Materials
ASTM D1784	Rigid Poly (vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80,

	and 120
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2464	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2466	Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2467	Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2564	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
ASTM D2657	Heat Joining Polyolefin Pipe and Fittings
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D4101	Propylene Plastic Injection and Extrusion Materials
ASTM F402	Safer Handling of Solvent Cements and Primers used for Joining Thermoplastic Pipe and Fittings
ASTM F437	Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F438	Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40
ASTM F439	Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F441	Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F493	Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings

PART 2 PRODUCTS

2.01 PVC PIPE

A. PRESSURE PIPE

PVC material for pipe and fittings shall conform to ASTM D1784, Class 12454-B. Pipe and fittings shall either be in accordance with ASTM D1785 or shall conform to ASTM D2241 for standard dimension ratios: 160 psi pipe-SDR 26; 200 psi pipe-SDR 21; 250 psi-SDR 17. Pressure rating for pipe shall be in excess of test pressure specified in Section 15050. Neoprene gaskets with push-on joints shall conform to ASTM F477.

Schedule 80 PVC socket type fittings shall conform to ASTM D2467. Schedule 40 PVC fittings shall conform to ASTM D2466. PVC solvent weld cement for socket connections shall meet the requirements of ASTM D2564. Schedule 80 PVC threaded fittings shall conform to ASTM D2464. Fittings for gasketed pipe shall be ductile iron or steel push-on IPS-sized pressure fittings rated for use with the specified class of PVC pipe.

B. NONPRESSURE PIPE

1. **GRAVITY SEWER PIPE:** PVC material for sewer pipe and fittings shall conform to Class 12454-B, as defined in ASTM D1784. Pipe and fittings shall meet the requirements of ASTM D3034 for SDR 35. Neoprene gaskets with push-on joints shall conform to ASTM F477.

C. DRAIN, WASTE, AND VENT PIPE: PVC material for drain waste and vent (DWV) pipe and fittings shall conform to Class 12454-B, ASTM D1784. Pipe and fittings shall conform to ASTM D2665. Unless otherwise specified, connections shall be solvent weld. Connections to traps, closet flanges, and nonplastic pipe shall be with approved adapter type fittings designed for intended use. Solvent weld cement for socket connections shall meet requirements of ASTM D2564.

2.02 CPVC PIPE

CPVC material for pipe and fitting shall conform to ASTM D1784, Class 23447-B. Pipe and fittings shall be in accordance with ASTM F441. Neoprene gaskets with push on joints shall conform to ASTM F477.

Schedule 80 CPVC socket type fittings shall conform to ASTM F439. Schedule 40 CPVC socket type fittings shall conform to ASTM F438. CPVC solvent weld cement for socket connections shall meet the requirements of ASTM F493. Schedule 80 CPVC threaded type fittings shall conform to ASTM F437.

2.03 PE PIPE

PE pipe shall meet the requirements of ASTM D1248, Type III, Grade P 34, Class C, 100 psi or as specified in Section 15050, whichever is higher. Fittings shall be of the same material, molded socket fusion for sizes 4 inch diameter and smaller and molded or fabricated butt fusion for sizes 6 inch and larger. Fittings shall be 125 psi or as specified in Section 15050, whichever is higher. Heat fusion welding shall be in conformance with ASTM D2657.

2.04 PP PIPE**A. PRESSURE PIPE**

PP pipe and fittings shall be formulated of polypropylene conforming to ASTM D4101, SDR 11, butt fusion type. Pipe shall be 150 psi rated in all sizes. Heat fusion welding shall be in conformance with manufacturer's recommendation.

B. DRAIN, WASTE, AND VENT PIPE

PP drain, waste, and vent (DWV) pipe and fittings shall be made from flame retardant, Schedule 40, polypropylene (PPFR) plastic as defined in ASTM D4101. Pipe and fittings used for buried piping and in concealed locations shall be joined by electrical fusion coils energized by a variable low-voltage power supply to completely fuse the interface between the pipe and socket and form a completely homogenous structure. Unless otherwise specified, mechanical joint fittings may be used under bench or in exposed locations where future disassembly is desired. The mechanical method shall be in conformance with the manufacturer's recommendation.

