Project Manual

Construction Documents

March 21, 2024

Alaska Court System
Boney Courthouse Generator Replacement

ACS Project Number: ANC-C-2024-0005

MCG EXPLORE DESIGN

RSA Engineering, Inc.
MECHANICAL AND ELECTRICAL CONSULTING ENGINEERS
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ANCHORAGE, ALASKA

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DIVISION 00

INVITATION TO BID
Alaska Court System

ISSUING OFFICE **ISSUE DATE: March 21, 2024**

Alaska Court System, Facilities Department
820 West 4th Avenue
Anchorage, Alaska 99501

Project No. ANC-C-24-0005

All questions shall be directed to the Facilities Project Manager: Eddie Hebert at (907) 264-8284 or via email at ehebert@**akcourts.gov**

PROJECT

Boney Courthouse Generator Replacement

Project site: Boney Courthouse, 303 K Street, Anchorage, AK 99501

Description and sequence of Work:	Remove existing generator, associated duct work, and electrical panels and associated wiring. Demolish portion of existing housekeeping pad. Provide and install new generator, associated duct work, and electrical panels and associated wiring. Set new generator on existing housekeeping pad to remain.
Required Performance Period And Notice to Proceed:	NOTICE to BIDDERS: This is a Multi-Step Sealed Bidding procurement**.** Priced bids are to be submitted at the same time as the unpriced technical offer. Priced bids and unpriced technical offers shall be submitted in a separate sealed envelope. This is a two-phase sealed bid procurement, and priced bids will be considered only in the second phase and only from those bidders whose unpriced technical offers are found acceptable in the first phase. In order to receive a Notice to Proceed with Work on this Contract, the successful Bidder must completely fill out and submit the documents as indicated in Section 00 1260. A Limited Notice to Proceed may be issued as determined by the Project Manager after Award and receipt of required documentation in order to procure long lead materials. Notice to Proceed with Work On-site will be given after the Progress Schedule has been approved, and, when Contractor has all materials on-hand, or, has materials scheduled for arrival to coordinate with the approved Progress Schedule. On-site Work required to commence no later than 04/01/2025. Substantial Completion required within 6 months of commencement of Work-on site. Contractor required to invoice the ACS prior to 010/01/2025 for all services rendered and for all materials purchased and being stored either on-site or in a local bonded and insured warehouse.

This Invitation to Bid is conducted under the provisions of the Alaska Court System Procurement Guidelines, adopted by the Administrative Director of the Alaska Court System effective September 25, 2013.

BID SUBMITTAL DEADLINE

DATE: April 11, 2024 **PREVAILING TIME: 2:00PM**

HAND DELIVER or MAIL SEALED BID TO:

Alaska Court System
Attn: Eddie Hebert
Project Manager
820 West 4th Avenue
Anchorage, Alaska 99501

Sealed Bids cannot be faxed or emailed. Bid **modifications only** may be faxed or emailed and will be accepted up to the time of bid. Faxed or emailed modifications must modify a sealed bid received by the Facilities Manager by the bid deadline. FAX number 907-264-8296 email address is ehebert@akcourts.gov. Bids will be opened publicly shortly after bid deadline.

PRE-BID MEETING – NOT MANDATORY

Pre-bid Meeting and Site Inspection will be on Monday, March 25, 2024 at 1:30pm

The pre-bid meeting will be conducted after which the project areas made available for inspection by bidders. All questions, concerns, or clarifications must be emailed to Eddie Hebert at ehebert@akcourts.gov

The cut-off date for contractor questions is 7 calendar days before the bid Date.

See Section 00110 Information Available to Bidders for additional information.

INDEX OF ATTACHMENTS TO THIS ITB

- Boney Courthouse Generator Replacement Bid Document Set- Drawings, Project Manual

END OF SECTION 00 0500

Boney Courthouse Generator Replacement
Project No. ANC-C-24-0005

Multi-Step Competitive Bid Process and Evaluation Criteria

The purpose of the multi-step bidding process is to ensure clear understanding of the project scope and address the need to continue to occupy the building during all phases of work. The Alaska Court System requires that the contractor provide a phasing plan that will address the need to relocate staff to other spaces in the facility, the timeframes for each disruption, and how the facility can remain operational during the construction phase.

Below you will find the criteria the Alaska Court System will use to grade proposals:

- Does the proposal address all required aspects of the project defined in SECTION 00 1000 INSTRUCTION TO BIDDERS and SECTION 001260 REQUIRED DOCUMENTS, and all other sections within Division I & II?
- Does the proposal provide a schedule?
    - Does the schedule include information about barge schedules and material shipping?
    - Does the schedule adhere to the one and a half year project timeline?
- Does the proposal address the need to keep the Court fully operational throughout the duration of construction?

Proposals will be evaluated using the grading criteria of acceptable, potentially acceptable, or unacceptable. Definitions below:

- Acceptable – The proposal addresses all technical aspects of the project as well as provides a favorable schedule and operational needs.
- Potentially Acceptable – The proposal addresses all technical aspects of the project as well as a schedule. The schedule may not fully address all of the needs of the staff to remain in this facility for the duration of the project i.e. staff may need to telework and/or move to another facility temporarily.
- Unacceptable – The proposal does not address all technical aspects of the project, does not provide a favorable schedule or ability to keep the court fully operational.

Proposals that are deemed acceptable will move forward to be evaluated by price.

Proposals that are deemed as potentially acceptable may move forward to be evaluated by price.

Proposals that are deemed unacceptable will not move forward to be evaluated by price.

SECTION 00 1000
INSTRUCTIONS TO BIDDERS

1. **MULTI-STEP SEALED BIDDING PROCESS.**

   a. This is a two-phase submittal. Unpriced Technical Offers and Priced Bids must be submitted in separate sealed packages. Priced bids are to be submitted at the same time as Technical Offers. Priced bids shall be submitted in a separate sealed envelope;

   b. In this is a two-phase sealed bid procurement priced bids will be considered only in the second phase and only from those bidders who's unpriced technical offers are found acceptable in the first phase;

2. **PROCEDURE FOR PHASE ONE, EVALUATION OF TECHNICAL OFFERS.**

   Evaluation of technical offers will be based solely on criteria set forth in the invitation to bid. The technical offers shall be categorized as,

   A. Acceptable;

   B. Potentially acceptable (that is, reasonably susceptible of being made);

   C. Unacceptable.

3. **PROCEDURE FOR PHASE TWO, OPENING OF PRICE BIDS.**

   A. Opening of priced bids submitted in phase one from bidders whose unpriced technical offers were found to be acceptable; or potentially acceptable.

   B. Phase two will be conducted as any other competitive sealed bid procurement.

4. **DEFINITIONS:** Throughout this Invitation to Bid (ITB) the term "bidder" and "bid" are utilized. For purposes of this ITB "bidder" is defined as the respondent to the ITB and "bid" is the response submitted by a respondent. Where the wording "day" is utilized in this Invitation to Bid, it is defined as a calendar day. Where "N/A" is used it is defined as Not Applicable to this project.

5. **THIS PROCUREMENT IS GOVERNED:** This Invitation to Bid is governed by the Alaska Court System Procurement Guidelines, adopted by the administrative director of the Alaska Court System effective September 25, 2013. Copies of the Procurement Guidelines are available without charge from the Anchorage Court System, Procurement Office, 820 4th Ave, Anchorage, Alaska 99501, telephone 907-264-8238.

6. **AVAILABILITY OF CONTRACT DOCUMENTS:** Contract Documents are available in electronic format from the State of Alaska, Online Public Notice website or from Eddie Hebert, Project Manager at ehebert@akcourts.gov.

7. **CANCELLATION OF INVITATION:** An ITB may be canceled before opening in whole or in part when the Project Manager determines in writing that such action is in the best interest of the court system.

8. **COMPLETENESS OF CONTRACT DOCUMENTS:** The submission of a bid is considered a representation that the Bidder has examined the Contract Documents to make certain that all sheets and pages were provided, that the Bidder has examined the Project site, and that the

Bidder is satisfied as to the conditions to be encountered in performing the Work. The Alaska Court System expressly denies any responsibility or liability for a bid submitted on the basis of an incomplete set of Contract Documents.

9. **INCLUSION IN PLANHOLDER'S LIST:** It is the responsibility of the bidder to ensure that the bidder's firm is placed on the Plan Holder's List by submitting accurate contact information to Eddie Hebert, Project Manager at ehebert@akcourts.gov. Addenda, notices, and other information regarding the bidding of this project will **only** be sent to the State of Alaska Online Public Notices site and to those firms on the Plan Holder's List as updated by Brian Roberts for this project.

10. **TIMELINESS OF SUBMITTAL:** It is the responsibility of the bidder to ensure that the bid is received by the Facilities Department before scheduled bid opening time. **Late bids, including bids mis-delivered to other Alaska Court System divisions, will not be accepted**.

Sealed Bids cannot be faxed or emailed. Emailed or Faxed bid **modifications only** will be accepted providing that the fax or email is received by the Project Manager by the bid deadline and that the modification amends a bid which was received before the bid deadline. The Fax number is 907-264-8296 and the email address of the Project Manager is: ehebert@akcourts.gov.

11. **RESPONSIVENESS OF BIDS:** Minor informalities are matters of form rather than substance, or insignificant mistakes that can be waived or corrected without prejudice to other bidders; that is, the effect on price, quantity, quality, delivery, or contractual conditions is negligible. The fiscal office shall waive in writing these informalities or allow a bidder to correct them depending on which is in the best interest of the Alaska Court System.

12. **REJECTION OF BIDS:** The Alaska Court System may reject any and all bids. A bid may be rejected if it does not conform in all material respects to the requirements of the invitation, if it is incomplete, if it contains a material alteration from the invitation, or if the bidder changes or qualifies the terms or conditions of the invitation in a material manner which gives the bidder a competitive advantage over other bidders.

13. **DOCUMENTS REQUIRED FOR BID:** Bidders must submit the following documents, properly completed and executed, within a sealed bid envelope, no later than the time of the bid opening. Bid documents must be submitted to the location listed in the RFP in a sealed envelope with the project name, project number and bid opening date and time marked on the front of the envelope. **Bids not including all of the items noted below in A, B, C (if applicable), D, and E will be rejected.**

A. The Bid Schedule and acknowledgment of any addenda that may be issued. (Bids may be submitted on photocopied forms.) **Bid Schedule must be fully completed, including bid amounts for Basic Bid, all Alternate Bids listed, and other required information.**

B. Current Alaska Business License Number and date of expiration as noted on Bid Schedule. Business license must be listed as current on the state website at the time the bid is submitted, or bidder must include a photocopy of valid Alaska Business License Application under AS.43.70.

C. Preferences: **To claim one or more of the preferences listed in Paragraph 11 below, a Contractor must provide documentation for proof and for calculation of the preferences. Reference "Bidder Preference Checklist" at the end of this section**. Preferences include Alaska Bidders, Alaskans with Disability, Employment Program, Alaska Veteran, Alaska Products, and Recycled Products or Paper.

D. Bid Security: The Alaska Court System requires bid security in the form of a bid bond or a deposit for all bids which have a total amount, including Base Bids and all Alternate Bids, of $100,000 or more. The bid security must be in the amount of 5% of the total bid amount and must accompany the bid. A bid bond must have this amount stated as the penal sum of the bond. A bid bond must be issued by a surety company licensed to do business in the State of Alaska. A deposit must be in the form of a certified check or similar instrument made payable to the State of Alaska - Alaska Court System. The bid security will be held until a firm contract is executed. If the successful bidder fails to enter into a contract, its bid security shall be forfeited to the Alaska Court System. After final award of contract, all bid security will be returned to the unsuccessful bidders. By submission of a bid security and signature on the bid form, the successful bidder and its surety acknowledge and agree to the conditions of this Invitation to Bid in its entirety.

E. Photocopy of Bidder's Contractor Registration under AS.08.18

14. **PREFERENCES:** Check the box on the Bid Schedule that indicates whether the bidder is eligible for any of the following Preferences. The ACS will calculate the application of preferences.

A. **ALASKA PREFERENCE**: A bid shall be awarded to an Alaska bidder whose bid is not more than five percent (5%) higher than the lowest non-resident's bid in accordance with Alaska Statute 36.30.170(b)(1) - (5). An Alaska bidder is defined as one who:

1) Holds a current Alaska business license (business license number must be shown in space provided on the bid schedule);

2) Submits a bid for goods or services under the name appearing on the current Alaska business license;

3) Has maintained a place of business in the State **staffed by the bidder or an employee of the bidder** for a period of six months immediately preceding the date of the bid;

4) Is incorporated or qualified to do business under the laws of the State, is a sole proprietorship and the proprietor is a resident of the State, or is a partnership and all partners are residents of the State; and

5) If a joint venture, is comprised entirely of ventures that qualify under paragraphs 1 through 4 of the sub-section.

NOTE: A bidder may receive the preferences below, provided the bidder supplies documentation showing entitlement to the preferences. Only one of the following preferences B or C, below, may be used and the individual or business claiming the preference **must be listed with the Division of Vocational Rehabilitation as qualified under Alaska Statute 36.30.170 at the time the bid is opened and must provide ACS with a copy of its Certification Letter.** The Department of Labor & Workforce Development, Division of Vocational Rehabilitation maintains a listing of vendors who qualify for the three disability related preferences. For disability preference certification, please contact Department of Labor & Workforce Development, Division of Vocational Rehabilitation, 801 West 10th Street, Suite A, Juneau, Alaska 99801-1894. Phone: (907) 465-2814. Fax: (907) 465-2856. http://www.labor.state.ak.us/dvr/home.htm. A bidder claiming a preference under B, C, or D, below must add value by actually performing, controlling, managing, and supervising the services provided.

B. **ALASKANS WITH DISABILITIES PREFERENCE:** A bid shall be awarded to an Alaska bidder whose bid is not more than ten percent (10%) higher than the lowest bid, if the bidder is a qualifying entity under 36.30.170(e).

C. **EMPLOYMENT PROGRAM PREFERENCE:** A bid shall be awarded to an Alaskan bidder whose bid is not more than fifteen percent (15%) higher than the lowest bid, if the bidder is offering services through an employment program in accordance with Alaska Statute 36.30.170(c).

D. **ALASKA VETERAN PREFERENCE.** A bid shall be awarded to a bidder whose bid is not more than five percent (5%) (not to exceed $5,000) higher than the lowest bid if the bidder qualifies as an Alaska Veteran in accordance with Alaska Statute 36.30.321(f).

E. **ALASKA PRODUCTS PREFERENCE**: For bid comparison purposes, ACS will decrease the bid by the percentage of the value of the designated Alaska products under AS 36.30.332 through AS 36-30-338. The bidder must execute the Alaska Products Preference Worksheet and submit the worksheet with the bid in order to receive this preference. A list of qualified Alaskan products may be obtained from the State of Alaska Department of Commerce and Economic Development, Division of Community and Business Developments or may be on line at the website located at https://www.commerce.alaska.gov/web/dcra/AlaskaProductPreferenceProgram.aspx An Alaska Products Preference Worksheet can be obtained from the Facilities Project Office by calling 264-8282 or 264-8283.

F. **RECYCLED PRODUCTS PREFERENCE:** Not Applicable.

15. **BID PREPARATION:** Except as provided in Procurement Guideline 4-401.03.8, the Alaska Court System shall not be liable for any costs incurred by the bidders in bid preparation.

16. **BID OFFERS:**

A. Offers made in response to this Invitation to Bid shall be good and firm for a period of sixty (60) days from the date of bid opening.

B. All offers and acceptance resulting from this Invitation to Bid shall be expressly limited to the terms and conditions contained in this document and its attachments.

17. **BID OPENING:** Received bids will be opened and read by Alaska Court System. After evaluation of offers, the successful bidder will be notified by a Notice of Intent to Award, published on the State of Alaska Online Public Notice website of the project RFP page.

18. **BID AWARD:** The bid award will be made to the lowest responsible and responsive bidder whose bid conforms in all material respects to the requirements and criteria set out in this Invitation to Bid. The sum of the Basic Bid plus any Alternates Bids awarded governs for purpose of determining low bidder.

A. If Bid Alternates are included in the Bid Documents, the Alaska Court System reserves the right to award some, none, or all of the alternates. Alternates may be awarded in any order in the best interest of the Alaska Court System. Bid amounts for alternates not awarded with this contract shall be held for 60 days from date of contract and may be awarded within that time as a fixed price Change Order.

B. Notice of Intent to Award will be issued to the lowest responsible and responsive Bidder generally within 2 working days after Bid Opening.

C. Notice of Award will be issued to the Bidder identified in the Notice of Intent to Award. If the Award amount is over $200,000.00, the Notice of Award will not be issued until at least ten calendar days after issuance of Notice of Intent to Award. Notice of Award will be made subject to availability of funds and its issuance may be delayed or canceled as

determined by the Project Manager in accordance with Alaska Court System Procurement Guidelines.

19. **RESPONSIBILITY REQUIREMENT:** A bid will be awarded only to a responsible bidder, who demonstrates the capability in all respects to perform fully the contract requirements and has the integrity and reliability which will assure good faith performance. In accordance with section 2-211 of the Alaska Court System Procurement Guidelines a bidder may be declared non-responsible and the bid will then be rejected when:

    A. The bidder is in arrears on taxes due the State.

    B. The bidder has failed to perform satisfactorily on a previous contract with the Alaska Court System, another state agency, or is not in a position to perform this contract;

    See ACS Procurement Guidelines Section 2-213 for responsibility criteria. A determination by the Facilities Manager that a bidder is not responsible may be protested.

20. **BID PROTESTS**: Bidders are requested to carefully review this entire Invitation To Bid as soon as it is received for defects and questionable or objectionable content. A person desiring to protest the provisions of this RFP or the award must comply with the applicable provisions of ACS Procurement Guideline 4-401. If a protest is sustained in whole or in part, the protestor's sole remedy is the successful protestor's documented reasonable bid or proposal preparation costs.

21. **EEO AND FEDERAL CIVIL RIGHTS COMPLIANCE:** By signature on the Bid Schedule, Section 00300 the bidder certifies compliance with the applicable portions of the Federal Civil Rights Act of 1964 and the Equal Employment Opportunity Act and the regulations issued there under by the State and Federal Government. If any bidder fails to comply with the Act or Regulations issued there under, the Alaska Court System reserves the right to terminate the contract.

22. **TAXES:** All bids shall exclude federal, state and local sales taxes. However, if the bidder believes that certain taxes are properly payable by the Alaska Court System; such taxes may be listed separately, directly below the bid price for the affected item. The Alaska Court System is exempt from federal excise tax under Registration No. 92-6001185.

23. **SUBCONTRACTORS:** Within 3 working days after the issuance of the Notice of Intent to Award, the apparent low bidder shall submit a list of the subcontractors the bidder proposes to use in the performance of the Contract. The list must include the name and location of the place of business for each subcontractor and evidence of the subcontractor's valid Alaska business license. A bidder for a construction contract shall submit evidence of each subcontractor's registrations under AS 08.08. Replacement of a subcontractor may be made with prior approval of the Contracting Officer, for reasons specified in the Alaska Court System Procurement Guidelines.

24. **ALASKA DAVIS BACON ACT:** Prospective Bidders are advised that construction or remodeling in connection with the contract is subject to AS 36. The Contractor must comply with the requirements noted within the most recent Department of Labor pamphlet entitled, "Laborer's and Mechanic's Minimum Rates of Pay," found at: http://www.labor.state.ak.us/lss/pamp600.htm The rate of wages shall be adjusted to the wage rate under AS 36.05.010.

25. **ACCEPTANCE OF CONTRACT, PERFORMANCE BOND, PAYMENT BOND, and PROOF OF INSURANCE:** If the ACS delivers or mails written notice of Intent to Award the contract to the Bidder within sixty (60) days after the date set for the opening of this bid, or at any other time thereafter before it is withdrawn, and the amount of the contract to be awarded exceeds $100,000, the Bidder will accept, execute and deliver the Contract to the ACS in accordance with the bid, and will also furnish and deliver to the ACS the performance bond, payment bond, and proof of insurance coverage, all within three working days after personal delivery or after deposit

in the mails of the notification of acceptance of this bid. The performance bond and payment bond must be substantially in the forms provided with this RFP.