2.05 PRODUCT DATA

The following information shall be provided in accordance with Section 01300:

1. Manufacturer's certificates of compliance with the specified standards and Contractor's layout drawings.

PART 3 EXECUTION**3.01 INSTALLATION**

PVC pipe 3 inches in diameter and smaller shall be joined by means of socket fittings and solvent welding in conformance with the manufacturer's/supplier's instructions and recommended procedures. Unless otherwise specified, PVC pipe 4 inches in diameter and greater shall be joined by means of gasketed push-on joints and steel or ductile iron push-on or mechanical joint fittings. Fittings shall be lined and coated as specified in Section 15061 or 15062. Unless otherwise specified, PVC and CPVC piping exposed to sunlight shall be painted with coating system L-2 as specified in Section 09900.

Connections to different types of pipe shall be by means of flanges, specified adapters or transition fittings. Where sleeve type couplings are used, both shall be uniformly torqued in accordance with pipe manufacturer's recommendation. Foreign material shall be removed from the pipe interior prior to assembly.

Unless otherwise specified, PE pipe and fittings 4 inch diameter and smaller shall be joined by means of thermal socket fusion and pipe 6 inches and larger by thermal butt fusion. Butt-fusion joining of the pipes and fittings shall be performed with special joining equipment in accordance with procedures recommend3d by pipe manufacturer. Tensile strength at yield of butt-fusion joints shall not be less than pipe. Flanged adapters shall be provided for connection to valves and where specified.

3.02 TESTING

Testing of plastic shall be as specified in Section 15050.

END OF SECTION 15064

SECTION 15096

Pipe Supports and Hangers

PART 1 GENERAL

1.01 SCOPE

- A. The work of this section includes all pipe supports, hangers and brackets necessary to install piping furnished under these Contract Documents. The Contractor shall furnish and install all foundations, anchor bolts, pipe supports, shims, hangers, clamps and hardware required for a complete installation as shown on the Drawings and/or specified herein.
- B. The Drawings do not show every pipe hanger location, but are intended to provide a guide as to type and usage of pipe supports intended under this Contract. The Contractor shall provide all pipe supports required to securely support all piping in accordance with the referenced standards.

1.02 PROJECT CONDITIONS

- A. The Contractor shall visit the Project site prior to the Bid to become familiarized with the extent of existing construction and to determine the scope of coordination required between the existing work and work specified in this section.
- B. The Contractor shall be responsible for field verifying existing dimensions prior to fabrication of pipe support systems.

1.03 PROJECT SCHEDULING

The Contractor shall coordinate scheduling of pipe support installation with the piping system installation to prevent any damage to installed piping due to lack of pipe supports

1.04 SUBMITTALS

Complete shop drawings and engineering data shall be submitted to the RWR.

1.06 QUALITY ASSURANCE

- A. Work shall be installed by workers experienced in the design, selection, fabrication and installation of pipe support systems.
- B. Selection, fabrication, and installation of pipe hangers and supports shall conform to the requirements of ASNI B31.1, MSS SP-58, SP-69, and SP-89.
- C. Pipe support system shall utilize standard manufactured hangers and supports wherever possible.
- D. Pipe support materials in contact with piping shall be compatible with the piping materials such that neither shall have a deteriorating action on the other.

- E. The Contractor shall select all piping support systems within the specified spans and component requirements. Selection of support system components shall withstand the dead loads imposed by the weight of the pipes filled with water, plus any insulation.
- F. Where piping connects to equipment it shall be supported by a pipe support and not by the equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Pipe support products shall be manufactured by ITT Grinnell, B-Line Systems, Michigan Hanger Company, Aickenstrut or equal.
- B. Non-metallic pipe hangers and supports shall be manufactured by Aickenstrut or equal.

2.02 MATERIALS AND CONSTRUCTION

- A. All structural steel shall conform to ASTM A 36.
- B. All pipe support columns shall conform to ASTM A 53, Grade B and shall be minimum Schedule 40.
- C. All embedded anchor bolt materials shall conform to ASTM A 193, Grade B8; ASTM A 276, Type 304, or IFI-104, Grade 304. Nuts shall be heavy hex nuts conforming to ASTM A 194, Grade 8 or IFI-104, Grade 304. Minimum anchor bolt size for pipe supports shall be 5/8-inch diameter.
- D. All rod and bolting materials in contact with cold piping (less than -20 degrees F) shall conform to ASTM A 320, Grade B8. Nuts shall be heavy hex nuts conforming to ASTM A 194, Grade 8 or 8T.
- E. All rod and bolting materials shall conform to ASTM A 307, Grade B. Nuts shall be heavy hex nuts conforming to ASTM A 307.
- F. All carbon steel or malleable iron straps, hangers, clamps, U-bolts and other hardware in contact with the pipe shall be shop primed except where specified or shown on the Drawings to be galvanized.
- G. Expansion type anchor bolts shall be of stainless steel construction and shall comply with Federal Specification sFF-S-325.
- H. Long runs of pipe subject to expansion shall be hung by means of adjustable swivel pipe roll hangers equal to Grinnell, Figure 181.
- I. Short runs of uninsulated pipe subject to expansion in sizes up to and including 3-1/2-inches as well as all pipe of those sizes not subject to expansion shall be hung by means of adjustable swivel, split pipe ring equal to Grinnell, Figure 104.

- J. Insulated piping and tubing, short lengths of 4-inches and larger pipe subject to expansion, and pipe 4-inches and larger not subject to expansion shall be hung by means of adjustable steel clevis hangers equal to Grinnell, Figure 260.
- K. Pipe 2-inches and less in diameter and not subject to expansion may, when paralleling walls, be supported by single hook clamp hangers equal to Grinnell, Figure 168.
- L. Flat strap hangers will not be permitted. Hangers relying on mastics or adhesives shall not be used.
- M. Pipe supported from underneath and subject to expansion shall have adjustable pipe roll stand supports equal to Grinnell, Figure 274. The pipe roll stand shall be supported by concrete piers, structural steel or steel brackets as required.
- N. Pipe supported from underneath and not subject to expansion shall have cast-in-place concrete supports as shown on the Drawings or adjustable pipe saddle supports on properly sized pipe stanchions and ample, properly grouted floor flanges. Saddle supports shall be equal to Grinnell, Figure 264.
- O. Hangers suspended from structural steel shall be supported on UFS beam clamp equal to Grinnell, Figure 228L or 292L, with links as required.
- P. Hangers from concrete work shall be secured by universal, galvanized metal inserts equal to Grinnell, Figure 282, placed in the concrete at the time of pouring. Wooden plugs or other improvised means shall not be used for any form of hanger fastening.
- Q. Riser clamps for vertical piping shall be steel riser clamps equal to Grinnell Figure 261.

2.03 NON-METALLIC SUPPORTS

- A. All glass fiber reinforced channel covered under this Section shall have a flame spread rating of 25 or less when tested per ASTM E 84.
- B. Glass fiber reinforced channel framing shall have a minimum pull out resistance of 1,000 pounds when a load is applied to the inside of the flanges over a 3/8-inch long section of the channel and shall not deflect more than 1/4-inch when a uniform load of 1,000 pounds is applied to a 24-inch beam. Framing shall have a surface veil over 100 percent of the surface which, along with a properly designed filler system will protect against degradation from ultraviolet light and shall be made from corrosion resistant grade polyester or vinylester resins. Framing shall be Aickenstrut Type P or V.
- C. Polyvinyl chloride channel framing shall be manufactured by the extrusion process and shall have a minimum pull-out strength of 1,400 pounds when a load is applied to the inside of the flanges over a 3/8-inch long section of the channel. Framing shall be manufactured from a UV stabilized resin. Framing shall be Aickenstrut Type E.
- D. Universal pipe clamps shall be made by the injection molding process using a polyurethane base resin, shall have full and interlocking contact with the interior area of channel flanges to maximize pull-out resistance, shall be adjustable to accommodate a minimum 3/4-inch variance in OD sizes of piping or conduit, and shall contain no metal materials. Pipe clamps shall be Aickenstrut "Aickenstrap".