BIDDER PREFERENCE CHECKLIST

Following is a list of items a bidder must submit in order to qualify for the preferences listed in Paragraph 11, above:

A. Alaska Bidder Preference:

☐ For each business entity other than a sole proprietorship, provide documentation showing that the bidder has maintained a place of business in the State staffed by the bidder or an employee of the bidder for a period of six months immediately preceding the date of the bid.

B. Alaskans with Disabilities Preference:

☐ In addition to the requirements for Alaska Bidder Preference, provide documentation showing that the bidder is listed as an approved "Qualifying Entity" on the most recent Procurement Preference Approved List issued by the Alaska Division of Vocational Rehabilitation.

C. Employment Program Preference:

☐ In addition to the requirements for Alaska Bidder Preference, provide documentation showing that the bidder is listed as an approved "Employment Program" on the most recent Procurement Preference Approved List issued by the Alaska Division of Vocational Rehabilitation.

D. Alaska Veteran Preference:

☐ Provide completed Alaska Veteran's Preference Affidavit.

E. Alaska Products Preference:

☐ Provide completed Alaska Products Preference Worksheet

☐ Provide documentation showing that the Alaska Products proposed are listed as qualified Alaska products.

F. Alaska Recycled Products Preference: Not Applicable.

END OF SECTION 00 1000

SECTION 00 1100
INFORMATION AVAILABLE TO BIDDERS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Before submitting a Bid, Bidders shall carefully examine the plans and specifications, and drawings as listed in the Information Available to Bidders and inspect the project site to fully inform themselves of all existing conditions and limitations. Each Bidder, by submitting a Bid, represents that it has so examined the plans and specifications, and the Information Available to Bidders, and inspected the site, that it understands the provisions of the plans and specifications, and that it has become familiar with the local conditions under which the work is to be performed. Bidders will not be given extra payment or contract time for conditions which were reasonably discoverable by such examinations. Further, the Bidder acknowledges by submitting its bid, that the Bidder has had sufficient opportunity to review the plans and specifications, and the Information Available to Bidders, to attend a pre-bid conference, and to obtain the advice of lawyers, accountants and other professional advisors regarding the Bidding Documents and to seek interpretation or correction. Therefore, the general principle that ambiguities in contract documents shall be construed against the drafter shall not apply to the Bidding documents or the contract.

B. The following information is available for hard copy review in Anchorage at the Alaska Court System Facilities Office, 420 W. 4th Ave. To schedule a review time call Eddie Hebert, Project Manager at ehebert@akcourts.gov.

1.2 SITE VISIT

A. A site visit will be conducted on the date of the Pre-Bid meeting.

PART 2 – PRODUCTS Not used.

PART 3 – EXECUTION Not used.

END OF SECTION 00 1100

SECTION 00 1260
REQUIRED DOCUMENTS

PART 1 – GENERAL

1.1 RELATED SECTIONS

A. General and Supplementary Conditions

B. Instruction to Bidders and Bid Schedule

C. Bid Bond, Performance Bond, Payment Bond, and Agreement Between Owner and Contractor

1.2 REQUIRED FOR BID

A. Bids will not be considered responsive if the following documents are not completely filled out and submitted at the time of Bidding. Bids with minor irregularities will be considered responsive and accepted if the Project Manager determines that acceptance is in the best interest of the court system.

1. Section 00 3000 Bid Schedule
   (Bidder must sign and acknowledge addenda issued.)
2. Photocopy of valid Alaska Business License Application if Business License is not current.
   (Section 00 1000 Instructions to Bidders)
3. Documentation required for any Preferences claimed
   (Section 00 1000 Instructions to Bidders)
4. Section 00 4100 - Bid Bond
   (Section 00 1000 Instructions to Bidders)
5. Photocopy of Contractor's Registration
   (Section 00 1000 Instructions to Bidders)

1.3 REQUIRED FOR NOTICE OF AWARD

A. In order to receive a Notice of Award on this Contract, the Contractor determined to be the lowest responsible and responsive Bidder must completely fill out and submit the following documents within the time specified below:

1. Subcontractor List: Three (3) working days after Notice of Intent to Award.
   (Section 00 1000)
2. Contractor's Questionnaire: Three (3) working days after Notice of Intent to Award. (Section 00 1270)

B. A **Notice of Intent to Award** is issued to the lowest apparent responsible and responsive Bidder generally within two (2) working days after Bid Opening. In compliance with Alaska Court System Procurement Guidelines, if the Award

amount is over $200,000.00, a **Notice of Award** cannot be issued until at least ten (10) calendar days after issuance of Notice of Intent to Award.

1.4 REQUIRED FOR NOTICE TO PROCEED

A. The successful Bidder is required completely fill out and submit the following documents within the time specified below.

1.	Signed Agreement Between Owner and Contractor: (Section 00 5100)	7 days after Notice of Award (submittal deadline as specified in Section 00300)
2.	Performance Bond: (Section 00 6100)	7 days after Notice of Award (submittal deadline as specified in Section 00300)
3.	Payment Bond: (Section 00 6200)	7 days after Notice of Award (submittal deadline as specified in Section 00300)
4.	Certificate of Insurance: (Section 00 7000)	7 days after Notice of Award (submittal deadline as specified in Section 00300)
5.	Preliminary Progress Schedule: (Section 01 3000)	14 days after Notice of Award (submittal deadline as specified in Section 01310)
6.	Schedule of Values: (Section 01 0270)	With Preliminary Progress Schedule (submittal deadline as specified in Section 01027)

B. A Limited Notice to Proceed may be issued as determined appropriate by the Project Manager. Such Notice to Proceed may be limited to procurement and fabrication of long lead materials and other off-site work prior to a full Notice to Proceed with on-Site construction activities.

C. Note: All Submittals are required within 3 weeks of Notice of Award. See Section 01 3000.

PART 2 – PRODUCTS - Not used.

PART 3 – EXECUTION - Not used.

END OF SECTION 00 1260

SECTION 00 1270
CONTRACTOR'S QUESTIONNAIRE

Project Number: ANC-C-24-0005
Project Name: Boney Courthouse Generator Replacement

Completely fill out and submit to the Alaska Court System within 3 days from receipt of the Notice of Intent to Award.

A. FINANCIAL

1. Have you ever failed to complete a contract? Yes _____ No _____ If yes, explain:

_____

_____

2. Describe any arrangements you have made to finance the work referenced in this submission.

3. _____

_____

4. What percent of the total value of this contract do you intend to subcontract?

_____

_____

5. Do you propose to purchase any equipment for use on this project?
Yes ____ No ____ If yes, describe type, quantity, and approximate cost:

_____

_____

6. Do you propose to rent any equipment for this work?
Yes ____ No ____ If yes, describe type and quantity:

_____

_____

6. Is your proposal based on firm offers for all materials necessary for this project?
Yes ____ No ____ If no, please explain:

B. EXPERIENCE

1. Have you had previous construction contracts or subcontracts with the State of Alaska? Yes _____ No ____ Describe the most recent contract similar in size and scope to this project. List project title, owner, and contract amount.

2. List, as an attachment to this questionnaire, other construction projects you have completed; the dates of completion; scope of work; and total contract amount for each project completed in the past 12 months.

I hereby certify that the above statements are true and complete.

Name of Contractor

Signature

Date

Name and Title of Person Signing

END OF SECTION 00 1270

SECTION 00 3000
BID SCHEDULE

1. TO ALASKA COURT SYSTEM:

   In compliance with the Invitation for Bid and the proposed Contract Documents issued March 21, 2024, the Undersigned proposes to enter into an agreement with ALASKA COURT SYSTEM in the form included in the Contract Documents to furnish and deliver all the materials and do all the Work and Labor required in the construction of:

   Boney Courthouse Generator Replacement
   Project #ANC-C-24-0005

   Project Location: Boney Courthouse, 303 K Street, Anchorage, AK 99501

   The Undersigned, having become thoroughly familiar with the terms and conditions of the proposed Contract Documents and with local conditions affecting the performance and costs of the Work at the place where the Work is to be completed, and having fully inspected the site, hereby proposes and agrees to perform the Work within the time stated and in strict accordance with the proposed Contract Documents, including furnishing all labor and materials to do all the work required to construct and complete said Work in accordance with the Contract Documents.

2. If discrepancies are found between the amount written numerically and the amount written in words, the amount written in words shall govern.

3. Contract award shall be made on the basis of the total Base Bid plus additive alternates as selected by the Alaska Court System. If Bid Alternates are included in the Bid Documents, the Alaska Court System reserves the right to award some, none, or all of the alternates. Alternates may be awarded in any order in the best interest of the Alaska Court System.

4. Addenda may be mailed, faxed, e-mailed or otherwise delivered. All Addenda issued during the time of bidding shall form part of the Contract Documents, shall be covered in the Bid, and shall become part of the Contract. Receipt of each Addendum shall be acknowledged in the Bid Form; failure to do so may subject the Bidder to disqualification. It shall be the Bidders responsibility to ensure that it has received all Addenda prior to bid. The Owner shall not be responsible for non-receipt or untimely receipt of Addenda due to acts or omissions of the delivering agency or any other source.

5. The Bidder acknowledges receipt of the following addenda to the DRAWINGS and/or SPECIFICATIONS (give number and date of each) and that associated costs are included in this bid.

Addenda #, Date Issued	Addenda #, Date Issued	Addenda #, Date Issued
_____	_____	_____
_____	_____	_____

   No other alternates or substitutions allowed on this Bid Form.

6. Bidder has included bid security and agrees to abide by Instructions to Bidders for disposition of bid security.

7. The Bidder understands that the OWNER reserves the right to reject this bid, but that this bid shall remain open and not be withdrawn for a period of sixty (60) days from the date prescribed for its opening.

8. If written Notice of Intent to Award the contract to the Bidder is mailed or delivered to the Bidder within sixty (60) days after the date set for the opening of this bid, or at any other time thereafter before it is withdrawn, the Bidder will accept, execute and deliver the Contract to the OWNER in accordance with this bid, and will also furnish and deliver to the OWNER the Performance Bond, Labor and Material Payment Bond, and proof of insurance coverage, all within fifteen (15) days after personal delivery or after deposit in the mails of the Notice of Award of this bid. In addition, the Bidder will furnish all other documentation according to the schedule.

9. Notice of Award, or request for additional information, may be addressed to the Bidder at the address set forth below.

10. Bidder Identification: The legal name of the bid entity and names of all persons interested in the foregoing bid as principals are:

_____

_____

_____

(IMPORTANT NOTICE: If the bidder is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder is an individual, give first and last names in full.)

11. Non-Collusion Affidavit: The undersigned Bidder declares, under penalty of perjury under the laws of the United States, that neither he nor the firm, association, or corporation of which he is a member, has, either directly or indirectly, entered into any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this bid.

12. HUMAN TRAFFICKING: By signature on this bid, the bidder certifies that the bidder is not established and headquartered or incorporated and headquartered in a country recognized as Tier 3 in the most recent United States Department of State's Trafficking in Persons Report. The most recent United States Department of State's Trafficking in Persons Report can be found at the following website: https://www.state.gov/trafficking-in-persons-report/ Failure to comply with this requirement will cause the state to reject the bid as non-responsive, or cancel the contract.

13. Bidder acknowledges that this Bid is being submitted with Bidder's facsimile signature. Bidder agrees that the Alaska Court System is relying upon this facsimile signature as if it were an original signature, and by submitting this Bid, Bidder waives any right to disclaim this Bid based upon the fact that the signature is not original.

BASE BID:

Furnish all labor, materials, equipment, etc., necessary to complete all work shown and specified:

Base Bid $ _____
(figures)

_____ **Dollars**
(words)

Ad. Alt #1 _____
(figures)

_____ **Dollars**
(words)

ALASKA BIDDERS' PREFERENCE:

Check Preference or Preferences if applicable – Reference Section 00100 Instructions to Bidders and attach required proof and documentation:

☐ Alaska Bidder Preference
☐ Alaskan Bidder with Disabilities
☐ Disabled Alaskan Employment Program
☐ Alaska Veteran's Preference
☐ Alaska Products

The undersigned has read the foregoing Bid Schedule and hereby agrees to the conditions stated therein by affixing his signature below:

SIGN HERE:

_____
Authorized Signature of Bidder Date

_____
Bidder Typed or Printed Name of Signer & Title

_____
Bidding Firm

(NOTE: If bidder is a corporation, set forth the legal name of the corporation together with the signature of the officer and officers authorized to sign contracts on behalf of the corporation. If bidder is a partnership, set forth the name of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.)

Business Address: _____

(Seal, if by Corporation)

Telephone Number:

Fax Number:

E-Mail Address:

Expires:

Alaska Contractor's Registration Number

Expires:

Alaska Business License Number

Federal Identification Number

END OF SECTION 00 3000

SECTION 00 4100
BID BOND

KNOW ALL MEN BY THESE PRESENTS: Date Bond Executed: _____

That _____ of _____ as principal,

and _____ of _____ as surety,

in the penal sum of _____ Dollars ($_____).

Date of bid: _____

We, the PRINCIPAL and SURETY above named, are held and firmly bound to the State of Alaska Court System (State of Alaska), in the penal sum of the amount stated above, for the payment of which sum will and truly be made, we bind ourselves and our legal representatives and successors, jointly and severally, firmly by this instrument.

THE CONDITION OF THE FOREGOING OBLIGATION is that the principal has submitted the accompanying bid or proposal in writing, date as shown above, on **Boney Courthouse Generator Replacement, #ANC-C-24-0005.**

In accordance with plans and specifications filed in the Alaska Court System Project Office and under the Invitation for Bids therefore and is required to furnish a bond in the amount stated above.

If Principal's bid is accepted and he is offered the proposed contract for award, and if Principal fails to enter into the contract, then the obligation to the Alaska Court System created by this bond shall be in full force and effect.

In presence of:

WITNESS		INDIVIDUAL PRINCIPAL	
1. _____	as to	_____	(SEAL)
2. _____	as to	_____	(SEAL)
3. _____	as to	_____	(SEAL)
4. _____	as to	_____	(SEAL)

Attest:

CORPORATE PRINCIPAL: _____

BUSINESS ADDRESS: _____

Affix Corporate Seal

BY: _____

NAME & TITLE: _____

CORPORATE SURETY: _____ Attest:

BUSINESS ADDRESS: _____

Affix Corporate Seal

BY: _____

NAME & TITLE: _____

State of Alaska Court System

END OF SECTION 00 4100

SECTION 00 5100
AGREEMENT BETWEEN OWNER AND CONTRACTOR

Date of Contract: _____

THIS AGREEMENT made by and between: **ALASKA COURT SYSTEM**, (hereinafter called "Owner") and

_____ (hereinafter called "Contractor").

The Owner and the Contractor agree as set forth below:

Article 1. Work

The Contractor shall perform all the Work required by the Contract Documents for the following project:

Boney Courthouse Generator Replacement
ANC-C-24-0005

It is agreed that for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Owner or its assignee, the Contractor hereby agrees with the Owner to commence and complete the construction described as follows:
Supply and installation of the entire Work as contained in the RFP issued February 00, 2024 (hereinafter called the "Work"), at a cost not to exceed the proposed price and to furnish all the materials, supplies, machinery, equipment, superintendents, labor, insurance and other accessories and services necessary to complete said Work in accordance with the conditions stated in the Contract Documents.

Article 2. Time of Commencement and Completion

Contractor hereby agrees to commence Work under this Agreement on a date to be specified in a written "Notice of Proceed" from the Owner and to complete the Work within the time stated in the Supplemental Conditions.

Article 3. Architect/Engineer

The Architect/Engineer for this project is: MCG Explore Design, LLC

Article 4. Contract Sum

The Owner shall pay the Contractor under provisions of the Contract Documents for the performance of the Work, subject to additions and deductions by change order as provided in the Contract Conditions, the Contract
Sum of _____, for Base Bid (and Additive and Deductive Alternates Awarded) Lump Sum Amounts. The attached bid sheets form an integral part of this Agreement.

Article 5. Contract Documents

5.1 The Contract Documents consist of this Agreement and documents listed hereinafter, (hereinafter called "Contract Documents"), and all are incorporated herein by reference and as fully a part of the Contract as if attached to this Agreement or repeated herein:
General Requirements
General Conditions

Supplementary Conditions
Laborers' and Mechanics' Minimum Rates of Pay
Technical Specifications
Technical Drawings
Contents of Addenda
Contractor's Bid Schedule
Notice of Award
Notice to Proceed

This Agreement and all covenants hereof shall insure to the benefit of and be binding upon the Owner and the Contractor, respectively, and their partners, successors, assigns and legal representatives.

Article 6. Progress and Final Payments

6.1 Payment shall be made to the Contractor by the Owner, or his assigns, based upon amount of the approved Contractor's estimate of Work completed and value of materials suitably stored on site up to date of application for payment less any retainage required by the Owner in accordance with General Conditions Article 13.

6.2 Final payment, constituting the final unpaid balance of the contract sum including retainage, shall be paid by the Owner or his assigns to the Contractor. Final payment shall be due to the Contractor in accordance with General Conditions Article 13.

Article 7. Miscellaneous

7.1 Any notice of communication which either party desires to give the other party which affects the contract sum of this Agreement shall be given in writing and either shall be personally delivered to the other party's representative or deposited in the United States mail as registered mail with all postage prepared and if given by the Contractor to the Owner, then addressed as follows:

Name:	Eddie Hebert, Project Manager	
Agency:	Alaska Court System	
Address:	820 West 4th Avenue	
City, State, Zip:	Anchorage, AK 99501	Email: ehebert@akcourts.gov
Phone:	907-264-8284	

If given by the Owner to the Contractor, then addressed as follows (including telephone number on the last line:

Name:	
Business:	
Address:	
City, State, Zip:	Email Address:
Phone:	

7.2 The Owner shall furnish to the Contractor 3 sets of drawings and 3 sets of specifications, at no extra cost, for use in the Construction of the Work. The Contractor may obtain additional sets of drawings or specifications by paying the Owner for the costs of reproduction, handling and mailing.

7.3 The Contractor shall perform at least ten percent of the total Work with forces that are in the direct employment of the Contractor's organization.

In WITNESS WHEREOF, the parties have made and executed this Agreement to be effective the day and year first above written.

ALASKA COURT SYSTEM, Owner	Contractor
By:	By:
Title: Contracting Officer	Title: _____

END OF SECTION 00 5100

SECTION 00 6100
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____ as principal

and _____ of _____ as surety, firmly bound and held unto the State of Alaska Court System (State of Alaska) in the penal sum of

_____ Dollars ($_____), good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the Alaska Court System, we bind ourselves, our heirs, successors, executors, administrators and assigns jointly and severally, firmly by these presents.

WHEREAS, the said principal has entered into written contract with said State of Alaska, on the _____day of _____ A.D., 20____, for the **Boney Courthouse Generator Replacement, Project ANC-C-24-0005**, said work to be done according to the terms of said contract.

NOW THEREFORE, the condition of the foregoing obligation is such that if the said principal shall well and truly perform and complete all obligations and work under said contract and shall indemnify and save harmless the State of Alaska, the Alaska Court System and employees thereof against any damages or loss which they or any of them may suffer or for which they or any of them become liable by the default, neglect, or carelessness on the part of said principal, his agents, servants or employees, in the performance of said Contract, and if the Principal shall reimburse upon demand of the Alaska Court System any sums paid to him which exceed the final payment determined to be due upon completion of the project, then these presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____, Alaska, this

_____ day of _____, A.D., 20____.

Principal: _____

By: _____

By: _____

Surety: _____

By: _____

By: _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

_____ _____

DATE CONTRACTING OFFICER
Alaska Court System

END OF SECTION 00 6100

SECTION 00 6200
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____ as principal,

and _____ of _____ as surety,

in the penal sum of _____ Dollars ($ ___).

good and lawful money of the United States of America for the payment whereof, well and truly to be paid to the State of Alaska Court System, we bind ourselves, our heirs successors, executors, administrators, and assigns jointly and severally, firmly by these presents.

WHEREAS, the said principal has entered into written contract with said State of Alaska Court System, on the ____ of _____ A.D., 20 _____, for the **Boney Courthouse Generator Replacement, Project Number #ANC-C-24-0005** said work to be done according to the terms of said contract.

NOW, THEREFORE, the condition of the foregoing obligation is such that if the said principal shall comply with all requirements of law and pay, as they become due, all just claims for labor performed and materials and supplies furnished upon or for the work under said contract, whether said labor be performed and said materials and supplies be furnished under the original contract, any subcontract, or any and all duly authorized modifications thereto, and shall indemnify and save harmless the State of Alaska, the Alaska Court System and employees thereof against any damages or loss which they or any of them may suffer or for which they or any of them become liable by the default of said principal, or by any neglect or carelessness on the part of said principal, his agents, servants or employees, then these presents shall become null and void; otherwise they shall remain in full force and effect.