- E. All fasteners shall be manufactured from long glass fiber-reinforced polyurethane.
- F. All threaded rods shall be made from vinylester resin.

PART 3 EXECUTION

3.01 INSTALLATION

A. General

1. Pipe hangers and supports shall be installed in complete conformance with the manufacturer's recommendations and the Contract Documents.
2. Pipe hangers, trapeze hangers, upper attachments and other supports shall be selected based on pipe size. Provide all hangers and rods, turnbuckles, angles, channels and other structural supports to support the piping systems. Rods for pipe hangers shall be as follows:

Hanger Rod Diameter	Pipe Size
3/8"	2" and smaller
1/2"	2-1/2" and 3"
5/8"	4" and 5"
3/4"	6"
7/8"	8", 10", and 12"

3. Intermediate pipe supports provided between building structural members so as not to exceed maximum support spacing specified shall be galvanized structural steel angles (minimum 2-1/2 x 2-1/2 x 1/4-inch).
4. All supporting equipment shall be designed with a minimum safety factor of 5 based on the ultimate tensile strength of the material.
5. Contact between ferrous supports and non-ferrous piping materials shall not be permitted. Supports and clamps shall be rubber coated as necessary to prevent this condition.
6. Adequate supports shall be provided so that there is no movement or visible sagging between supports.
7. Hangers shall permit a minimum of 1-1/2-inch vertical adjustment after installation.

8. Annealed copper tubing, polyethylene tubing, and PVC piping shall be supported on maximum intervals as follows:

Tubing Size	Maximum Interval
3/8" and smaller	2'
1/2" – 5/8"	3'
3/4" – 1-1/8"	4'
1-1/4" – 2"	5'
2-1/2" – 3-1/2"	6'
4"	7'
6"	8'

9. Where indicated or directed by the Engineer, exposed piping and tubing carrying liquid shall be sloped as necessary to permit complete draining. Pipe deflection between supports shall be considered when determining the slope required to permit complete drainage. All underground piping shall be sloped uniformly for complete drainage.
10. Cast iron or ductile iron piping shall be supported as recommended by the manufacturer, and at all valves and fittings larger than 4-inches in size. At least one support shall be provided per pipe section or at every other joint, whichever is closer. Supports shall be located next to joints.
11. Open ends of pipe columns used for support shall be completely covered with 1/4-inch thick plate or angle leg welded in place.
12. All threaded connections installed loose, such as hanger rods and U-bolt, shall have a double nut installation.
13. Vertical piping shall be supported as shown or required to prevent buckling or swaying utilizing special brackets. Unless otherwise shown, vertical piping shall be supported at the bottom and at each floor. Vertical copper tubing one-inch and smaller in size shall be supported at five foot intervals.
14. Provide a support within 18-inches of each elbow and within 24-inches of each equipment connection.
15. Insulation on hot piping (carrying fluids above 70 degrees F) shall be protected at supports and hangers with a 12-inch long galvanized steel insulation shields with a 180 degree contour. Insulation shields shall be equal to Grinnell Figure 167.
16. Insulation on cold piping (carrying fluids at 70 degrees F or below) shall be protected at supports and hangers by galvanized steel insulation shields with a 180 degree contour. Insulation shields shall be equal to Grinnell Figure 167.
17. On insulation finished with an aluminum jacket, a 1/32-inch thick sheet of neoprene shall be provided between the jacket and the shield.
18. Hangers shall be selected to fit around insulation.

19. Unless otherwise shown, piping shall not be fastened to a support in such a manner that would prevent axial movement due to thermal expansion and contraction.
20. No pipe supports shall be anchored to or supported from floor grating.
21. Unless otherwise noted, piping dimensions shown on the Drawings are for reference only and shall be verified in the field by the Contractor. The Contractor shall size supports and hangers using actual field dimensions.

B. Standard Pipe Supports:

1. Horizontal Suspended Piping:

- a. Single pipes: Adjustable swivel ring, splint-ring or clevis hangers.
- b. Grouped pipes: Trapeze hanger systems.
- c. Furnish galvanized steel protection shield and oversized hangers for all insulated pipe.
- d. Furnish precut sections of rigid insulation with vapor barrier at hangers for all insulated pipe.