IN WITNESS WHEREOF, we have hereunto set our hands and seals at _____ Alaska,

this _____ day of _____, A.D., 20 _____.

Principal:_____

By: _____

By: _____

Surety: _____

By: _____

By: _____

The offered bond has been checked for adequacy under the applicable statutes and regulations:

_____ _____

DATE CONTRACTING OFFICER
Alaska Court System

END OF SECTION 00 6200

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SECTION 00 7001
ALASKA COURT SYSTEM
GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1 - DEFINITIONS

Wherever in the Contract Documents the following terms, or pronouns in place of them, are used, the intent and meaning, unless a different intent or meaning is clearly indicated, shall be interpreted as set forth below.

The titles and headings of the Sections, Subsections and Articles herein are intended for convenience of reference and shall not be considered as having bearing on their interpretation.

Whenever used in the Specifications or other Contract Documents the following terms have the meaning indicated and are applicable to both the singular and plural thereof. Working titles that have a masculine gender are intended to refer to persons of either sex.

Terms not defined below shall have their ordinary accepted meanings within the context that they are used. "Webster's Third New International Dictionary of the English Language, Unabridged, Copyright 1961", or subsequent revision thereof; shall provide ordinarily accepted meanings. Words that have a well-known technical or trade meaning when used to describe work, materials or equipment shall be interpreted in accordance with such meaning. Words defined in Article 1 are capitalized throughout these General Conditions.

Addenda - All clarifications, corrections, or changes issued graphically or in writing by the OWNER after the Advertisement but prior to the opening of Proposals.

Advertisement - The public announcement, as required by law, inviting bids for Work to be performed or materials to be Furnished.

Approved or Approval - Means written approval by the Contracting Officer or his authorized representative as defined in Article 2.1.

ARCHITECT OR ARCHITECT/ENGINEER - Person or entity representing the OWNER within specified limits of authority. Any reference to the ARCHITECT/ENGINEER shall mean Project Manager.

AS - Initials which stand for Alaska Statute.

Award - The acceptance, by the OWNER, of the successful bid.

Bid Bond - A type of Proposal Guaranty.

Bidder - Any individual, firm, corporation or any acceptable combination thereof, or joint venture submitting a bid for the advertised Work.

Calendar Day - Every day shown on the calendar, beginning and ending at midnight.

Change Order - A written order by the OWNER authorizing changes to the Contract Documents, within their general scope.

Conditions of the Contract - Those portions of the Contract Documents that define the rights and responsibilities of the contracting parties and of others involved in the Work. The Conditions of the Contract include General Conditions, Supplementary Conditions and other conditions.

Consultant - The person, firm, or corporation retained directly by the OWNER to prepare Contract Documents, perform construction administration services or other Project related services.

Contract - The written agreement between the OWNER and the CONTRACTOR setting forth the obligations of the parties and covering the Work to be performed, all as required by the Contract Documents.

Contract Documents - The Contract form, Addenda, the bidding requirements and CONTRACTOR's bid (including all appropriate bid tender forms), the bonds, the Conditions of the Contract and all other Contract requirements, the Specifications, and the Drawings Furnished by the OWNER to the CONTRACTOR, together with all Change Orders and documents approved by the Contracting Officer for inclusion, modifications and supplements issued on or after the Effective Date of the Contract.

Contracting Officer - The person authorized by the OWNER to enter into and administer the Contract on behalf of the OWNER. He has authority to make findings, determinations and decisions with respect to the Contract and, when necessary, to modify or terminate the Contract. The Contracting Officer is identified on the Contract.

CONTRACTOR - The individual, firm, corporation or any acceptable combination thereof, contracting with the OWNER for performance of the Work.

Contract Price - The total moneys payable by the OWNER to the CONTRACTOR under the term of the Contract Documents.

Contract Time - The number of Calendar Days or the date specified in the construction Contract and authorized time extensions that identify how much time the CONTRACTOR is allowed to achieve Final Completion.

Day – Calendar Day, unless otherwise noted.

Defective - An adjective that refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the OWNER's approval of final payment.

Directive - A written communication to the CONTRACTOR from the Contracting Officer interpreting or enforcing a Contract requirement or ordering commencement of an item of Work.

Drawings - The drawings that show the character and scope of the Work to be performed and which have been furnished by the OWNER or the OWNER's Consultant and are by reference made a part of the Contract Documents.

Effective Date - The date on which the Contract or Change Order effective. The Effective date may be specified in the Contract or Change Order. If no Effective Date is specified in the Contract or Change Order, the Effective Date is the date that the Contract or Change Order is fully executed by both CONTRACTOR and the OWNER.

Final Acceptance - The OWNER's written acceptance of the Work following Final completion and the performance of all Contract requirements by the CONTRACTOR.

Final Completion - The Work (or specified part thereof) has progressed to the point that all Work is complete as determined by the Contracting Officer

Furnish - Supply and deliver to the Project including the cost to supply and deliver.

General Requirements - Sections of Division 1 of the Specifications that contain administrative and procedural requirements as well as requirements for temporary facilities that apply to Specification Divisions 2 through 16.

Holidays - In the State of Alaska, legal Holidays occur on:

1. New Year's Day - January 1
2. Martin Luther King Jr.'s Birthday - Third Monday in January
3. President's Day - Third Monday in February
4. Seward's Day - Last Monday in March
5. Memorial Day - Last Monday in May
6. Independence Day - July 4
7. Labor Day - First Monday in September
8. Alaska Day - October 18
9. Veteran's Day - November 11
10. Thanksgiving Day - Fourth Thursday in November
11. Christmas Day - December 25
12. Every Sunday
13. Every Day designated by public proclamation by the President of the United Sates or the Governor of the State as a legal Holiday.

If any Holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal Holidays. If the Holiday should fall on a Sunday, except (12) above, Sunday and the following Monday are both legal Holidays. See Title 44, Alaska Statutes.

Install - Means to build into the Work, ready to be used in complete and operable condition and in compliance with Contract Documents.
Invitation for Bids - A portion of the bidding documents soliciting bids for the Work to be performed.

Notice of Award – The written notice by OWNER to all Bidders that all conditions required for award are met and identifying the successful contractor.

Notice of Intent to Award - The written notice by the OWNER to all Bidders identifying the apparent successful Bidder and establishing the OWNER's intent to execute the Contract.

Notice to Proceed - A written notice to the CONTRACTOR to begin the Work and establishing the date on which the Contract Time begins.

OWNER – The Alaska Court System.

Payment Bond - The security Furnished by the CONTRACTOR and its Surety to guarantee payment of the debts covered by the bond.

Performance Bond - The security Furnished by the CONTRACTOR and its Surety to guarantee performance and completion of the Work in accordance with the Contract.

Project - The total construction, of which the Work performed under the Contract Documents is the whole or a part, where such total construction may be performed by more than one CONTRACTOR.

Project Manager - The authorized representative of the Contracting Officer who is responsible for administration of the Contract.

Proposal - The offer of a Bidder, on the prescribed form to perform the Work at the prices quoted.

Proposal Guaranty - The security Furnished with a Proposal to guarantee that the bidder will enter into a Contract if its Proposal is accepted by the OWNER.

Provide - Furnish and Install for a complete, finished, and operable system.

Regulatory Requirements - All applicable state. Federal, and local laws, rules, regulations, ordinances, codes and/or orders.

Request for Payment - The form provided by the OWNER that is to be used by the CONTRACTOR in requesting progress or final payments and is to include such supporting documentation as is required by the Contract Documents.

Schedule of Values - The OWNER's document, submitted by the CONTRACTOR and reviewed by the Contracting Officer, which shall serve as the basis for computing payment and for establishing the value of separate items of Work that comprise the Contract Price.

Shop Drawings - All Drawings, diagrams, illustrations, schedules and other data that are specifically prepared by or for the CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by the CONTRACTOR to illustrate material, equipment, fabrication, or erection for some portion of the Work.

Site – Areas furnished by the OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by the OWNER which are designated for the use of the CONTRACTOR.

Specifications - Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative and procedural details applicable thereto.

Subcontractor - An individual, firm, or corporation to whom the CONTRACTOR or any other Subcontractor sublets part of the Contract.

Substantial Completion - Although not fully completed, the Work (or a specified part thereof) has progressed to the point where, in the opinion of OWNER as evidenced by the OWNER's written notice, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended. The terms "Substantially Complete" and "Substantially Completed" as applied to any Work refer to Substantial Completion thereof.

Supplemental Agreement - A written agreement between the CONTRACTOR and the OWNER covering work that is not within the general scope of the Contract.

Supplementary Conditions - The part of the Contract Documents that amends or supplements these General Conditions.

Supplier - A manufacturer, fabricator, distributor, materialman or vendor of materials or equipment.

Surety - The corporation, partnership, or individual, other than the CONTRACTOR, executing a bond Furnished by the CONTRACTOR.

Using Agency - The entity that will occupy or use the completed Work.

Work - Work is the act of, and the result of, performing services, Furnishing labor, Furnishing and incorporating materials and equipment into the Project and performing other duties and obligations, all as required by the Contract Documents. Such Work, however incremental, will culminate in the entire completed Project, or the various separately identifiable parts thereof.

Working Day – Monday through Friday, inclusive, with the exception of Holidays.

ARTICLE 2 - AUTHORITIES AND LIMITATIONS

2.1 Authorities and Limitations

2.1.1 The Contracting Officer alone, shall have the power to bind the OWNER and to exercise the rights, responsibilities, authorities and functions vested in the Contracting Officer by the Contract Documents, except that the Contracting Officer shall have the right to designate in writing authorized representatives to act for him. Wherever any provision of the Contract Documents specifies an individual or organization, whether governmental or private, to perform any act on behalf of or in the interests of the OWNER that individual or organization shall be deemed to be the Contracting Officer's authorized representative under this Contract but only to the extent so specified. The Contracting Officer may, at any time during the performance of this Contract, vest in any such authorized representatives additional power and authority to act for the Contracting Officer or designate additional representatives, specifying the extent of their authority to act for the Contracting Officer; a copy of each document vesting additional authority in or removing that authority from an authorized representative or designating an additional authorized representative shall be furnished to the CONTRACTOR. The OWNER reserves the right to appoint a new Contracting Officer without affecting any of the CONTRACTOR's obligations to the OWNER under this Contract.

2.1.2 The CONTRACTOR shall perform the Work in accordance with the Contract Documents and any Directive or other written order (including but not limited to instruction, direction, interpretation or determination) issued by an authorized representative in accordance with the authorized representative's authority to act for the Contracting Officer. The CONTRACTOR assumes all the risk and consequences of performing the Work in accordance with any order (including but not limited to instruction, direction, interpretation or determination) of anyone not authorized to issue such order, and of any order not in writing.

2.1.3 Should the Contracting Officer or his authorized representative designate Consultant(s) to act for the OWNER as provided for in Paragraph 2.1.1, the performance or nonperformance of the Consultant under such authority to act, shall not give rise to any contractual obligation or duty of the Consultant to the CONTRACTOR, any Subcontractor, any Supplier, or any other organization performing any of the Work or any Surety representing them.

2.1.4 The term "Contracting Officer" when used in the text of these General Conditions or other Contract Documents following this section shall also mean any duly authorized representative of the Contracting Officer when authorized in accordance with Paragraph 2.1.1.

2.2 Evaluations by Contracting Officer:

2.2.1 The Contracting Officer will decide all questions that may arise as to:

a. Quality and acceptability of materials Furnished;

b. Quality and acceptability of Work performed;

c. Compliance with the schedule of progress.

d. Interpretation of Contract Documents;

e. Acceptable fulfillment of the Contract on the part of the CONTRACTOR.

2.2.2 In order to avoid cumbersome terms and confusing repetition of expressions in the Contract Documents the terms "as ordered", "as directed", "as required", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used it shall be understood as if the expression were followed by the words "by the Contracting Officer," or “to the Contracting Officer.”

When such terms are used to describe a requirement, direction, review or judgment of the Contracting Officer as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise).

2.2.3 The use of any such term or adjective shall not be effective to assign to the OWNER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

2.3 Means and Methods:

The means, methods, techniques, sequences or procedures of construction, or safety precautions and the program incident thereto, and the failure to perform or Furnish the Work in accordance with the Contract Documents are the sole responsibility of the CONTRACTOR.

2.4 Visits to Site/Place of Business:

The Contracting Officer will make visits to the site and approved remote storage sites at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. The Contracting Officer may, at reasonable times, inspect that part of the plant or place of business of the CONTRACTOR or Subcontractor that is related to the performance of the Contract. Such observations or the lack of such observations shall in no way relieve the CONTRACTOR from its duty to perform the Work in accordance with the Contract Documents.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Incomplete Contract Documents

The submission of a bid is considered a representation that the Bidder has examined the Contract Documents to make certain that all sheets and pages were provided, that the Bidder has examined the Project site, and that the Bidder is satisfied as to the conditions to be encountered in performing the Work. The OWNER expressly denies any responsibility or liability for a bid submitted on the basis of an incomplete set of Contract Documents.

3.2 Copies of Contract Documents:

The OWNER shall furnish to the CONTRACTOR up to five copies of the Contract Documents. Additional copies will be furnished, upon request, at the cost of reproduction.

3.3 Scope of Work:

The Contract Documents comprise the entire Contract between the OWNER and the CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the Regulatory Requirements of the place of the Project.

It is specifically agreed between the parties executing this Contract that it is not intended by any of the provisions of the Contract to create in the public or any member thereof a third party benefit, or to authorize anyone not a party to this Contract to maintain a suit pursuant to any terms or provision of the Contract.

3.4 Intent of Contract Documents:

3.4.1 It is the intent of the Contract Documents to describe a functionally complete Project to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied, without any adjustment in Contract Price or Contract Time, whether or not specifically called for.

3.4.2 Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Regulatory Requirements of any governmental authority, whether such reference be specific or by implication, shall mean the edition stated in the Contract Documents or if not stated the latest standard specification, manual, the code of Regulatory Requirements in effect at the time of Advertisement for the Project (or, on the Effective Date of the Contract if there was no Advertisement). However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER and the CONTRACTOR, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to the OWNER or any of the OWNER's Consultants, agents or employees, any duty or authority to supervise or direct the Furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.3 or 2.4.

3.5 Discrepancy in Contract Documents:

3.5.1 Before undertaking the Work, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures, and dimensions shown thereon and all applicable field measurements and conditions. Work in the area by the CONTRACTOR shall imply verification of figures, dimensions and field measurements. If, during the above study or during the performance of the Work, the CONTRACTOR finds a conflict, error, discrepancy or omission in the Contract Documents, or a discrepancy between the Contract Documents and any standard specification, manual, code, or Regulatory Requirement that affects the Work, the CONTRACTOR shall promptly report such discrepancy in writing to the Contracting Officer. The CONTRACTOR shall obtain a written interpretation or clarification from the Contracting Officer before proceeding with any Work affected thereby. Any adjustment made by the CONTRACTOR without this determination shall be at its own risk and expense. However, the CONTRACTOR shall not be liable to the OWNER for failure to report any conflict, error or discrepancy in the Contract Documents unless the CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

3.5.2 Discrepancy - Order of Precedence:

When conflicts, errors, or discrepancies within the Contract Documents exist, the order of precedence from most governing to least governing will be as follows:

1. The Signed Contract;
2. Contents of Addenda;
3. Instructions to Bidders;
4. Supplementary Conditions;
5. General Conditions;
6. General Requirements;
7. Manufacturer's Instructions;
8. Technical Specifications;
9. Drawings (recorded dimensions will govern over scaled dimensions, large scale details over small scale, schedules over plans, architectural Drawings, over structural Drawings over mechanical and electrical Drawings)

3.6 Clarifications and Interpretations:

The Contracting Officer will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as the Contracting Officer may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

3.7 Reuse of Documents:

Neither the CONTRACTOR nor any Subcontractor, or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with the OWNER shall have or acquire any title to or ownership rights in any of the Contract Documents (or copies thereof) prepared by or for the OWNER and they shall not reuse any of the Contract Documents on extensions of the Project or any other project without written consent of the Contracting Officer.

Contract Documents prepared by the CONTRACTOR in connection with the Work shall become the property of the OWNER.

ARTICLE 4 - NOT USED IN THIS CONTRACT

ARTICLE 5 - BONDS INSURANCE, AND INDEMNIFICATION

5.1 Insurance Requirements:

5.1.1 The CONTRACTOR shall provide evidence of insurance with a carrier or carriers satisfactory to the OWNER covering injury to persons and/or property suffered by the State of Alaska or a third party, as a result of operations which arise both out of and during the course of this Contract by the CONTRACTOR or by any Subcontractor. This coverage will also provide protection against injuries to all employees of the CONTRACTOR and the employees of any

Subcontractor engaged in Work under this Contract. The policy of insurance shall be endorsed to provide for delivery to the OWNER of a written 30-Day notice is required before cancellation of any coverage or reduction in any limits of liability. Insurance carriers shall have an acceptable financial rating.

5.1.2 The CONTRACTOR shall maintain in force at all times during the performance of Work under this agreement the following policies of insurance. Failure to maintain insurance may, at the option of the Contracting Officer, be deemed Defective Work and remedied in accordance with the Contract. Where specific limits and coverages are shown, it is understood that they shall be the minimum acceptable. The requirements of this paragraph shall not limit the CONTRACTOR's responsibility to indemnify under paragraph 5.2. Additional insurance requirements specific to this Contract are contained in the Supplementary Conditions, when applicable.

a. Workers' Compensation Insurance: The CONTRACTOR shall provide and maintain, for all employees of the CONTRACTOR engaged in Work under this Contract, Workers' Compensation Insurance as required by AS 23.30.045.

The CONTRACTOR shall be responsible for Workers' Compensation insurance for any Subcontractor who Provides services under this Contract, to include:

1. Employer's Liability Protection in the amount of $100,000 per person/$100,000 per occurrence;

2. If the CONTRACTOR directly utilizes labor outside of the State of Alaska in the prosecution of the Work, "other States" endorsement shall be required as a Condition of the Contract.

b. Comprehensive or Commercial General Liability Insurance: shall cover all operations by or on behalf of the CONTRACTOR and shall provide insurance for bodily injury and property damage liability including coverage for premises and operations; products and completed operations; contractual liability insuring obligations assumed under paragraph 5.2, indemnification; broad form property damage; and personal injury liability. The minimum limits of liability shall be:

1. If the CONTRACTOR carries Comprehensive General Liability policy, the limits of liability shall not be less than a Combined Single Limit for bodily injury, property damage and Personal Injury Liability of:

$ 500,000 each occurrence
$1,000,000 aggregate

2. If the CONTRACTOR carries Commercial General Liability policy the limits of liability shall not be less than:

$ 500,000 Each Occurrence (Combined Single Limit for bodily injury and property damage.)

$500,000 for Personal Injury Liability

$1,000,000 Aggregate for Products- Completed Operations

$1,000,000 General Aggregate

The OWNER shall be named as an "Additional Insured" under all liability coverages listed above.

c. Automobile Liability Insurance:

Such insurance shall cover all owned, hired and non-owned vehicles and provide coverage not less than that of the Business Automobile Policy in limits not less than the following:

$1,000,000 Each Occurrence (Combined Single Limit for bodily injury and property damage.)

d. Builder's Risk Insurance:

Coverage shall be on an "All Risk" completed value basis including "quake and flood" and protect the interests of the OWNER, the CONTRACTOR and its Subcontractors. Coverage shall include all materials, supplies and equipment that are intended for specific installation in the project while such materials, supplies and equipment are located at the project site and in transit from port of arrival to job site and while temporarily located away from the project site.

In addition to providing the above coverages the CONTRACTOR shall ensure that Subcontractors provide insurance coverages as noted in clauses a., b., and c. of this subparagraph.

e. Other Coverages: As specified in the Supplementary Conditions.

5.1.3 Evidence, consisting of a certificate of insurance or the policy declaration page with required endorsements attached thereto -- all of which have been executed by the insurer's representative and issued to the OWNER, shall denote the type, amount, class of operations covered, effective (and retroactive) dates, and dates of expiration of policies.

Evidence pertaining to Worker's Compensation, General Liability, Automobile Liability and all other coverages shall be evidenced prior to commencement of Work and execution of the Contract. Acceptance by the OWNER of deficient evidence does not constitute a waiver of Contract requirements as provided for by the Conditions of the Contract.

If a certificate is submitted as evidence it shall contain the following statement:

"This is to certify that the policies described herein comply with all aspects of the insurance requirements of [Contract Name and Number, and Project Number]."

5.2 Indemnification:

The CONTRACTOR shall indemnify, hold harmless, protect and defend the OWNER and its agents, including its employees from and against any and all claims, demands, and causes of action for injuries or damages sustained by any person or property arising out of, or in any way connected with the Work or the CONTRACTOR's performance of or obligations under this Contract. The CONTRACTOR is not obligated to indemnify the OWNER for its sole negligence.

5.3 Payment and Performance Bonds

Payment and Performance bonds must be in a sum equal to at the total amount payable by the terms of the Contract. Use forms shown in Section 00610 and 00620 or a facsimile copy, or a form provided by a corporate surety that provides substantially the same information.

ARTICLE 6 -CONTRACTOR'S RESPONSIBILITIES

6.1 Prosecution of the Work

The CONTRACTOR shall diligently, and in skillful, workmanlike manner, provide all labor, materials, equipment, and facilities necessary to perform the Work in accordance with the Contract Documents and in a manner to complete the Work within the specified contract time.

6.2 Supervision of Work:

The CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

6.3 Superintendence by CONTRACTOR:

The CONTRACTOR shall provide on the Site at all times during the prosecution of the Work a competent, resident superintendent. The Contracting Officer shall be advised in writing of the superintendent's name, local address, and telephone number. This written advice is to be kept current until Final Acceptance by the OWNER. The superintendent will be the CONTRACTOR's representative at the site and shall have full authority to act and sign documents on behalf of the CONTRACTOR.

All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall cooperate with the Contracting Officer in every way possible.

6.4 Character of Workers:

The CONTRACTOR shall provide a sufficient number of competent, suitably qualified personnel to plan, manage, and Provide the Work as required by the Contract Documents. The CONTRACTOR shall at all times maintain good discipline and order at the site. The Contracting Officer may, in writing, require the CONTRACTOR to remove from the Work any employee the Contracting Officer deems incompetent, careless, or otherwise detrimental to the progress of the Work, but the Contracting Officer shall have no duty to exercise this right.

6.5 CONTRACTOR to Provide:

Unless otherwise specified in the General Requirements, the CONTRACTOR shall Provide and assume full responsibility for all materials, equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the Furnishing, performance, testing, start-up and completion of the Work.

6.6 Materials and Equipment:

All materials and equipment shall be of specified quality and new, except as otherwise provided in the Contract Documents. The CONTRACTOR shall Provide all facilities and labor required to protect materials and other components of the Work from damage or deterioration due to environmental exposure, handling, or other factors. If required by the Contracting Officer, the CONTRACTOR shall Furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment provided. All materials and equipment shall be applied, Installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to the OWNER or any of the OWNER's Consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraphs 2.2, 2.3 or 2.4.

6.7 Anticipated Schedules:

Unless otherwise specified in the General Requirements, within reasonable time prior to the preconstruction conference the CONTRACTOR shall submit to the Contracting Officer for review an anticipated progress schedule indicating the starting and completion dates of the various stages of the Work.

6.8 Adjusting Schedules:

Upon substantial changes to the schedule or upon request, the CONTRACTOR shall submit to the Contracting Officer for acceptance adjustments in the schedules to reflect the actual present and anticipated progress of the Work.

6.9 Substitutes:

Notwithstanding any other provisions of the Contract, the CONTRACTOR bears the risk of delay or failure associated with any substitution requested or proposed by the CONTRACTOR, regardless of whether the substitution has been approved by the OWNER.

6.9.1 Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by the Contracting Officer, but only if sufficient information is submitted by the CONTRACTOR that clearly demonstrates to the Contracting Officer that the material or equipment proposed is equivalent or equal in all aspects to that named. The procedure for review by the Contracting Officer will include the following as supplemented in the General Requirements:

a, Requests for review of substitute items of material and equipment will not be accepted by the Contracting Officer from anyone other than the CONTRACTOR.

b. If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the Contracting Officer for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will certify that the evaluation and acceptance of the proposed substitute will not delay the CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the OWNER for Work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.

c. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the OWNER in evaluating the proposed substitute. The OWNER may require the CONTRACTOR to Furnish at the CONTRACTOR's expense additional data about the proposed substitute.

6.9.2 The Contracting Officer may reject any substitution request that the Contracting Officer determines is not in the best interest of the OWNER.

6.9.3 Substitute Means and Methods:

If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, the CONTRACTOR may Furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Contracting Officer, if the CONTRACTOR submits sufficient information to allow the Contracting Officer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the Contracting Officer will be similar to that provided in paragraph 6.10 as applied by the Contracting Officer and as may be supplemented in the General Requirements.

6.10 Evaluation of Substitution:

The Contracting Officer will be allowed a reasonable time within which to evaluate each proposed substitute. The Contracting Officer will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Contracting Officer's prior written acceptance which will be evidenced by either a Change Order or Approval in accordance with paragraph 6.9. The Contracting Officer may require the CONTRACTOR to Furnish at the CONTRACTOR's expense a special performance guarantee or other Surety with respect to any substitute.

6.11 Dividing the Work:

The divisions and sections of the Specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.12 Subcontractors:

The CONTRACTOR may utilize the services of licensed specialty Subcontractors on those parts of the Work, which under normal contracting practices, are performed by licensed specialty Subcontractors.

6.12.1 The CONTRACTOR shall be fully responsible to the OWNER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or Furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions.

6.12.2 Nothing in the Contract Documents shall create any contractual relationship between the OWNER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the OWNER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Regulatory Requirements. The OWNER will not undertake to settle any differences between or among the CONTRACTOR, Subcontractors, or Suppliers.

6.12.3 The CONTRACTOR shall include on its own payrolls any person or persons working on this Contract who are not covered by written subcontract, and shall ensure that all Subcontractors include on their payrolls all persons performing Work under the direction of the Subcontractor.

6.12.4 No claim of CONTRACTOR shall include any element of a claim of a Subcontractor unless the CONTRACTOR first warrants that the claim is valid.

6.12.5 The CONTRACTOR shall be responsible for ensuring that all personnel on the Project are covered by Unemployment Insurance as required by Regulatory Requirements.

6.13 Use of Premises:

The CONTRACTOR is responsible for the site, the Work, and persons and materials thereon. The CONTRACTOR shall confine construction equipment, the storage of material and equipment and the operations of workers to the Project limits and approved remote storage sites.

6.14 Structural Loading:

The CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.15 Record Documents:

The CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Directives, Change Orders, Supplemental Agreements, and written interpretations and clarifications (issued pursuant to paragraph 3.6) in good order and annotated to show all changes made during construction. The CONTRACTOR shall update the record documents weekly to reflect all changes through the date of the update. These record documents together with all Approved samples and a counterpart of all Approved Shop Drawings will be available to the Contracting Officer for reference and copying. Upon completion of the Work, the annotated record documents, samples and Shop Drawings will be delivered to the Contracting Officer. Record documents shall accurately record variations in the Work that vary from requirements shown or indicated in the Contract Documents.

6.16 Safety and Protection:

The CONTRACTOR alone 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:

6.16.1 All employees on the Work and other persons and organizations who may be affected thereby;

6.16.2 All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.16.3 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.

The CONTRACTOR shall comply with all applicable Regulatory Requirements of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the CONTRACTOR with no change in Contract Price or Contract Time, except damage or loss attributable to unforeseeable causes beyond the control of and without the fault or negligence of the CONTRACTOR, including but not restricted to the acts of God, the public enemy, or governmental authorities. The CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until Final Acceptance (except as otherwise expressly provided in connection with Substantial Completion).

6.16.4 All employees, persons, property and landscaping at the property, including plantings, pavements, roadways, structures, lighting, utilities, and vehicles, from the weight and activity of cranes and other heavy hoisting equipment.

6.17 Safety Representative:

The CONTRACTOR shall designate a responsible safety representative at the site. This person shall be the CONTRACTOR's superintendent unless otherwise designated in writing by the CONTRACTOR to the Contracting Officer.

6.18 Emergencies:

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the OWNER, is obligated to act to prevent threatened damage, injury or loss. The CONTRACTOR shall give the Contracting Officer prompt written notice if the CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the OWNER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a change will be authorized by one of the methods indicated in Paragraph 9.2, as determined appropriate by the Contracting Officer.

6.19 Maintenance During Construction:

The CONTRACTOR shall maintain the Work during construction and until Substantial Completion, at which time the responsibility for maintenance shall be established in accordance with paragraph 13.7.

6.20 Continuing the Work:

The CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the OWNER. No Work shall be delayed or postponed pending resolution of any disputes, disagreements, or claims except as the CONTRACTOR and the Contracting Officer may otherwise agree in writing.

6.21 Consent to Assignment:

The CONTRACTOR shall obtain the prior written consent of the Contracting Officer to any proposed assignment of any interest in, or part of this Contract. The consent to any assignment or transfer shall not operate to relieve the CONTRACTOR or its Sureties of any obligations under this Contract or the Performance Bonds. Nothing herein contained shall be construed to hinder, prevent, or affect an assignment of monies due, or to become due hereunder, made for the benefit of the CONTRACTOR's creditors pursuant to law.

6.22 CONTRACTOR's Records:

6.22.1 Records of the CONTRACTOR and Subcontractors relating to personnel, payrolls, invoices of materials, and any and all other data relevant to the performance of this Contract, must be kept on a generally recognized accounting system. Such records must be available during normal work hours to the Contracting Officer for purposes of investigation to ascertain compliance with Regulatory Requirements and provisions of the Contract Documents.

6.22.2 Payroll records must contain the name and address of each employee, his correct classification, rate of pay, daily and weekly number of hours of work, deductions made, and actual wages paid. The CONTRACTOR and Subcontractors shall make employment records available for inspection by the Contracting Officer and representatives of the U.S. and/or State Department of Labor and will permit such representatives to interview employees during working hours on the Project.

6.22.3 Records of all communications between the OWNER and the CONTRACTOR and other parties, where such communications affected performance of this Contract, must be kept by the CONTRACTOR and maintained for a period of three years from Final Acceptance. The OWNER or its assigned representative may perform an audit of these records during normal work hours after written notice to the CONTRACTOR.

ARTICLE 7 - LAWS AND REGULATIONS

7.1 Regulatory Requirements

The CONTRACTOR shall keep fully informed of all federal and state Regulatory Requirements and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the Work, or which in any way affect the conduct of the Work. The CONTRACTOR shall at all times observe and comply with all such Regulatory Requirements orders and decrees; and shall protect and indemnify the OWNER and its representatives against all claims, demands, and liabilities arising out of or in any way connected with an actual or alleged violation of any such Regulatory Requirement, order, or decree whether by the CONTRACTOR, Subcontractor, or any employee of either. Except where otherwise expressly required by applicable Regulatory Requirements, the OWNER shall not be responsible for monitoring CONTRACTOR's compliance with any Regulatory Requirements.

7.2 Permits, Licenses, and Taxes

7.2.1 The CONTRACTOR shall procure all permits and licenses, pay all charges, fees and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the Work. As a condition of performance of this Contract, the CONTRACTOR shall pay all Federal, State and local taxes incurred by the CONTRACTOR, in the performance of this Contract. Proof of payment of these taxes may be a condition precedent to final payment by the OWNER under this Contract. The OWNER shall pay for all plan review and building permit fees required by the State Fire Marshal and/or the Municipality of Anchorage. The CONTRACTOR shall pay for all building and trade permits and licenses.

7.2.2 The CONTRACTOR's certification that taxes have been paid (as contained in the Release of Contract) will be verified with the Department of Revenue and Department of Labor, prior to final payment.

7.2.3 If any Federal, State or local sales or excise tax is imposed, charged, or repealed after the date of bid opening and is made applicable to and paid by the CONTRACTOR on the articles or supplies herein contracted for, then the Contract shall be increased or decreased accordingly by a Change Order.

7.3 Patented Devices, Materials and Processes

If the CONTRACTOR employs any design, device, material, or process covered by letters of patent, trademark or copyright, the CONTRACTOR shall provide for such use by suitable legal agreement with the patentee or owner. The CONTRACTOR and the Surety shall indemnify and save harmless the OWNER, any affected third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device material or process, or any trademark or copyright, and shall indemnify the OWNER for any costs, expenses, and damage that it may be obliged to pay by reason of any infringement, at any time during the prosecution or after the completion of the Work.

7.4 Compliance of Specifications and Drawings:

If the CONTRACTOR observes that the Specifications and Drawings supplied by the OWNER are at variance with any Regulatory Requirements, CONTRACTOR shall give the Contracting Officer prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 9.2. as determined by the Contracting Officer. If the CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Regulatory Requirements, and without such notice to the Contracting Officer, the CONTRACTOR shall bear all costs arising therefrom; however, it shall not be the CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings supplied by the OWNER are in accordance with such Regulatory Requirements.

7.5 Accident Prevention:

The CONTRACTOR shall comply with AS 18.60.075 and all pertinent provisions of the Construction Code Occupational Safety and Health Standards issued by the Alaska Department of Labor.

7.6 Sanitary Provisions:

The CONTRACTOR shall Furnish and maintain in a neat and sanitary condition such accommodations for the use of its employees and OWNER representatives as may be necessary to comply with the Regulatory Requirements of the State and local Boards of Health, or of other bodies or tribunals having jurisdiction.

7.7 Business Registration:

Comply with AS 08.18.011, as follows: "A person may not submit a bid or work as a contractor until that person has been issued a certificate of registration as a contractor by the department. A partnership or joint venture shall be considered registered if one of the general partners or venturers whose name appears in the name under which the partnership or venture does business is registered as a contractor."

7.8 Professional Registration and Certification

All craft trades, architects, engineers and land surveyors, electrical administrators, and explosive handlers employed under the Contract shall specifically comply with applicable provisions of AS 08.18, 08.48, 08.40, and 08.52. CONTRACTOR shall provide copies of individual licenses within seven days following a request from the Contracting Officer.

7.9 Local Building Codes:

The CONTRACTOR shall comply with AS 35.10.025, which requires construction in accordance with applicable local building codes including the obtaining of required permits.

7.10 Air Quality Control:

The CONTRACTOR shall comply with all applicable provisions of AS 46.03.04 as pertains to Air Pollution Control.

7.11 Hazardous Materials: Spills, Reporting & Communication Plan

The CONTRACTOR shall comply with all applicable provisions of Alaska Administrative Code Title 18, Section 75.300 regarding reporting of hazardous materials and oil spills. For all toxic or hazardous materials used in this Project the CONTRACTOR shall have available on site Material Safety Data Sheets and have in place a hazard communication program and comply with other requirements of Alaska Administrative Code Title 18 Section 15.010.

7.12 Preferential Employment:

The CONTRACTOR shall comply with all applicable and valid laws and regulations regarding the hiring of Alaska residents now in effect or that might subsequently take effect during the term of this

Contract. In order to ensure that the CONTRACTOR's Subcontractors will comply with all applicable laws and regulations regarding the hiring of Alaska residents now in effect or that might subsequently take effect, the CONTRACTOR shall include in its Contracts with Subcontractors under this Contract language that is substantially the same as the first sentence of this provision.

7.13 Wages and Hours of Labor:

7.13.1 One certified copy of all payrolls shall be submitted weekly to the State Department of Labor to assure compliance with AS 36.05.040, Filing Schedule of Employees' Wages Paid and Other Information. An additional copy of all certified payrolls shall be submitted to the OWNER concurrently with the submittal to the State Department of Labor. The CONTRACTOR shall be responsible for the submission of certified copies of payrolls of all Subcontractors. The certification shall affirm that the payrolls are current and complete, that the wage rates contained therein are not less than the applicable rates referenced in these Contract Documents, and that the classification set forth for each laborer or mechanic conforms with the Work he performed. The CONTRACTOR and its Subcontractors shall attend all hearings and conferences and produce such books, papers, and documents all as requested by the Department of Labor. Should Federal funds be involved, the appropriate Federal Agency shall also receive a copy of the CONTRACTOR's certified payrolls.

7.13.2 The following Labor provisions shall also apply to this Contract:

a. wages may not be less than those stated in the advertised Specifications, regardless of the contractual relation-ship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors;

b. the scale of wages to be paid shall be posted by the CONTRACTOR in a prominent and easily accessible place at the site of the Work;

c. the OWNER shall withhold so much of the accrued payments as is necessary to pay to laborers, mechanics, or field surveyors employed by the CONTRACTOR or Subcontractors the difference between

1. the rates of wages required by the Contract to be paid laborers, mechanics, or field surveyors on the Work, and

2. the rates of wages in fact received by laborers, mechanics, or field surveyors.

7.14 Overtime Work Hours and Compensation:

Pursuant to AS 23.10.060, the CONTRACTOR shall not require nor permit any laborer or mechanic in any workweek in which he is employed on any Work under this Contract to work in excess of eight hours in any Calendar Day or in excess of forty hours in such workweek on Work subject to the provisions of the Contract Work Hours and Safety Standards Act unless such laborer or mechanic receives compensation at a rate not less than one and one half times his basic rate of pay for all such hours worked in excess of eight hours in any Calendar Day or in excess of forty hours in such workweek whichever is the greater number of overtime hours. In the event of any violation of this provision, the CONTRACTOR shall be liable to the affected employee for any amounts due and penalties and to the OWNER for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of this provision in the sum of $10.00 for each Calendar Day on which such employee was required or permitted to be employed on such Work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by this paragraph.

7.15 Covenant Against Contingent Fees:

The CONTRACTOR warrants that no person or selling agent has been employed or retained to solicit or secure this Contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the CONTRACTOR for the purpose of securing business. For breach or violation of this warrant, the OWNER shall have the right to annul this Contract without liability or, in its discretion, to deduct price of consideration from the Contract or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

7.16 Officials Not to Benefit:

No member of or delegate to the State Legislature or other State official shall be admitted to any share or part of this Contract, nor to any benefit that may arise therefrom. However, this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

7.17 Personal Liability of Public Officials:

In carrying out any of the provisions thereof, or in exercising any power or authority granted to the Contracting Officer by the Contract, there will be no liability upon the Contracting Officer nor upon State employees authorized as his representatives, either personally or as officials of the State of Alaska, it being always understood that in such matters they act as agents and representatives of the OWNER/

ARTICLE 8 - OTHER WORK

8.1 Assignment of Component Contract by the Owner

The OWNER may at any time enter into separate contracts with other contractors to perform work or supply materials or services for the Project. The OWNER may, at its sole discretion, assign its interests, rights, and responsibilities in one or more of the component contracts to the CONTRACTOR anytime after execution of such contract. The assignment shall be executed using a Form of Agreement provided by the OWNER. The Contract Documents will describe the scope of Work, estimated, or actual contract amounts, and scheduling requirements for these assigned contracts.

If an assigned subcontract is indicated in the General Requirements, the Contractor shall include in its bid an amount as compensation for all supervision, overhead, bonds, profit, and all other expenses associated with the assumption of the OWNER's interests, rights, and responsibilities in the assigned subcontracts.

8.2 Related Work at Site;

8.2.1 The OWNER reserves the right at any time to contract for and perform other or additional work on or near the Work covered by the Contract.

8.2.2 When separate contracts are let within the limits of the Project, the CONTRACTOR shall conduct its Work so as not to interfere with or hinder the work being performed by other contractors. The CONTRACTOR when working on the same Project with other contractors shall cooperate with such other contractors. The CONTRACTOR shall join its Work with that of the others in an acceptable manner and shall perform it in proper sequence to that of others.

8.2.3 If the fact that other such Work which is to be performed is identified or shown in the Contract Documents, the CONTRACTOR shall assume all liability, financial or otherwise, in connection with this Contract and indemnify and save harmless the OWNER from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced by the CONTRACTOR because of the presence and operations of other contractors.

8.2.4 If the fact that such other work is to be performed is not identified or shown in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work. If the CONTRACTOR believes that such performance will require an increase in Contract Price or Contract Time, the CONTRACTOR shall notify the Contracting Officer of such required increase within 15 Calendar Days following receipt of the Contracting Officer's notice. Should the Contracting Officer find such increase(s) to be justified, a Change Order will be executed.