2. Horizontal Piping Supported From Walls:

- a. Single pipes: Wall brackets or wall clips attached to wall with anchors. Clips attached to wall mounted framing also acceptable.
- b. Stacked Piping:
 - 1) Wall mounted framing system and clips acceptable for piping smaller than 3-inch minimal diameter.
 - 2) Piping clamps which resist axial movement of pipe through support not acceptable.

3. Horizontal Piping Supported From Floors:

- a. Stanchion Type:
 - 1) Pedestal type; adjustable with stanchion, saddle, and anchoring flange.
 - 2) Use yoked saddles for piping whose centerline elevations is 18 inches or greater above the floor and for all exterior installations.
- b. Floor mounted channel supports:
 - 1) Use for piping smaller than 3-inch nominal diameter running along floors and in trenches at piping elevations lower than can be accommodated using pedestal pipe supports.
 - 2) Attach channel framing to floors with anchor bolts.
 - 3) Attach pipe to channel with clips or pipe clamps.

C. Installation – Pipe Supports for Vertical Piping

4. Vertical Pipe:

- a. Supports for all pipes shall fit directly around the pipe, except that on insulated pipes, the support shall be insulated and provided with vapor barrier.
- b. Support with wall brackets and base elbow or riser clamps on floor penetrations. Vertical pipes passing through floors shall be provided with a riser clamp at each floor. Riser clamps shall have steel lugs, 1/3-inch thick x 2-inches high x 1-1/2-inches long, welded to the clamp arms so that clamp does not come in contact with the pipe sleeve.

- D. Insulation Shields – Pipe Insulation Protective Shields and Saddles for Horizontal Piping: Minimum insulation shield requirements unless otherwise noted:
1. Pipes 2-inches and Smaller: 18 gauge x 12-inches long
 2. Pipes 2-1/2-inches and Larger: 16 gauge x 12-inches long
 3. Shields shall be 180 degree type at all pipe hangers, except that on trapeze hangers, pipe rack and on floor supported horizontal pipes shields shall be 360 degree type. Use foamglass inserts at all shields, hangers, sleeves, etc.
 4. Galvanized pipe clamps, including bolts and nuts, shall be provided with the framing channels and shall be used for securing pipes to channels. Pipe clamps on insulated pipes shall fit around pipe, pipe insulation and pipe insulation protection shield.

3.02 SURFACE PREPARATION AND SHOP PAINTING

Fabricated pipe supports and accessories, except where shown on the Drawings to be galvanized, shall be cleaned and shop primed.

3.04 CLEANING

Prior to acceptance of the work of this section, thoroughly clean all install materials, equipment and related areas.

END OF SECTION 15096

SECTION 15120
Pipe Insulation**PART 1 GENERAL****1.01 SCOPE**

- A. Furnish and install thermal insulation for as indicated below.

1.02 REFERENCES

- A. The latest edition of the testing standards indicated below shall be used as test procedures to verify compliance of submitted products with performance standards specified herein. Manufacturers of submitted products shall certify that materials furnished are as tested in accordance with these standards.

1. American Society for Testing and Materials (ASTM) Standards

ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

2. National Fire Protection Association (NFPA) Standards

NFPA 255 Method of Test of Surface Burning Characteristics of Building Materials

3. Underwriters Laboratories, (UL) Standards

UL 723 Test for Surface Burning Characteristics of Building Materials

1.03 QUALITY ASSURANCE

- A. Insulation products shall have a Flame Spread Rating not exceeding 25 and Smoke Developed Rating not exceeding 50.
- B. Insulation shall not emit volatile organic compounds or other noxious substances through “off gassing” or promote the growth of fungi or bacteria.
- C. Installation shall be performed by workers skilled in the fitting and installation of insulation products.

1.04 SUBMITTALS

- A. Submit product data
- B. Submit catalog cuts, performance data, sealing tape, mastic and all other information required to demonstrate compliance with the Contract Documents.
- C. Submit manufacturer’s installation instructions.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Insulation products shall be manufactured by Certain Teed, Knauf, Johns Manville, Owen-Corning, IMCOA, Pittsburgh-Corning and Armstrong.