8.3 Access, Cutting, and Patching:

The CONTRACTOR shall afford each utility owner and any other contractor who is a party to a direct contract with the OWNER (or

the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with the work of others. The CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter such other work with the written consent of the Contracting Officer. The duties and responsibilities of the CONTRACTOR under this paragraph are for the benefit of other contractors to the extent that these are comparable provisions for the benefit of the CONTRACTOR in said direct contracts between the OWNER and other contractors.

8.4 Defective Work by Others:

If any part of the CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor, utility owner or the OWNER, the CONTRACTOR shall inspect and promptly report to the Contracting Officer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure too so report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or nonapparent defects and deficiencies in the other work.

8.5 Coordination:

If the OWNER contracts with others for the performance of other work at the site, Contracting Officer will have authority to coordinate the activities among the various prime contractors.

ARTICLE 9 - CHANGES & DIRECTIVES

9.1 OWNER's Right to Change

The OWNER reserves the right to make, at any time during the progress of the Work, without notice to Sureties and within the general scope of the Contract, such changes, deviations, additions to or deletions from the Contract Documents, including the right to alter the quantity of any item or portion of the Work as may be deemed by the OWNER to be necessary or desirable and to require such extra Work, including direction to accelerate the Work, as may be determined by the OWNER to be required for the proper completion or construction of the whole Work contemplated. Such changes shall be set forth in writing as a Change Order and shall neither invalidate the Contract nor release the Surety. CONTRACTOR agrees to perform the Work, as changed, the same as if it had been a part of the original Contract.

9.2 Authorization of Changes within the General Scope

Additions, deletions, or revisions in the Work within the general scope of the Contract as specified in 9.1 shall be authorized only by Change Order.

9.3 Directive

9.3.1 The Contracting Officer shall provide written clarification or interpretation of the Contract Documents (pursuant to paragraph 3.6).

9.3.2 The Contracting Officer may authorize minor variations in the Work from the requirements of the Contract Documents that do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents.

9.3.3 The Contracting Officer may order the CONTRACTOR to correct Defective Work or methods that are not in conformance with the Contract Documents.

9.3.4 The Contracting Officer may direct the commencement of Work, the commencement of Work under dispute, the suspension of Work or emergency related Work (as provided in paragraph 6.19).

9.3.5 Upon the issuance of a Directive to the CONTRACTOR by the Contracting Officer, the CONTRACTOR shall proceed with the performance of the Work as prescribed by such Directive.

9.3.6 If the CONTRACTOR believes that the changes noted in a Directive may cause an increase in the Contract Price or an extension of Contract Time, the CONTRACTOR shall, within 3 Working Days, provide written notice to the Contracting Officer depicting such increases before proceeding with the Directive, except in the case of an emergency. If the Contracting Officer finds the increase in Contract Price or the extension of Contract Time justified, a Change Order will be issued. If however, the Contracting Officer does not find that a Change Order is justified, the Contracting Officer may direct the CONTRACTOR to proceed with the Work. The CONTRACTOR shall cooperate with the Contracting Officer in keeping complete daily records of the cost of such Work. If a Change Order is ultimately determined to be justified, in the absence of agreed prices and unit prices, payment for such Work will be made on a cost of the Work basis.

9.4 Change Order

A change in Contract Time, Contract Price, or responsibility may be made for changes within the scope of the Work only by Change Order. Upon receipt of an executed Change Order, the CONTRACTOR shall promptly proceed with the Work involved, which will be performed under the applicable Conditions of the Contract except as otherwise specifically provided. Changes in Contract Price and Contract Time shall be made in accordance with Articles 10 and 11.

9.5 Extra Work

Any change that is outside the general scope of the Contract, as determined by the Contracting Officer, must be authorized by a Supplemental Agreement signed by the appropriate representatives of the OWNER and the CONTRACTOR. Extra Work performed without a signed Supplemental Agreement or Change Order shall be treated as unauthorized work.

9.6 Unauthorized Work:

The CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in this Article 9, except in the case of an emergency as provided in paragraph 6.18 and except in the case of uncovering Work.

9.7 Differing Site Conditions:

9.7.1 The CONTRACTOR shall promptly, and before such conditions are disturbed (except in an emergency as permitted by paragraph 6.18), notify the Contracting Officer in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in the Contract, and which could not have been discovered by a careful examination of the site, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Contracting Officer shall promptly investigate the condition, and if the Contracting Officer finds that such conditions do materially so differ and cause an increase or decrease in the CONTRACTOR's cost of, or time required for, performance of this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly.

9.7.2 Any claim for additional compensation by the CONTRACTOR under this clause shall be made in accordance with Article 15 and shall not be allowed unless the CONTRACTOR has first given the notice required by this Contract. In the event that the Contracting Officer and the CONTRACTOR are unable to reach an agreement concerning alleged differing site conditions, the CONTRACTOR will be required to keep an accurate and detailed record that will indicate the actual cost of the Work done under the alleged differing site condition. Failure to keep such a record shall be a bar to any recovery by reason of such alleged differing site conditions. The Contracting Officer shall be given the opportunity to supervise and check the keeping of such records.

ARTICLE 10 – CONTRACT PRICE; COMPUTATION AND CHANGE

10.1 Contract Price:

The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to the CONTRACTOR for performing the Work. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR shall be at the CONTRACTOR's expense without change in the Contract Price. The Contract Price may only be changed by a Change Order or a Supplemental Agreement.

10.2 Changes:

The OWNER reserves the right to make changes to the Work or Contract Documents in accordance with Article 9 of these General Conditions. CONTRACTOR agrees to perform the Work, as changed, as if it had been a part of the original Contract. If the directed changes justify changes in Contract Price the Contract Price change shall be determined as specified in this Article 10.

10.3 Compensation for Altered Quantities of Unit Priced Items.

Payment to the CONTRACTOR for unit price items shall be made only for the actual accepted quantities of Work performed or materials furnished, in conformance with the Contract. When the accepted quantities of Work or materials vary from the quantities stated in the bid schedule, CONTRACTOR shall accept as payment in full, payment at the original Contract unit prices for the quantities of Work and materials Furnished, completed, and accepted, except as provided below:

10.3.1 Under the provisions of Section 10.3, a "Major Contract Item" is any Contract item for which the product of the bid quantity and the unit bid price exceeds $50,000.

10.3.2 Where the final quantity of a Major Contract Item is greater than 125% of the bid quantity, an adjustment shall be made for those units of Work completed and accepted that are in excess of 125% of the bid quantity.

10.3.3 Where the final quantity of a Major Contract Item is less than 75% of the bid quantity, payment shall be made as determined under Paragraph 10.3.4 for those units of Work completed and accepted, except that the total payment for the item shall not exceed 75% of the total amount bid for the item.

10.3.4 For Major Contract Item Work completed and accepted and materials furnished in excess of 125% of the bid quantity and, subject to the limitation in Paragraph 10.3.3, for Major Contract Item Work performed and accepted and materials furnished whose final quantity is less than 75% of the bid quantity, payment shall be made either on a unit basis at agreed prices or, if no agreement is reached as to unit prices, the Contract item shall be deleted from the Contract, and payment for Work performed and accepted and materials furnished shall be calculated as an Additive or Deductive Change under Paragraph 10.4.

10.4 Changes in Contract Items not Covered by a Unit Price.

10.4.1 Additive Changes

Payment to the CONTRACTOR for changes in the Contract not covered by unit prices shall be determined utilizing one of the following methods:

a. Mutually acceptable lump sum price including overhead and profit. The CONTRACTOR shall provide an estimated cost breakdown in accordance with, 10.4.5 and 10.4.6. – or-

b. If no agreement can be reached regarding an acceptable lump sum price, or if the CONTRACTOR is directed by the OWNER to proceed with the changed Work, actual documented cost for time and materials spent on the work. CONTRACTOR shall provide an itemization of actual costs in accordance with 10.4.7.

10.4.2 Deductive Changes

The CONTRACTOR shall itemize deductive changes identical to 10.4.6, except that the markup rates stated are mandatory.

10.4.3 Additive Changes and Deductive Changes Together

a. If a change in the Work involves both additive and deductive changes for the same type of Work, the appropriate overhead and profit amounts allowed will be added to the net difference of items of direct labor, material, construction equipment, small tools, and upper tier Subcontractor Proposals.

b. If other unrelated additive changed items are included in the same change Proposal, the appropriate overhead and profit allowed is to be applied to these individual changed items.

10.4.4 Changes Under $700

If the description of the change in the Work is, in the opinion of the OWNER, definitive enough for the OWNER to determine fair value, and the total of the change does not exceed $700, no cost breakdown is required.

10.4.5 Changes $700 and Over and Less than $2,500

If the description of the change in the Work is, in the opinion of the OWNER, definitive enough to determine fair value, the CONTRACTOR shall provide an estimated cost breakdown in accordance with the following categories:

a. Lump sum labor

b. Lump sum material

c. Lump sum equipment usage

c. Appropriate superintendence, small tools, overhead and profit as defined in Article 10.4.6

10.4.6 Changes $2,500 and Greater

If the cost of a change is $2,500 or greater or if, in the opinion of the OWNER, the description of the change in the Work is not definitive enough to determine fair value, the CONTRACTOR shall provide a breakdown of the estimated cost of a change in accordance with the following cost categories:

a. Direct Labor Costs:

Direct labor costs are estimated labor costs developed by estimating the number of hours necessary to perform the change multiplied by the hourly cost for the particular trade or professional involved or industry standard hourly labor costs. The hourly costs shall be based on the following:

1. Basic Wages/Fringe Benefits: Hourly rates and fringe benefits including, but not limited to, health and medical insurance, shall be as stated on the Department of Labor approved Labor and Mechanics Minimum Rates of Pay in force on the Contract date.

2. Worker's Insurance: Direct contributions to the State of Alaska such as industrial insurance, medical aid, and and supplemental pension, by the class and rates established by the State of Alaska, Department of Labor.

3. Federal Insurance: Direct contributions required by the Federal Insurance Compensation Act (FICA), Federal Unemployment Tax Act (FUTA), and the State Unemployment Compensation Act (SUCA).

4. Travel Allowance: Travel allowance and/or subsistence, if applicable, shall not exceed those established by regional labor union agreements, itemized and identified separately.

5. On Site Supervision: Direct on-site supervision

shall not exceed 15% of the cost of direct labor, and if a working supervisor's hours are covered, other supervision shall not be allowed. On-site supervision is defined as the combined total of CONTRACTOR's Project superintendents, foremen and lead crew personnel. All other supervision costs shall be included in CONTRACTOR's overhead and profit allowance as defined by Article 10.4.6.g below.

b. Direct Material Costs:

Direct material costs are an itemization of the estimated quantity and cost of materials necessary to perform the proposed change. Material pricing shall be developed from actual known costs, Supplier quotations, or standard industry pricing guides. Material costs shall consider all offered or available discounts and/or rebates. Freight costs, storage, express charges, or special delivery charges shall be itemized.

c. Construction Equipment Costs:

Construction equipment costs are an itemization of the type of equipment and the estimated length of time the construction equipment will be used on the proposed change. Costs will be allowed for construction equipment only if used solely for the changed Work, or additional rental costs are actually incurred by the Contractor. Equipment costs shall be developed from one of the following sources:

1. The current rental rates established by the National Electrical Contractor's Association (NECA) for equipment used on electrical work.

2. The current rental rates established by the Mechanical Contractor's Association for equipment used on mechanical work.

3. If equipment is required for which a rental rate is not established in any of the above, an agreed rental rate shall be established for the equipment using the Data Quest Rental Rate (Blue Book) as a basis for verifying rates. Such rates and the use of the equipment on the Work must be Approved by the OWNER prior to performing the Work.

d. Small Tools, Expendables & Consumable Supplies:

Small tools consist of tools that cost $250 or less and are normally Furnished by the performing contractor.

1. The maximum rate for small tools shall not exceed the following:

a) For the CONTRACTOR, 3% of direct labor costs

b) For specialty CONTRACTORs, 5% of direct labor costs

2. Expendables and consumable supplies, including utilities, directly associated with the change in Work must be itemized.

e. All Applicable Taxes

f. Subcontractor Proposals:

Subcontractor Proposals are to be itemized as specified in Articles a., b., c. and d. above.

g. Overhead and Profit by the CONTRACTOR, a Subcontractor, or Supplier Actually Performing the Work:

Allowances not to exceed 15% for overhead and profit for the party performing the Work will be based upon the value of labor, material, and use of construction equipment as defined in Articles 10.4.6.a., b., c. and d. above. This allowance is to compensate the CONTRACTOR for all personnel not included in Article 10.4.6.a. above, temporary construction facilities, field engineering, schedule updating, as-built Drawings, home office cost, project management, office engineering, estimating costs, additional home office overhead because of extended time, and any other indirect cost incidental to the performance of the change in work.

h. Overhead and Profit by the CONTRACTOR on Subcontractors actually performing the Work or Supplier dealing directly with the CONTRACTOR:

1. Overhead and Profit on subcontract change amount below $1000: The CONTRACTOR shall be allowed a $50 lump sum markup.

2. Overhead and Profit on Subcontract change amount above $1000: The CONTRACTOR shall be allowed a 5% markup.

3. Markups are allowed on the first lower tier subcontractor only. No other markup on other lower tiered subcontractors or suppliers shall be allowed.

4. No direct labor by the CONTRACTOR will be allowed to be added to a Subcontractor's proposal.

Costs incurred by the CONTRACTOR, which are additional to the fee allowed in this article, must be detailed in accordance with Article 10.4.6.a. Direct Labor Costs; Article 10.4.6.b. Direct Material Costs; Article 10.4.6.c. Construction Equipment Costs; Article 10.4.6.d. Small Tools, Expendables and Consumable Supplies; and Article 10.4.6.e. All Applicable Taxes.

10.4.7 Time and Materials (T&M) Work

When the CONTRACTOR has been directed to proceed utilizing the Time and Materials method of accounting for costs the CONTRACTOR shall categorize the costs of the Work in accordance with Articles 10.4.6 a., b., c., d., e., f., g., and h. with the modification that the costs tabulated shall be actual costs rather than estimated costs and with the following additional requirements:

a. Labor must be clearly identified and segregated from other work performed on workers' daily time sheets.

b. Time sheets must be submitted within two working days for OWNER's review and approval.

1. If supervisor's hours are included, then supervision markup will not be allowed.

2. CONTRACTOR's Daily Field Report must clearly identify action performed on Time and Material items of Work.

d. Material, freight, expendable, consumables and other incidental charges must be supported by invoices.

e. The CONTRACTOR shall not exceed any cost limit(s) without prior written approval by the OWNER.

10.4.8 Disagreements

In the event the CONTRACTOR does not agree upon the adjustment in Contract Price, scope of Work, or Contract Time, the following provisions shall apply:

a. Adjustments:

1. During the cost review process, the OWNER may discover discrepancies or arithmetic errors. If the discrepancy exceeds $50, a correction will be made and the Change Order process shall continue with the new value. This process will avoid delay in the processing of Change Orders.

2. Upon completion of the Change Order, the CONTRACTOR shall either accept the Change Order value as adjusted, or within two weeks of the Change Order receipt, notify the OWNER in writing of any disagreements.

b. Written Challenges: When the CONTRACTOR disagrees with either a Contract interpretation or a processed Change Order, a letter shall be submitted to the OWNER as described below:

1. Explain the nature of the disagreement

2. Identify the appropriate sections of the Contract Documents

3. State the CONTRACTOR's position in detail

4. Provide a detailed scope of Work

5. Request the issuance of a Change Order proposal

6. Provide a detailed cost breakdown of compensation requested

7. Provide support documentation and construction schedule for any request for Contract Time extensions

c. Prosecution of the Disputed Work: The OWNER may direct the CONTRACTOR to proceed with the Work by issuing a written authorization pending resolution of disputed items. If so directed the CONTRACTOR shall immediately and diligently proceed to complete the Work.

d. Negotiation: The OWNER and the CONTRACTOR shall review and negotiate the items in disagreement in an effort to clarify and resolve the dispute. All resolutions shall be incorporated into a Contract Change Order.

10.4.9 OWNER's Right to Audit

The CONTRACTOR shall maintain, and the OWNER shall have immediate and unrestricted access to, and the right to examine, any directly pertinent estimates, documents, papers, and records of the transactions relating to this Contract, and to make excerpts, copies, and transcriptions for the purpose of verifying CONTRACTOR's claims for extra costs and delays. This provision shall be in force for a period of time to end six (6) years after the Final Acceptance date of this Contract.

10.4.10 No Claim after Final Acceptance

No claim by the CONTRACTOR for a change in the Contract Price shall be allowed unless claimed before Final Acceptance of this Contract.

ARTICLE 11 - CONTRACT TIME; COMPUTATION AND CHANGE

11.1 Commencement of Contract Time; Notice to Proceed:

The Contract Time will commence to run on the Day indicated in the Notice to Proceed. Contract completion time is specified as a fixed calendar date, in lieu of “contract time”.

11.2 Starting the Work:

No Work on Contract items shall be performed before the effective date of the Notice to Proceed. The CONTRACTOR shall notify the Contracting Officer at least 10 days in advance of the time actual construction operations will begin. The CONTRACTOR may request a limited Notice to Proceed after Award has been made, to permit it to order long lead materials that could cause delays in Project completion. However, granting of a limited Notice to Proceed is within the sole discretion of the Contracting Officer, and refusal or failure to grant a limited Notice to Proceed shall not be a basis for claiming for delay, extension of Contract Time, or alteration of Contract Price.

11.3 Computation of Contract Time:

11.3.1 When the Contract Time is specified on a Calendar Days basis, all Work under the Contract shall be completed within the number of Calendar Days specified. The count of Contract Time begins on the Day following receipt of the Notice to Proceed by the CONTRACTOR, if no starting Day is stipulated therein.

Calendar Days shall continue to be counted against Contract Time until and including the date of Substantial Completion of the Work.

11.3.2 When the Contract completion time is specified as a fixed calendar date, it shall be the date of Substantial Completion. Contractor shall achieve Substantial Completion no later than October 31, 2008.

11.4 Contract Time Change:

The Contract Time may only be changed by a Change Order or Supplemental Agreement.

11.5 Extension Due to Delays:

If the CONTRACTOR is delayed or disrupted in its performance under the Contract by any of the following causes, the CONTRACTOR shall be entitled to an extension of Contract Time as its exclusive remedy. The Contractor agrees to complete the Work within the Contract Time as thus extended. Such extensions shall postpone the beginning of the time period for payment of liquidated damages by the CONTRACTOR, but they and the events producing them shall not be grounds for claims by the CONTRACTOR in damages or for additional costs, expenses, overhead or profit or other compensation.

The delays to which this Article applies, unless otherwise specified elsewhere in the Contract Documents, are unforeseeable delays due to:

11.5.1. Force majeure which includes war, riot, acts of God, unusually severe weather or any other cause beyond the CONTRACTOR's reasonable ability to foresee or control, whether or not similar to those enumerated.

11.5.2. An event that is the result of the negligence or other fault of the Owner, Contracting Officer or Project Manager.

11.5.3. Performance, attempted performance or delays in performance by any other contractor employed by the OWNER or their subcontractors; delays caused by any direction of the Project Manager respecting the order of precedence in the performance of the other contracts, and acts by other third parties including public and private utilities.

The CONTRACTOR shall file with the Project Manager a written request for an extension of Contract Time within 7 Calendar Days after the CONTRACTOR knows or by reasonable diligence should know, of the event causing or likely to cause delay. The request shall state the portion of the Work so delayed and shall fully state the reasons for such delay. No extension will be made for any portion of any delay occurring more than 10 Days before said request is made in writing to the Project Manager. In the case of a continuing cause of delay, only 1 request is necessary.

When such a request is received, the Project Manager will ascertain the reasons for and the extent of the delay, if any, and shall provide a finding of fact and determination to the CONTRACTOR. If the Project Manager determines that the facts justify an extension of Contract Time, the Contract will be modified by a Change Order in writing. If the Project Manager determines that the facts as reported by the CONTRACTOR do not justify an extension of Contract Time, such request will be denied in writing. The Project Manager's determination shall be final and conclusive unless the Contractor submits a Notice of Claim under the article entitled CLAIMS AND DISPUTES.

11.6 Essence of Contract:

All time limits stated in the Contract Documents are of the essence of the Contract.

11.7 Reasonable Completion Time:

It is expressly understood and agreed by and between the OWNER and the CONTRACTOR that the date of beginning and the time for Substantial Completion of the Work described herein are reasonable times for the completion of the Work.

11.8 Delay Damages:

Whether or not the CONTRACTOR's right to proceed with the Work is terminated, the CONTRACTOR and its Sureties shall be liable for damages resulting from CONTRACTOR's refusal or failure to complete the Work within the specified time.

Liquidated damages for delay shall be paid by the CONTRACTOR or its Surety to the OWNER in the amount(s) stipulated in Supplementary Conditions 00800 for each Calendar Day the completion of the Work or any part thereof is delayed beyond the time required by the Contract, or any extension thereof. The CONTRACTOR stipulates and agrees that the liquidated damages established herein are not a penalty but rather constitute an estimate of damages that the OWNER will sustain by reason of delayed completion. These liquidated and actual damages are intended as compensation for losses anticipated to arise.
These damages will continue to run both before and after termination in the event of default termination. These liquidated damages do not cover excess costs of completion or OWNER costs, fees, and charges related to reprocurement. If a default termination occurs, the CONTRACTOR or its Surety shall pay in addition to these damages, all excess costs and expenses related to completion as provided by Article 14.2.3.

ARTICLE 12 - QUALITY ASSURANCE

12.1 Warranty and Guaranty:

The CONTRACTOR warrants that all Work will be in accordance with the Contract Documents and will not be Defective. Prompt notice of all defects shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided for in this Article.

12.1.1 General Provisions

a. Neither the final payment nor any provision in the Contract Documents nor partial or entire occupancy of the Project by the OWNER shall constitute acceptance of Work not performed in accordance with the Contract Documents, or operate to relieve the CONTRACTOR of liability with respect to any responsibilities for faulty materials or workmanship. In addition to any other warranties in this Contract, the CONTRACTOR shall remedy any defects in the Work that appear within a period of 1 year after the date this warranty period commences unless a longer period is specified and shall pay for any damage to other work resulting from defective work or from efforts to repair defective Work. The OWNER shall give notice of observed defects with reasonable promptness.

b. The warranty period shall commence at Substantial Completion, as evidenced by the OWNER's written notice. The warranty period shall commence only as to those items of Work that are substantially complete as of the date of beneficial occupancy. The CONTRACTOR shall make all required arrangements with Suppliers of equipment and materials for the Project to enable all manufacturer and Supplier warrantees to remain in force during the warranty period at a minimum.

c. The CONTRACTOR, when notified by the OWNER of a defect in the Work within the warranty period, shall immediately, and at no cost to the OWNER, place in satisfactory condition all defective Work. The CONTRACTOR's warranty with respect to Work repaired or replaced will extend for one year from the date of the repair or replacement.

d. If the CONTRACTOR fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the OWNER shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the CONTRACTOR's expense.

12.2 Access to Work:

The OWNER and the OWNER's representatives, testing agencies and governmental agencies with jurisdiction interests will have access to the Work at reasonable times for their observation, inspecting and testing. The CONTRACTOR shall provide proper and safe conditions for such access.

12.3 Tests and Inspections:

12.3.1 The CONTRACTOR shall give the Contracting Officer timely notice of readiness of the Work for all required inspections, tests or approvals.

12.3.2 If Regulatory Requirements of any public body having jurisdiction require any work (or part thereof) to specifically be inspected, tested or approved, the CONTRACTOR shall assume full responsibility therefore, pay all costs in connection therewith and Furnish the Contracting Officer the required certificates of inspection, testing or approval. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to the CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by the CONTRACTOR. The OWNER may perform additional tests and inspections that it deems necessary to insure quality control. All such failed tests or inspections shall be at the CONTRACTOR's expense. OWNER shall pay for all special inspections required by the IBC Chapter 17.

12.3.4 If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of the Contracting Officer, that Work must, if requested by the Contracting Officer, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the Contracting Officer timely notice of CONTRACTOR's intention to cover the same and the Contracting Officer has not acted with reasonable promptness in response to such notice.

12.3.5 Neither observations nor inspections, tests or approvals by the OWNER or others shall relieve the CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

12.4 OWNER May Stop the Work:

If the Work is Defective, or the CONTRACTOR fails to supply suitable materials or equipment, or fails to Furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the Contracting Officer may order the CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Contracting Officer to stop the Work shall not give rise to any duty on the part of the Contracting Officer to exercise this right for the benefit of the CONTRACTOR or any other party.

12.5 Correction or Removal of Defective Work:

If required by the Contracting Officer, the CONTRACTOR shall promptly, as directed, either correct all Defective Work, whether or not fabricated, Installed or completed, or, if the Work has been rejected by the Contracting Officer, remove it from the site and replace it with Work that conforms to the requirements of the Contract Documents. The CONTRACTOR shall bear all direct, indirect and consequential costs of such correction removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

12.6 Acceptance of Defective Work

Instead of requiring correction or removal and replacement of Defective Work, the Contracting Officer may accept Defective Work, the CONTRACTOR shall bear all direct, indirect and consequential costs attributable to the Contracting Officer's evaluation of and determination to accept such Defective Work (costs to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the OWNER shall be entitled to an appropriate decrease in the Contract Price. If the OWNER has already made final payment to the CONTRACTOR, an appropriate amount shall be paid by the CONTRACTOR or its Surety to the OWNER.

12.7 OWNER May Correct Defective Work:

If the CONTRACTOR fails within a reasonable time after written notice from the Contracting Officer to proceed to correct Defective Work or to remove and replace rejected Work as required by the Contracting Officer in accordance with paragraph 12.5 or if the CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the OWNER may, after seven days' written notice to the CONTRACTOR, correct and remedy any such deficiency. The cost of corrective action shall be born by the CONTRACTOR or its Surety. To the extent necessary to complete corrective and remedial action, the Contracting Officer may exclude the CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend the CONTRACTOR's services related thereto, take possession of the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or approved remote storage sites or for which the OWNER has paid the CONTRACTOR but which are stored elsewhere, the CONTRACTOR shall allow the Contracting Officer and his authorized representative such access to the site as may be necessary to enable the Contracting Officer to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of the OWNER in exercising such rights and remedies will be charged against the CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and the OWNER shall be entitled to an appropriate decrease in the Contract Price. Such direct, indirect and consequential costs will include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the CONTRACTOR's Defective Work. The CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the Contracting Officer of the OWNER's rights and remedies hereunder.

ARTICLE 13 - PAYMENTS TO CONTRACTOR AND COMPLETION

13.1 Application for Progress Payment:

The CONTRACTOR shall submit to the Contracting Officer for review a Request for Payment filled out and signed by the CONTRACTOR covering the Work completed as of the date of the Request for Payment and accompanied by such supporting documentation as is required by the Contract Documents. Progress payments will be made as the Work progresses on a monthly basis.

13.2 Review of Applications for Progress Payment:

Contracting Officer will either indicate in writing a recommendation of payment or return the Request for Payment to the CONTRACTOR indicating in writing the Contracting Officer's reasons for refusing to recommend payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the Request for Payment.

13.3 Stored Materials and Equipment:

If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Request for Payment shall also be accompanied by a bill of sale, paid invoice or other documentation warranting that the OWNER has received the materials and equipment free and clear of all charges, security interests and encumbrances and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the Contracting Officer. No payment will be made for perishable materials that could be rendered useless because of long storage periods. No progress payment will be made for living plant materials until planted.

13.4 CONTRACTOR's Warranty of Title:

The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Request for Payment, whether incorporated in the Project or not, will pass to the OWNER no later than the time of payment free and clear of any claims, liens, security interests and further obligations.

13.5 Withholding of Payments:

The OWNER may withhold or refuse payment for any of the reasons listed below provided it gives written notice of its intent to withhold and of the basis for withholding:

13.5.1 The Work is Defective, or completed Work has been damaged requiring correction or replacement, or has been Installed without Approval of Shop Drawings, or by an unapproved Subcontractor or for unsuitable storage of materials and equipment.

13.5.2 The Contract Price has been reduced by Change Order.

13.5.3 The OWNER has been required to correct Defective Work or complete Work in accordance with paragraph 12.7.

13.5.4 The occurrence of any of the events enumerated in paragraphs 14.2.1a through 14.2.1k inclusive.

13.5.5 Claims have been made against the OWNER or against the funds held by the OWNER on account of the CONTRACTOR's actions or inactions in performing this Contract, or there are other items entitling the OWNER to a set off.

13.5.6 Subsequently discovered evidence or the results of subsequent inspections or test, nullify any previous payments for reasons stated in subparagraphs 13.5.1 through 13.5.5.

13.5.7 The CONTRACTOR has failed to fulfill or is in violation of any of its obligations under any provision of this Contract.

13.5.8 Contract close-out documentation and a Schedule of Values are both required by General Requirements to be submitted and accepted by the Contracting Officer. Submittal of the contract close-out documents must

be included in the Schedule of Values as specific activities or items for each class of documents listed below. The minimum Schedule of Value percentages or amounts required are shown:

a. Certificate of Occupancy: 10% of Contract amount or $20,000 whichever is less. Submittal of a Conditional Certificate of Occupancy may allow partial payment of this item.

b. Project Record Documents, Operation and Maintenance Manuals, warranties, guarantees, bonds, certificate of compliance, close-out abatement reports, commissioning reports and other required technical submittals: 10% of Contract amount or $10,000 whichever is less.

c. Contractor and subcontractor affidavit of release of liens, affidavit of payment of debts and claims, consent of surety to final payment, wage certification: 5% of Contract or $5,000, whichever is less.

13.5.9 Delay damages per paragraph 11.8.

13.5.10 On the basis of estimates of Work performed during the preceding calendar month and Approved by the Contracting Officer, the OWNER will make progress payments to the CONTRACTOR; but to ensure the proper performance of this Contract, the OWNER may at any time, at its sole option, retain up to ten percent (10%) of the amount of progress payments until Final Completion and Final Acceptance; provided that on completion and acceptance of the Project or of each separate building, public work, or other division of the Project on which the price is stated separately in the Contract, payment may be made in full for that portion completed and accepted including retained percentages less authorized deductions or other provisions of the Contract.

13.6 Request for Release of Funds:

If the CONTRACTOR believes the basis for withholding is invalid or no longer exists, immediate written notice of the facts and Contract provisions on which the CONTRACTOR relies, shall be given to the OWNER, together with a request for release of funds and adequate documentary evidence proving that the problem has been cured. In the case of withholding that has occurred at the request of the Department of Labor, the CONTRACTOR shall provide a letter from the Department of Labor stating that withholding is no longer requested. Following such a submittal by the CONTRACTOR, the OWNER shall have a reasonable time to investigate and verify the facts and seek additional assurances before determining whether release of withheld payments is justified.

13.7 Substantial Completion:

When the CONTRACTOR considers the Work ready, in accordance with the Contract Documents, for its intended use the CONTRACTOR shall notify the Contracting Officer in writing that the Work or a portion of Work that has been specifically identified in the Contract Documents is substantially complete (except for items specifically listed by the CONTRACTOR as incomplete) and request that the OWNER issue a certificate of Substantial Completion. Within a reasonable time thereafter, the Contracting Officer, the CONTRACTOR and appropriate consultant(s) shall make an inspection of the Work to determine the status of completion. If the Contracting Officer does not consider the Work substantially complete, the Contracting Officer will notify the CONTRACTOR in writing giving the reasons therefore. If the Contracting Officer considers the Work substantially complete, the Contracting Officer will within fourteen days execute and deliver to the CONTRACTOR a certificate of Substantial Completion with tentative list of items to be completed or corrected. At the time of delivery of the certificate of Substantial Completion the Contracting Officer will deliver to the CONTRACTOR a written division of responsibilities pending Final Completion with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties, which shall be consistent with the terms of the Contract Documents.

The OWNER shall be responsible for all OWNER costs resulting from the initial inspection and the first re-inspection, the CONTRACTOR shall pay all costs incurred by the OWNER resulting from re-inspections, thereafter.

13.8 Access Following Substantial Completion:

The OWNER shall have the right to exclude the CONTRACTOR from the Work after the date of Substantial Completion, but the OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

13.9 Final Inspection:

Upon written notice from the CONTRACTOR that the entire Work or an agreed portion thereof is complete, the Contracting Officer will make a final inspection with the CONTRACTOR and appropriate consultants and will notify the CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or Defective. The CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies. The CONTRACTOR shall pay for all costs incurred by the OWNER resulting from re-inspections.

13.10 Final Completion and Request for Payment:

After the CONTRACTOR has completed all such corrections to the satisfaction of the Contracting Officer and delivered all maintenance and operating instructions, schedules, guarantees, bonds, certificates of payment to all laborers, Subcontractors and Suppliers, certificates of inspection, marked-up record documents and other documents - all as required by the Contract Documents; and after the Contracting Officer has indicated in writing that the Work has met the requirements for Final Completion, and subject to the provisions of paragraph 13.14, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Request for Payment shall be accompanied by all certificates, warranties, guarantees, releases, affidavits, and other documentation required by the Contract Documents.

13.11 Final Payment:

13.11.1 If, on the basis of the Contracting Officer's observation of the Work during construction and final inspection, and the Contracting Officer's review of the final Request for Payment and accompanying documentation - all as required by the Contract Documents; and the Contracting Officer is satisfied that the Work has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the OWNER will process final Request for Payment. Otherwise, the Contracting Officer will return the Request for Payment to the CONTRACTOR, indicating in writing the reasons for refusing to process final payment, in which case the CONTRACTOR shall make the necessary corrections and resubmit the final Request for Payment.

13.11.2 If, through no fault of the CONTRACTOR, Final Completion of the Work is significantly delayed, the Contracting Officer shall, upon receipt of the CONTRACTOR's final Request for Payment, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. Such payment shall be made under the terms and Conditions of the Contract governing final payment, except that it shall not constitute a waiver of claims.

13.12 Final Acceptance:

Following certification of payment of payroll and revenue taxes, and final payment to the CONTRACTOR, the OWNER will issue a letter of Final Acceptance, releasing the CONTRACTOR from further obligations under the Contract, except as provided in paragraph 13.13.

13.13 CONTRACTOR's Continuing Obligation:

The CONTRACTOR's obligation to perform and complete the Work and pay all laborers, Subcontractors, and materialmen in accordance with the Contract Documents shall be absolute. Neither any progress or final payment by the OWNER, nor the issuance of a certificate of Substantial Completion, nor any use or occupancy of the Work or any part thereof by the OWNER or Using Agency, nor any act of acceptance by the OWNER nor any failure to do so, nor any review and approval of a Shop Drawing or other Project submittal, nor any correction of Defective Work by the OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents.

13.14 Waiver of Claims by CONTRACTOR:

The making and acceptance of final payment will constitute a waiver of all claims by the CONTRACTOR against the OWNER other than those previously made in writing and still unsettled.

13.15 No Waiver of Legal Rights:

The OWNER shall not be precluded or be estopped by any payment, measurement, estimate, or certificate made either before or after the completion and acceptance of the Work and payment therefor, from showing the true amount and character of the Work performed and materials Furnished by the CONTRACTOR, nor from showing that any payment, measurement, estimate or certificate is untrue or is incorrectly made, or that the Work or materials are Defective. The OWNER shall not be precluded or estopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the CONTRACTOR or its Sureties, or both, such damages as it may sustain by reason of its failure to comply with requirements of the Contract Documents. Neither the acceptance by the OWNER, or any representative of the OWNER, nor any payment for or acceptance of the whole or any part of the Work, nor any extension of the Contract Time, nor any possession taken by the OWNER, shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damages. A waiver by the OWNER of any breach of the Contract shall not be held to be a waiver of any other subsequent breach.

ARTICLE 14 - SUSPENSION OF WORK, DEFAULT AND TERMINATION

14.1 OWNER May Suspend Work

14.1.1 The OWNER may, at any time, suspend the Work or any portion thereof by notice in writing to the CONTRACTOR. If the Work is suspended without cause the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an Approved claim therefore as provided in Article 15. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that suspension is due to the fault or negligence of the CONTRACTOR, or that suspension is necessary for Contract compliance, or that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the CONTRACTOR.

14.1.2 In case of suspension of Work, the CONTRACTOR shall be responsible for preventing damage to or loss of any of the Work already performed and of all materials whether stored on or off the site or approved remote storage sites.

14.2 Default of Contract

14.2.1 If the CONTRACTOR:

a. Fails to begin the Work under the Contract within the time specified in the Proposal, or

b. Fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficiently skilled workmen, suitable materials, or equipment or failure to adhere to the progress schedule established under paragraph 6.6 as revised from time to time), or

c. Performs the Work unsuitably or neglects or refuses to remove materials or to correct Defective Work, or

d. Discontinues the prosecution of the Work, or

e. Fails to resume Work that has been discontinued within a reasonable time after notice to do so, or

f. Becomes insolvent, except that if the CONTRACTOR declares bankruptcy termination shall be in accordance with U.S.C. 362 and/or 11 U.S.C. 365. In the event the CONTRACTOR declares bankruptcy the CONTRACTOR agrees that the Contract will be assumed or rejected in a timely manner so that the Contract will be completed by the date specified in the Contract, or

g. Allows any final judgment to stand against him unsatisfied for period of 60 days, or

h. Makes an assignment for the benefit of creditors without the consent of the Contracting Officer, or

i. Disregards Regulatory Requirements of any public body having jurisdiction, or

j. Otherwise violates in any substantial way any provisions of the Contract Documents, or

k. For any cause whatsoever, fails to carry on the Work in an acceptable manner,

the Contracting Officer may give notice in writing to the CONTRACTOR and its Surety of such delay, neglect, or default.

14.2.2 If the CONTRACTOR, within the time specified in the above notice of default, shall not proceed in accordance therewith, then the OWNER may, upon written notification from the Contracting Officer of the fact of such delay, neglect or default and the CONTRACTOR's failure to comply with such notice, have full power and authority without violating the Contract, to take the prosecution of the Work out of the hands of the CONTRACTOR. The OWNER may terminate the services of the CONTRACTOR, exclude the CONTRACTOR from the site and take possession of the Work and of all the CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by the CONTRACTOR (without liability to the CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which the OWNER has paid the CONTRACTOR but which are stored elsewhere, and finish the Work as the OWNER may deem expedient. The OWNER may enter into an agreement for the completion of said Contract according to the terms and provisions thereof, or use such other methods that in the opinion of the Contracting Officer are required for the completion of said Contract in an acceptable manner.

14.2.3 If the Contract is terminated for default, the CONTRACTOR shall be liable for damages for delay as provided by Article 11.8, and for the excess cost of completion, and all costs and expenses incurred by the OWNER in completing the Work, including but not limited to costs of assessing the Work to be done, costs associated with advertising, soliciting or negotiating for bids or Proposals for completion, and other reprocurement costs. Following termination the CONTRACTOR shall not be entitled to receive any further balance of the amount to be paid under the Contract until the Work is fully finished and accepted, at which time if the unpaid balance exceeds the amount due the OWNER and any amounts due to persons for whose benefit the OWNER has withheld funds, such excess shall be paid by the OWNER to the CONTRACTOR. If the damages, costs, and expenses due the OWNER exceed the unpaid balance, the CONTRACTOR and its Surety shall pay the difference.

14.2.4 If, after notice of termination of the CONTRACTOR's right to proceed under the provisions of this clause, it is determined for any reason that the CONTRACTOR was not in default under the provisions of this clause or that the delay was excusable under the provisions of this clause, or that termination was wrongful, the rights and obligations of the parties shall be determined in accordance with the clause providing for convenience termination.

14.3 Rights or Remedies:

Where the CONTRACTOR's services have been so terminated by the OWNER, the termination will not affect any rights or remedies of the OWNER against the CONTRACTOR then existing or that may thereafter accrue. Any retention or payment of moneys due the CONTRACTOR by the OWNER will not release the CONTRACTOR from liability.

14.4 Convenience Termination:

14.4.1 The performance of the Work may be terminated by the OWNER in accordance with this section in whole or in part, whenever, for any reason the Contracting Officer shall determine that such termination is in the best interest of the OWNER. Any such termination

shall be effected by delivery to the CONTRACTOR of a "Notice of Termination", specifying termination is for the convenience of the OWNER the extent to which performance of Work is terminated, and the date upon which such termination becomes effective.