2.02 PIPE INSULATION

- A. Materials (Indoor Piping for Temperatures 150° F and Below and up to 2-inches in Diameter or Refrigerant or Condensate Piping)
1. Piping insulation shall be flexible elastomeric closed-cell type, slipped on the pipe prior to connection whenever possible. Where the slip-on technique is not possible, the insulation shall be pre-slit and snapped over the pipe with pre-applied adhesive. Butt joints shall be sealed with insulation manufacturer's adhesive or heat fuse method. Where required, the insulation shall be covered with high quality interior enamel or latex enamel. Sealer shall be latex caulk. Thermal conductivity shall not exceed 0.27 BTU in/hr/Ft²/°F at 75 degrees F.
 2. Fittings shall be insulated using fabricated fitting covers of flexible elastomeric closed-cell type insulation in accordance with the manufacturer's instructions. Join slit seams and mitered joints with insulation manufacturer's adhesive or heat fuse method.
 3. Furnish PVC jacketing with solvent welded seams over insulation.
 4. Insulation products shall be equal to Armacell AP/Armaflex®SS.
- B. Materials (Outdoor Piping Exposed to Weather)
1. Premolded cellular glass thermal insulation shall be furnished in accordance with ASTM C 552 and C 1639 fabricated for standard pipe sizes, fittings and valves.
 2. Maximum thermal conductivity of 0.32 BTU in/hr/Ft²/°F at 75 degrees F in accordance with ASTM C 177 and C 518.
 3. Maximum water vapor permeability of 0.00 perm-in when tested in accordance with ASTM E 96.
 4. Average density of 8 pounds per cubic foot.
 5. Maximum Flame Spread Rating of 0 and Smoke-Developed Rating of 0 when tested in accordance with NFPA 255.
 6. Utilize installation adhesives and joint sealants as recommended by the insulation manufacturer.
 7. Furnish 30 gauge smooth Type 316 stainless steel jacketing over insulation retained by stainless steel bands on insulated pipes located outdoors.

8. Insulation products shall be equal to Pittsburgh Corning FOAMGLAS.

- C. Description: Piping insulation thickness shall be 1-inch for pipes up to 2-inches, 1-1/2-inches for pipes over 2-inches and up to 4-inches, and 2-inches for pipes over 4-inches.

2.03 EQUIPMENT INSULATION

- A. Equipment insulation shall be glass fiber board with factory applied foil-skrim-kraft vapor barrier. Thermal conductivity shall not exceed 0.23 BTU in/hr/Ft²/°F at 75 degrees F.
- B. Equipment carrying conditioned air located in mechanical rooms or other service areas shall be provided with 1-inch thick insulation of the type indicated below unless insulation has been factory-furnished by equipment manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Insulation shall be installed in accordance with the manufacturer's recommendations.
- B. Insulation butt joints shall be sealed with tape a minimum of 2-inches wide matching the character of the insulation vapor barrier.
- C. Insulation bonding must be by glue, self-adhesive lap or tape. Staples are not permitted. Mechanical fasteners shall only be located on the underside of ductwork three feet or greater in width. Seal all vapor barrier punctures.
- D. Surface to be insulated and insulation shall be clean and dry during installation.
- E. Duct liner shall be secured with adhesive, stick pins and clips.
- F. Insulation shall be continuous through wall or floor penetrations.

3.02 PIPE INSULATION

- A. Pipe hangers shall be outside of the pipe insulation.
- B. Install pipe insulation on exterior pipe below grade to a depth at least six inches below the frost line or 30 inches below grade, whichever is greater.
- C. Seal edges of pipe insulation with approved mastic to create a water and vapor proof seal.
- D. Insulate all services listed below.
 - 1. Potable and non-potable water piping.
 - 2. Tepid water piping to emergency fixtures.
 - 3. Refrigerant piping.
 - 4. Condensate piping from AHU.
- E. Insulate all piping, valves and fittings that are heat traced in addition to those services specified herein.
- F. Paint or identify insulation on services.

END SECTION 15120