Immediately upon receipt of a "Notice of Termination" and except as otherwise directed by the Contracting Officer, the CONTRACTOR shall:

a. Stop Work on the date and to the extent specified in the "Notice of Termination";

b. Place no further orders or subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the Work as is not terminated;

c. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the "Notice of Termination";

d. With the written Approval of the Contracting Officer, to the extent he may require, settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, the cost of which would be reimbursable, in whole, or in part, in accordance with the provisions of the Contract;

e. Submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory exclusive of items the disposition of which had been directed or authorized by the Contracting Officer;

f. Transfer to the Contracting Officer the completed or partially completed record Drawings, Shop Drawings, information, and other property that if the Contract had been completed, would be required to be Furnished to the OWNER;

g. Take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to the Contract that is in the possession of the CONTRACTOR and in which the OWNER has or may acquire any interest.

The CONTRACTOR shall proceed immediately with the performance of the above obligations.

14.4.2 When the OWNER orders termination of the Work effective on a certain date, all Work in place as of that date will be paid for in accordance with Article 13 of the Contract. Materials required for completion and on hand but not incorporated in the Work will be paid for at invoice cost plus 15% with materials becoming the property of the OWNER - or the CONTRACTOR may retain title to the materials and be paid an agreed upon lump sum. Materials on order shall be cancelled, and the OWNER shall pay reasonable factory cancellation charge with the option of taking delivery of the materials in lieu of payment of cancellation charges. The CONTRACTOR shall be paid 10% of the cost, freight not included, of materials cancelled, and direct expenses only for CONTRACTOR chartered freight transport that cannot be cancelled without charges, to the extent that the CONTRACTOR can establish them. The extra costs due to cancellation of bonds and insurance and that part of job start-up and phase-out costs not amortized by the amount of Work accomplished shall be paid by the OWNER. Charges for loss of profit or consequential damages shall not be recoverable except as provided above.

14.4.3 The termination claim shall be submitted promptly, but in no event later than 90 days from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer upon request of the CONTRACTOR made in writing within the 90 Day period. Upon failure of the CONTRACTOR to submit its termination claim within the time allowed, the Contracting Officer may determine, on the basis of information available to him, the amount, if any, due to the CONTRACTOR by reason of the termination and shall thereupon pay to the CONTRACTOR so determined.

14.4.4 The CONTRACTOR and the Contracting Officer may agree upon whole or any part of the amount or amounts to be paid to the CONTRACTOR by reason of the total or partial termination of Work pursuant to this section. The Contract shall be amended accordingly, and the CONTRACTOR shall be paid the agreed amount.

In the event of the failure of the CONTRACTOR and the Contracting Officer to agree in whole or in part, as provided heretofore, as to the amounts with respect to costs to be paid to the CONTRACTOR in connection with the termination of the Work the Contracting Officer shall determine, on the basis of information available to him, the amount, if any, due to the CONTRACTOR by reason of the termination and shall pay to the CONTRACTOR the amount determined as follows:

a. All costs and expenses reimbursable in accordance with the Contract not previously paid to the CONTRACTOR for the performance of the Work prior to the effective date of the "Notice of Termination";

b. So far as not included under "a" above, the cost of settling and paying claims arising out of the termination of the Work under subcontracts or orders that are properly chargeable to the terminated portions of the Contract;

c. The reasonable costs of settlement with respect to the terminated portion of the Contract heretofore, to the extent that these costs have not been covered under the payment provisions of the Contract.

14.4.5 The CONTRACTOR shall have the right of appeal under the OWNER's claim procedures as defined in Article 15, for any determination made by the Contracting Officer, except if the CONTRACTOR has failed to submit its claim within the time provided and has failed to request extension of such time, CONTRACTOR shall have no such right of appeal.
In arriving at the amount due the CONTRACTOR under this section, there shall be deducted:

a. All previous payments made to the CONTRACTOR for the performance of Work under the Contract prior to termination;

b. Any claim for which the OWNER may have against the CONTRACTOR;

c. The agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the CONTRACTOR or sold pursuant to the provisions of this section and not otherwise recovered by or credited to the OWNER; and,

d. All progress payments made to the CONTRACTOR under the provisions of this section.

14.4.6 Where the Work has been terminated by the OWNER said termination shall not affect or terminate any of the rights of the OWNER against the CONTRACTOR or its Surety then existing or that may thereafter accrue because of such default. Any retention or payment of monies by the OWNER due to the CONTRACTOR under the terms of the Contract shall not release the CONTRACTOR or its Surety from liability.

Unless otherwise provided for in the Contract Documents, or by applicable statute, the CONTRACTOR, from the effective date or termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the OWNER at all reasonable times at the office of the CONTRACTOR, all its books, records, documents, and other evidence bearing on the cost

and expenses of the CONTRACTOR under its Contract and relating to the Work terminated hereunder.

ARTICLE 15 - CLAIMS AND DISPUTES

15.1 Notification:

In addition to the notice requirements set out elsewhere in this Contract, if the CONTRACTOR becomes aware of any act or occurrence that may form the basis of a claim by the CONTRACTOR for additional compensation or an extension of time for performance, or if any dispute arises regarding a question of fact or interpretation of the Contract, the CONTRACTOR shall, within 3 Working Days, inform the Project Manager. If the matter cannot be resolved by agreement within 7 days, the CONTRACTOR shall, within the next 14 days, submit an "Intent to Claim" in writing. The claim, if not resolved, shall be presented to the Project Manager within 60 days following receipt of the "Intent to Claim". Receipt of the claim will be acknowledged in writing by the Project Manager. The CONTRACTOR agrees that unless these written notices are provided, the CONTRACTOR will have no entitlement to additional time or compensation for such act, event or condition. The CONTRACTOR shall in any case continue diligent performance of the Contract.

15.2 Presenting Claim:

The claim shall specifically include the following:

15.2.1 The act, event, or condition giving rise to the claim.

15.2.2 The Contract provisions that apply to the claim and under which relief is provided.

15.2.3 The item or items of Contract Work affected and how they are affected.

15.2.4 The specific relief requested, including Contract Time if applicable, and the basis upon which it was calculated.

15.3 Claim Validity, Additional Information, and Project Manager's Actions:

The claim, in order to be valid, must not only show that the CONTRACTOR suffered damages or delay but that those conditions were actually a result of the act, event or condition complained of and that the Contract provides entitlement to relief to the CONTRACTOR for such act, event, or condition. The Project Manager reserves the right to make written request to the CONTRACTOR at any time for additional information that the CONTRACTOR may possess relative to the claim. The CONTRACTOR agrees to provide the Project Manager such additional information within 30 days of receipt of such a request. Failure to Furnish such additional information may be regarded as a waiver of the claim. The claim, if not resolved by agreement within 60 days of its receipt, will automatically be forwarded to the Contracting Officer for formal written decision.

15.4 Contracting Officer's Decision:

The CONTRACTOR will be furnished the Contracting Officer's decision within the next 90 days, unless additional information is requested by the Contracting Officer. The Contracting Officer's decision is final and conclusive unless fraudulent as to the claim or unless, within 14 days of receipt of the decision, the CONTRACTOR delivers a written Notice of Appeal to the Deputy Director, Alaska Court System. Procedures for appeals and hearings are covered under Admin Rule 47. Any dispute or appeal requiring judicial review must be filed within the Third Judicial District in Anchorage, Alaska.

15.5 Construing the Contract

This Contract shall be construed in accordance with the laws of Alaska.

15.6 Integrated Contract

This is an integrated contract. If any provision of this Contract is found to be illegal, all other provisions shall be given full force and effect.

END OF SECTION

SECTION 00 8000
SUPPLEMENTARY CONDITIONS

The following supplements modify, change, delete from or add to the General Conditions of the Contract for Construction.

ARTICLE I - DEFINITIONS

Contract Documents Revise to Read as follows:

Contract Documents - The Contract form, Invitation to Bid (including all documents and forms issued with the Invitation to Bid), Addenda, Notice of Award, Notice to Proceed, the bidding requirements and CONTRACTOR's bid (including all appropriate bid tender forms), the bonds, the General Conditions and the Supplementary Conditions of the Contract, Laborers, and Mechanics' Minimum Rates of Pay, Specifications, Drawings, and all other Contract requirements and specifications Furnished by the OWNER to the CONTRACTOR, together with all Change Orders and documents approved by the Contracting Officer for inclusion, modifications and supplements issued on or after the Effective Date of the Contract.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.1 Revise to read as follows:

The CONTRACTOR shall diligently, and in skillful, workmanlike manner, provide all labor, materials, equipment, and facilities necessary to perform the Work in accordance with the Contract Documents and in a manner to complete the Work within the specified contract time. The CONTRACTOR shall not perform any portion of the Work for which the Contract Documents require submittal; review; and approval of Shop Drawings, Product Data, Samples or similar documents until the applicable submittal has been approved by the Owner/Architect.

6.3 Revise to read as follows:

The CONTRACTOR shall provide on the Site at all times during the prosecution of the Work an Owner approved, competent resident Superintendent. The CONTRACTOR is to submit to the Owner for consideration, the proposed Superintendents qualifications and relevant work history, and four (4) project references, no older than 5 years old, with scope, date, and contact information including phone numbers of the referenced project's Project Manager. The Owner shall also be advised in writing of the Superintendent's name, email address, local address, mailing address, and telephone number. This written advice is to be kept current until Final Completion by the OWNER. The Superintendent will be the CONTRACTOR's representative at the site and shall have full authority to act and sign documents on behalf of the CONTRACTOR. The Superintendent may not be changed or replaced without prior approval of the Owner. All communications given to the Superintendent shall be as binding as if given to the CONTRACTOR.

The CONTRACTOR shall cooperate with the Owner in every way possible.

6.7 Add a new paragraph to Read:

In addition to the provisions of this Subsection 6.7, CONTRACTOR must adhere to the provisions of Section 01 3100 Project Schedules.

6.8 Add a new paragraph to Read:

In addition to the provisions of this Subsection 6.8, CONTRACTOR must adhere to the provisions of Section 01 3100 Project Schedules.

6.22 Add Paragraph 6.22.4 to Read:

"CONTRACTOR must prepare contemporaneous daily reports showing the progress of the work. The CONTRACTOR must transmit a copy of the daily reports to the Owner no less frequently than once per week. Each transmittal of daily reports must include all daily reports generated since the most recent transmittal. Transmittal of daily reports does not constitute notice to the Owner of any matter for which notice is specifically required under the Contract Documents. The daily reports must include, at the minimum, information regarding the project schedule, safety issues, subcontractors on site, work performed, meetings held, and communications with the Owner."

ARTICLE 7 – LAWS AND REGULATION

7.2.1 Add: The OWNER shall pay for all plan review and building permit fees required by the local Building Safety department at the project location. The CONTRACTOR shall pay for all building and trade permits and licenses."

7.12 Revise to read as follows:

7.12 Preferential Employment.

7.12.1 The CONTRACTOR shall comply with all applicable and valid laws and regulations regarding the hiring of Alaska residents now in effect or that might subsequently take effect during the term of this Contract.

7.12.2 Employment Preference in Zones of Underemployment. The Alaska Department of Labor and Workforce Development has determined that certain areas of Alaska are Zones of Underemployment. If the Work is to be performed wholly or partly within a Zone of Underemployment, the CONTRACTOR must give employment preference to Alaska residents as determined by the Alaska Department of Labor and Workforce Development. Failure to comply with this requirement can result in substantial civil and criminal penalties under AS 36.10.100. Within 20 days after award of a contract under this procurement, the Alaska Court System will report the Contract to the Alaska Department of Labor and Workforce Development, which will be responsible for administration and enforcement of employment preference requirements. Contractor can obtain the Alaska Department of Labor and Workforce Development Employment Preference Determination at the following internet address: http://labor.alaska.gov/lss/forms/res-hire-notice-2013.pdf. For further information, contact the Alaska Department of Labor and Workforce Development, Division of Wage and Hour Administration, at 907-269-4900.

7.12.3 In order to ensure that the CONTRACTOR's Subcontractors will comply with all applicable laws and regulations regarding the hiring of Alaska residents now in effect or that might subsequently take effect, the CONTRACTOR shall include in its Contracts with Subcontractors under this Contract language that is substantially the same as 7.12.1 and 7.12.2, above.

7.13 Revise 7.13.2 to read as follows:

7.13.2 The following Labor provisions shall also apply to this Contract:

a. CONTRACTOR and Subcontractors of CONTRACTOR shall pay all employees unconditionally and not less than once a week;

b. wages may not be less than those stated in the advertised Specifications, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors;

c. the scale of wages to be paid shall be posted by the CONTRACTOR in a prominent and easily accessible place at the site of the Work;

d. the OWNER shall withhold so much of the accrued payments as is necessary to pay to laborers, mechanics, or field surveyors employed by the CONTRACTOR or Subcontractors the difference between

1. the rates of wages required by the Contract to be paid laborers, mechanics, or field surveyors on the Work, and

2. the rates of wages in fact received by laborers, mechanics, or field surveyors.

ARTICLE 11 - CONTRACT TIME; COMPUTATION AND CHANGE

11.3 Add to 11.3.1: “Substantial Completion required 30 days after completion with Work on-site.”

Add to 11.3.2: “Contractor shall achieve Final Completion no later than 30 calendar days after Substantial Completion.”

11.8 Add: “Liquidated damages will be in the amount of $200.00 per day, beginning on the date provided in Section 00 8000, Paragraph 11.3 for Final Completion and ending on the date that Final Completion is achieved. These liquidated damages are intended to compensate the OWNER for contract administration costs due to delay and are in addition to any actual damages that OWNER may claim as a result of loss of use or other harm resulting from delay of Final Completion.”

ARTICLE 12 – QUALITY ASSURANCE

Add to 12.3.1: “Contractor shall provide a minimum of 72 hours notice for all required or requested inspections, approvals, tests or differing condition verifications that require site visits. Site visits by Owner are limited to weekdays, unless agreed to in advance by both parties.”

Add to 12.3.2: “Owner shall pay for all special inspections required by the IBC Chapter 17.”

ARTICLE 13 – PAYMENTS TO CONTRACTOR AND COMPLETION

Delete the last paragraph of 13.7 and substitute the following: “Owner shall make the first inspection for Substantial Completion at the Owner’s expense. If, due to the absence of Substantial Completion at the time of the first inspection, Owner is required to make one

or more further inspections for Substantial Completion, Contractor shall bear and be responsible for all of Owner's costs to perform such further inspections, including the cost of labor and travel costs."

END OF SECTION 00 8000

DIVISION 01

SECTION 01 0100
SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1. Provide all equipment, materials, labor, and workmanship, necessary to complete the Work as described and reasonably inferred to in the Contract Documents. In General:

   A. The ALASKA COURT SYSTEM requires services from a qualified contractor to install a 100 Kilowatts/125kVA, 277/480V, 60 Hz, three phase, diesel, emergency generator set Caterpillar D100 GC, an automatic transfer switch panel (ATS), a concrete platform and associated electrical connections. The contractor will be responsible for restoration repairs on the walls and floor surfaces areas around the location for the generator set; all electrical panels and all installations are to comply with the applicable local electric codes. The project site is located in Anchorage, AK. The price listed below shall include labor, materials, transportation, insurance and any additional fee included on this service. The ALASKA COURT SYSTEM will pay the Contractor a firm lump sum for standard services that have been satisfactorily performed.

   B. The generator set and the automatic transfer switch (ATS) shall be inspected by the contractor in the presence of the Project Manager to determine any damaged or missing parts. The contractor shall be responsible for damaged or loss occurring after the inspection and during transportation from the warehouse to the final location in Anchorage, AK.

   C. Perform installation and start-up of the equipment per manufacturer's recommendations and Section 26 32 00.

   D. Install an automatic transfer switch (ATS), includes power and control wiring, electrical piping and accessories shall be Metal Conduit for surface mount areas. ATS shall be properly grounded as per described in the National Electric code section 250.

   E. Install grounding protection system for generator set as per described in the National Electric Code section 250 grounding and bonding, section 225.31-225.39,702,445 and all applicable codes.

   F. All electrical labor related to installation included electrical materials. Main feeder from generator set to the ATS and from ATS to main distribution panel shall support 160 amperes, use copper wire THHN for phases and ground line. Electric load calculation and electric load demand design shall be done according the National Electric Code articles 210, 215, 220, 240 and 250.

   G. Starting and testing all the system in automatic mode simulating power failures from the utility. Electrical wires, pipes and devices shall comply with

UL standard and meet National Electric Codes.

H. Contractor shall provide all electrical diagrams, power and control wiring related to this project.

I. Twelve (12) month Warranty for normal operation for work performed.

J. The Contractor shall remove all garbage from the premises after work is finished. The Contractor shall clean, wash and remove debris.

1.2 CONTRACT TYPE

A. Competitively bid lump sum single prime contract.

PART 2 – PRODUCTS Not used.

PART 3 – EXECUTION Not used.

END OF SECTION 01 0100

SECTION 01 0270
SCHEDULE OF VALUES/ REQUEST FOR PAYMENT

PART 1 GENERAL

1.1 SCHEDULE OF VALUES

A. Submit Schedule of Values with Final Project Schedule required in Section 01 3100, and with each Request for Payment.

B. Schedule of Values should include the following information:

1. Item or Activity Number
2. Description of Work.
3. Scheduled Value ($).

C. Examples of item to be described include items for each separate stage of work: General Conditions; Material Procurement; Site Mobilization; Demolition; Abatement; Hoisting; Mechanical; Electrical; Roofing; Close Out; etc. Work items to be accomplished by a subcontractor should include subcontractor's name.

D. Schedule of Values must be reviewed and approved by Owner prior to approval of first Request for Payment.

1.2 REQUEST FOR PAYMENT

A. Submit typed request for payment on forms provided by the Owner. Request for Payment and Pay Request Itemization Sheet shall use the item number, description of work and scheduled value as approved for the Schedule of Values. Sample copies of the forms are attached to this section.

B. Submit one draft copy of each request for payment by the first of the month. Draft copy shall be reviewed and adjusted as needed and agreed by the Owner and Contractor to reflect actual project progress and withholdings.

C. Submit original signed and notarized adjusted copies of each request for payment by the 10th of the month. No more than one request for payment shall be allowed each month.

D. Contractor shall provide all substantiating information, including but not limited to, updated progress schedule, material invoices, freight receipts, test reports, daily field reports, data sheets and data justifying amounts questioned when requested by the Owner to confirm amounts shown on request for payment.

END OF SECTION 01 0270

Alaska Court System
REQUEST FOR PAYMENT

Project No.: ANC-C-24-0005 **Project:** Boney Courthouse Generator Replacement

Pay Period: _____ **Request No.:** _____

Contractor: _____

Analysis of Work Performed

a. ORIGINAL CONTRACT SUM: $ _____
b. CHANGE ORDERS TO DATE: $ _____
c. CONTRACT SUM TO DATE (Line a + Line b): $ _____

d. WORK COMPLETED TO DATE (see next sheet): $ _____
e. STORED MATERIALS: $ _____
f. TOTAL EARNED TO DATE (Line d + Line e): $ _____

g. LESS RETAINAGE (see below*): $ _____
h. LESS PREVIOUS PAYMENTS: $ _____
(amount certified + Line h from prior Request for Payment)
i. CURRENT PAYMENT DUE (Line f less Line g & h): $ _____
j. BALANCE TO FINISH (including retainage amount): $ _____

*Reason for withheld amounts: _____

EXECUTED CHANGE ORDERS

No.	Description	Increase	Decrease	Net Amount
	Total Change Orders:	$ -		$ -

CERTIFICATION

The undersigned Contractor certifies that all items and amounts are in accordance with the contract requirements and that the Contractor has complied with the labor provisions of said Contract, including payment to subcontractor and suppliers of amounts paid to the Contractor for work included in previous Requests for Payment.

CONTRACTOR'S SIGNATURE: _____ DATE: _____

STATE OF: COUNTY OF:

Subscribed and sworn before me this day of ,20

Notary Public _____ My Commission expires: _____

REVIEWED AND APPROVED FOR PAYMENT BY: ENGINEER: _____

AMOUNT CERTIFIED: _____ DATE: _____

The Architect certifies to the Owner that the work has progressed as indicated, the quality of the work is in accordance with the Contract Documents and the Contractor is entitled to payment of the **AMOUNT CERTIFIED**.

FACILITIES DIRECTOR: _____ PROJECT MANAGER: _____

DATE: _____ DATE: _____

ALASKA COURT SYSTEM
PAY REQUEST ITEMIZATION SHEET

Request No.: _____
Date: _____
Pay Period: _____

Project: Boney Courthouse Generator Replacement #ANC-C-24-0005

ITEM NO.	SPEC. SECTION	DESCRIPTION OF WORK	SCHEDULED VALUE	% COMPLETE	VALUE OF WORK COMPLETED TO DATE	STORED MATERIALS	TOTAL VALUE COMPLETED & STORED TO DATE	LESS PREVIOUS PAYMENTS	BALANCE TO FINISH	RETAINAGE
1					$ -		$ -		$ -	
2					$ -		$ -		$ -	
3					$ -		$ -		$ -	
4					$ -		$ -		$ -	
5					$ -		$ -		$ -	
6					$ -		$ -		$ -	
7					$ -		$ -		$ -	
8					$ -		$ -		$ -	
9					$ -		$ -		$ -	
10					$ -		$ -		$ -	
11					$ -		$ -		$ -	
12					$ -		$ -		$ -	
13					$ -		$ -		$ -	
14					$ -		$ -		$ -	
15					$ -		$ -		$ -	
16					$ -		$ -		$ -	
17					$ -		$ -		$ -	
18					$ -		$ -		$ -	
19					$ -		$ -		$ -	
		Page Totals:	$ -		$ -	$ -	$ -		$ -	$ -

SECTION 01 1400
WORK RESTRICTIONS

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 00 0500 Invitation to Bid
B. Section 01 5000 Temporary Facilities and Controls
C. Section 01 7100 Cleaning

1.2 DEFINITIONS

A. Alaska Court System (ACS) Normal Working Hours: 8:00am until 5:00pm, Monday through Friday; not including State Holidays.

1.3 DESCRIPTION

A. Work limitations

1. Site restrictions affecting this project include but are not limited to:
   a. Parking
   b. Hoisting
   c. Off Loading and Storage areas for construction and deliveries
   d. Waste Receptacle.
   e. Temporary Facilities

2. Interior Building restrictions affecting this project include, but are not limited to:
   a. Interior staging and material storage areas.
   b. Use of Owner's vertical transportation (elevators and stairs)
   c. Conditions of Owner's Occupancy
   d. Security and Clearances

1.3 PRODUCT HANDLING

A. Protection - Use all materials and means necessary and to the Owners satisfaction to maintain temporary traffic controls, barriers for material storage areas, and protection of Owner's facilities, walkways, and stairways, throughout progress of the work.

B. Replacements - In the event of loss or damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 SITE ACCESS

A. Roof Access:

1. During Normal Work Hours roof access from the interior of the facility is not permitted. Minimal access will be allowed after coordination with the Owner.

B. Vehicular:

1. Contractor will be allowed to park in the ACS employee parking areas only after Normal Business Hours; on weekends; or on Holidays.
   a. The Owner may at its discretion designate two off-street parking spaces at the project location for Contractor's use. These spaces may be used for parking, staging, dumpster placement, or as needed by the Contractor. Any material stored is not considered under ownership of the Owner until the work begins and the Contractor shall be responsible for the properly storing and securing all materials on site until installed.
   b. The Owner will not provide any parking for the project outside of the two spaces noted under item B.1.a above. Contractor shall be responsible to secure necessary parking and staging space through on-street parking with the appropriate authorities.

2. Off-loading of materials and equipment permitted only after Normal Business Hours unless pre-approved otherwise by Owner.

3. Contractor is responsible for protection of site work including but not limited to concrete and asphalt paving, striping, curbs, landscaping, lawns and fencing. Damage to site to be restored/repaired to its original condition prior to Final Payment.

4. Contractor is responsible to schedule; obtain; and provide all permits/approval required to perform the Work. Including but not limited to ACS, Local, State, Muni, sidewalk closing; street closing; parking; meter/space hooding/closing, and hoisting/crane work.

C. Pedestrian: After the court system Normal Working Hours all building entrances must be secured and remain secured (locked) throughout the Work session.
   1. The east employee entrance may not be blocked or otherwise impede regular and daily use by employees of the facility.

3.2 SITE STAGING, STORAGE, MATERIAL DELIVERIES, AND WASTE DISPOSAL

A. As necessary, store materials off site in a bonded and insured warehouse until needed at the job site to maintain a clutter free environment.

B. Material deliveries shall be off-loaded and transported to an exterior project storage or construction area without delay. Arrange product deliveries in

accordance with construction scheduling requirements in such a way as to minimize a buildup of materials on-site. The Contractor shall be present and be responsible for protection of materials during delivery, off-loading, and transportation to acceptable storage areas. It is the Contractor's responsibility to safely and securely enclose and secure materials and equipment from the public and weather and to handle/transport materials to the project site in coordination with the Work.

C. Interior storage in construction areas is limited to non-occupied periods only.

D. Exterior areas approved for staging and storage are as follows:

1. Refer to 3.1.B.1.a for on-site staging that may be provided at Owner's discretion. Contractor shall secure all necessary staging and storage as required for the project.

E. Site Waste Disposal

2. The Contractor shall clean-up and remove waste daily and consistently as needed by project conditions in order to keep a clean and organized Work site; to prevent windblown debris; and as directed by Owner.

3. On-site waste containers are required to be kept within the Contractor Storage/Parking area and have closed lids on them at all times when not in use.

4. No construction waste shall be deposited in facility receptacles. No construction liquids, waste or debris shall be deposited into plumbing fixtures.

3.3 VERTICAL TRANSPORTATION

A. During ACS Normal Working Hours: Use of stairways and elevators for transportation of materials and equipment is not allowed unless approved otherwise by Owner.

B. After ACS Normal Working Hours: The stairways and elevators may be used. Contractor to protect stairway and elevator walls from damage.

C. After ACS Normal Working Hours; provide temporary signage at lobby walls and within elevator to notify the users that elevator is being used for construction activities. Remove signs and restore elevator to original state of cleanliness prior to ACS Normal Working Hours.

D. Provide and maintain adequate protection for the Owner's property and equipment while in use, and ensure that loads do not exceed posted elevator load capacity. Leave elevator and stairwells in neat and clean condition for use by the building occupants by 7:30 A.M daily.

E. Do not store materials in stairways or elevators. Comply with fire exiting regulations, which prohibit limiting free access within stairways, and at entrances

to stairways, at any time.

3.4 OWNER'S OCCUPANCY

A. The Owner and tenants will continue to occupy and operate the building. The Contractor shall coordinate with the Owner to allow normal business operations in all areas and shall cooperate with Owner and tenants in construction operations to minimize conflict and to facilitate Owner and tenant usage. Contractor shall at all times conduct his operation to insure the least inconvenience to staff, visitors, employee parking, and the general public.

1. Contractor must maintain the existing fire exiting, and public and private sidewalks and circulation pathways.

B. Contractor shall schedule any Work which could interfere with the Owner's operation to be conducted after ACS Normal Working Hours. Specific schedules and Work activities which will be required to be performed after Normal Work Hours are:

1. All demolition work.

2. Any concrete drilling or saw cutting.

3. Any water, heat, or power shut offs.

4. All work with loud power tools.

5. All fire alarm and security system disruption or testing.

6. All work in interior spaces without prior coordination with the Owner.

C. Interior spaces:

1. Contractor shall provide the Owner with a written 3-day notice prior to the commencement of work within interior spaces.

2. Contractor shall move and cover office furniture, furnishing, and equipment as needed to perform the Work and prior to the following business day shall return the office to the configuration; level of cleanliness and functionality in which it was found.

D. Disruption of Operations: Any work deemed by the Owner or Contractor to be disruptive to the ACS or other facility operations due to excessive noise, smell, vibration, or other reasons will be required to be performed after Normal Working Hours. The Contractor must schedule and coordinate such work with the Owner prior to proceeding with work. Contractor shall coordinate with the Owner periods of time when construction work is producing strong odors for the remedial operation of HVAC systems.

1. Upon notice by court staff that the Contractors work is disrupting operations the Contractor must immediately cease work.

E. Include in contract sum sufficient funds as may be required for any “after hours” work caused by these requirements. No additional payment to Contractor will be authorized because of Contractor’s failure to anticipate required “after hours work”.

F. Construction areas must be segregated by closed doors or temporary barriers from the occupied areas of the facility to allow Contractor’s work to occur during ACS Working Hours when approved, and, to prevent public access to secure areas.

3.5 SECURITY AND CLEARANCES

A. Contractors, agents, principals, officers or employees who supply goods or services to the ACS must have completed background checks. The interior premises of ACS facilities may contain confidential information relating to the business of the ACS. Any person with the following conditions is restricted from working within the interior premises or entering the interior premises, other than as a member of the general public:

B. Been convicted of a violent crime or crime of theft within last 5 years;

C. Been convicted of more than 2 misdemeanors in last 5 years;

D. Been convicted of more than one felony in previous 10 years;

E. Has an on on-going case in the court where work is being performed with ACS until case is resolved. The ACS may make an exception to this restriction where services are provided under conditions in which the movements and activities of the person providing services within the premises are constantly monitored, and under circumstances in which the movements and activities of the person providing services are limited to areas in which confidential information relating to the business of the ACS is not present.

F. The ACS may limit or reject certain individuals if their presence is determined by the Contracting Officer to be detrimental to the normal conduct of the ACS business.

G. Prior to commencement of any work on court premises, the ACS requires each contractor, agent, principal, officer or employee who will work on court premises to provide a State of Alaska Background Check Form completely and correctly filled out so that a background check can be conducted and a security clearance can be obtained. Allow 4 days for clearance approval after Background Check Form is submitted. A Background Check Form has been provided at the back of this Section. Note: There are no fees associated with the acquisition of the required background checks.

H. Much of the business of the ACS is necessarily confidential and not subject to public disclosure. The confidentiality of draft opinions, internal memoranda, conversations regarding pending issues and other court business are essential to the court’s function. Additionally, records related to personnel issues, procurement proceedings, internal policy discussions, and other administrative issues are also confidential. Prior to commencing any work under this contract, the contractors,

agents, principals, officers or employees who supply goods or services to the premises shall inform all contractors, agents, principals, officers, and employees working on the premises that the disclosure of any confidential court business observed or overheard may result in permanent removal form the premises and may be grounds for termination of contract and even criminal prosecution.

3.6 ACCESS

A. Access to the Facility will be permitted with a limited issuance of hard keys. The Contractor is responsible for tracking and safeguarding the keys and must return them to the issuing entity as a condition of final payment. No duplications are to be made by the Contractor. The Contractor may also be given security codes to allow entry into secure areas of the courthouse. The Contractor and the Contractors Supervisor are the only individuals to be made aware of these codes. Should loss of keys or unauthorized code distribution occur, the Contractor shall advise the Owner immediately, and will be responsible for replacement keys; re-keying; and recoding costs.

END OF SECTION 01 1400

SECTION 01 2000
PROJECT MEETINGS

PART 1 GENERAL

1.1 PRECONSTRUCTION MEETING

A. The Owner's Project Manager will conduct this meeting and the attendance of Contractor, Contractors Project Manager, Contractors Superintendent, and first-tier subcontractors is required.

B. Suggested Agenda:

1. Distribution (by Contractor) and discussion of:
   a. Superintendent’s name, local address, e-mail address, and 24-hour telephone or cell number.
   b. Review of earlier submitted list of major Subcontractors and Suppliers. Contractor to give notice of any changes to the submitted Subcontractor list. Contractor to provide names and phone numbers of Subcontractor contacts.
   c. Progress Schedule.
      1) Commencement of Work on Site – 10-day advance notice for on-site commencement required by Section 00 7000.
      2) Review of progress schedule milestones and critical path.
      3) Projected Substantial Completion date.
      4) Discussion of Contractor’s proposed work hours and methods.
2. Procedures and processing of Requests for Information, Submittals, Request for Proposals and Change Orders.
3. Review of Contract Documents.
4. Use of premises: work restrictions, Owner occupancy, construction facilities and temporary facilities. Review of Contractor’s proposed interior and exterior material and equipment staging and storage areas.
5. Safety, security and housekeeping, including designation of safety representative at the site.
6. Review of security clearance procedures and current list of personnel with approved criminal history reports.
7. Status of building permit and any required government notices (EPA notifications, road closures, etc.)
8. Communication and interfacing with court staff on site.

1.2 PROGRESS AND SPECIAL MEETINGS

A. The Contractor will conduct Progress meetings weekly to coordinate the Work, answer questions, and resolve problems.

B. Required Attendance: Contractor's Project Manager and Superintendent, Owner's Project Manager. First tier subs to attend upon request.

C. Suggested Meeting Agenda includes attendance, review of minutes, outstanding action items, submittals, RFIs, RFPs, upcoming inspections, concerns and schedule.

1.3 PREINSTALLATION CONFERENCES

A. When required in individual specification section, a pre-installation conference will be scheduled by the Contractor and convened prior to commencing Work of the section. These meetings will require attendance of entities directly affecting, or affected by, Work of the section.

B. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.4 MINUTES

A. The Contractor will compile minutes of each project meeting and will distribute copies to all interested parties prior to the next meeting. Each item shall be carried forward until resolved. The minutes compiled by the Contractor will be the official record minutes and all clarifications and/or corrections shall be transmitted in writing to the Owner within 3 days of date of receipt of the minutes.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION 01 2000

SECTION 01 3000
SUBMITTALS

PART 1 GENERAL

1.1 SUBMITTAL PROCEDURES

A. Contractor is required to provide electronic PDF copies of all required submittals to both the Architect and the Owner **within 3 weeks of Notice of Award.**

B. Submittals for each section shall be submitted individually, complete, and all at one time. **Partial submittals will not be considered.** The data shall be arranged and indexed under basic categories in order of the Specification Sections. An index shall be included with bookmarks and identifying tabs between sections and references to sections of specifications.

C. Identify Project, Contractor, subcontractor or supplier; pertinent contract drawings sheet and detail numbers and specification section number and location in Work.

D. Apply Contractor's stamp, signed, certifying that review, verification of products required, field dimensions, adjacent construction Work and coordination of information is in accordance with the requirements of the Work and the Contract Documents.

E. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.

F. The Contractor shall perform no portion of the Work for which the Contract documents require submittal and review of Shop Drawings, product data, Samples, Qualifications, or similar submittals until the respective submittal has been approved by the Owner.

G. Contractor required to submit required resubmittals within 7 days.

1.2 SHOP DRAWINGS AND PRODUCT DATA, CERTIFICATES, INSTRUCTIONS

A. Submittal copy size for most submittals shall be 8-½" by 11". Copy size for electrical, mechanical, case work shop, and design drawings shall be 11"x17" minimum and 24"x36" maximum.

B. Mark each copy to identify applicable products, details, models, options and other project specific data.

C. Supplement manufacturer's standard data to provide information unique to this project. Show reference standards, performance characteristics and capacities, electrical characteristics, wiring and piping diagrams and controls, component parts finishes, dimensions, details and required clearances.

1.3 SAMPLES

A Submit two full set of samples. One to the Owner and one to the Architect to review, select, and retain. Provide additional sets of samples as needed for return to Contractor. Contractor shall keep one set of samples at the project site for on site reference. Include identification on each sample with full project information.

B. Submit samples to illustrate functional and aesthetic characteristics of the product with integral parts and attachment devices. Coordinate samples submittals for interfacing work.

C. Submit samples of finishes from the full range of manufacturer's standard colors, textures and patterns or in custom finishes if specified, for Owner's selection.

1.4 SUBSTITUTIONS

A. No items will be considered for Substitution, or for equal approval prior to Bid Opening. No request will be considered from sub-bidders or suppliers directly. To be considered, requests for Substitution should conform to this Section.

B. In connection with the use of any substitute item approved by the Architect or Owner, it shall be in the Contractor's responsibility to see that such items meet all space requirements, and that any alterations to connecting items necessitated by use of the alternate items are properly made, at no increase in cost to the Owner.

C. Specific reference in the specifications to any article, device, product, materials, form or type of construction, etc., by name, make or catalog number, shall be interpreted as establishing a standard of quality and/or color and shall not be construed as limiting competition.

D. In making a request for substitution, Contractor represents:

1. He has personally investigated proposed product or method, and determined that: It is equal or superior in all aspects to that specified; and that any significant variation between the product specified and the proposed product that would affect the use of product, operation of building systems, or exposed appearance of product has been identified to the Owner.

2. He will provide the same guarantee for substitution as for product or method specified and that he waives all claims for additional costs related to substitution which consequently becomes apparent.

3. He will coordinate installation of accepted substitution as for product or method specified.

E. Substitution review:

1. Owner will be sole judge of acceptability of any proposed substitution and only approved substitutions may be used on Contract Work.

2. Each request for substitution approval shall include:

a. The identity of product for which substitution is requested, identity of substitution and quality comparison of proposed substitution with specified product.

b. Changes required in other work because of substitution and effect on construction progress schedule.

c. Availability of local (Anchorage, Alaska) maintenance service and source of replacement materials.

1.5 CERTIFIED PAYROLL

A. The Contractor shall provide one copy of all certified payrolls which are submitted to the State Department of Labor to the Owner for review.

1. Certified payrolls shall be submitted weekly while work is proceeding for all Contractor and subcontractor personnel on site.

2. At completion of each subcontractor's on-site work, a final certified payroll shall be submitted with the wording "FINAL" denoted on it.

PART 2 PRODUCTS - Not Used.

PART 3 EXECUTION - Not Used.

END OF SECTION 01 3000

SECTION 01 3100
PROJECT SCHEDULES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Included: To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract and to assist the Owner in appraising the reasonableness of the proposed schedule and in evaluating progress of the Work, prepare and maintain the schedules and report described under this Section.

B. Definitions: "Day" unless otherwise stated, means "calendar day".

1.02 FORMAT

A. Prepare network analysis system using the critical path method, as outlined in the Associated General Contractors of America (AGC) publication - The Use of CPM in Construction - A Manual for General Contractors.

B. Scheduling Software to be used shall be either: Microsoft "Project" or Primavera "Suretrak, Project Manager for Windows. No substitutions allowed.

C. Schedule shall be of sufficient detail to show the actual detail of all Work to be performed. Schedule to include identification of long lead items and anticipated delivery times as well as all milestones.

D. Schedule shall be formatted in calendar days.

1.03 SUBMITTALS

A. Submit preliminary progress schedule within 14 days after the Notice of Award for review; comment; revision process.

B. Upon receipt Owner’s review comments resubmit schedule incorporating Owner’s comments within 4 days.

C. Continue Progress Schedule submittal/revision process until a Final Progress Schedule is agreed upon.

D. Submit Final Project Schedule 4 weeks prior to the beginning of Work On-Site. Provide updates to schedule as needed to maintain schedule accuracy.

E. Submit Progress Schedule with Pay Request.

F. For each required submittal provide two paper copies of the Bar Chart and Activity Report, and transmit via e-mail, the updated electronic schedule in software program used.

PART 2 –PRODUCTS Not Used.

PART 3 – EXECUTION Not Used.

END OF SECTION 01 3100

SECTION 01 4500
SAFETY PROCEDURES

PART 1 GENERAL

1.01 PRELIMINARY WORK

A. Prior to start of and during course of the Work (above and below ground), Contractor shall make a thorough survey of entire work site to determine all potential hazards. Workmen shall be made aware of those hazards and shall be instructed in procedures and use of equipment for their protection. Contractor shall verify location and condition (live or dead) of all utilities on and near worksite and take precautions to protect his employees, general public, and property.

1.02 IMMINENT DANGER

A. Contractor shall be wholly responsible for any accidents (including death) occurring at any time during progress of Work and until final acceptance of Work by Owner, which may happen to any of his workmen or those of any Subcontractor employed on the project, or for any damage or injuries (including death) which his work and operations may cause to Work being constructed, or to existing buildings, or to any tenants and occupants of property, or of adjoining properties, or to public, or to any public or private property.

1.03 SAFETY

A. Contractor shall ensure that all employees, visitors, subcontractors' employees, and suppliers' employees, while on worksite, comply with requirements of OSHA, these requirements and safety precautions contained in several specification sections. Contractor shall promptly and fully comply with, execute, and without separate charge thereof to Owner, shall enforce compliance with provisions of the latest issue of the Alaska Department of Labor Occupational Safety and Health Standards.

B. Contractor shall immediately advise Owner of inspections conducted by OSHA at worksite and shall transmit copies of citations and violations to Owner.

1.04 CONTRACTOR'S SAFETY PROGRAM / SUBMITTAL

A. A safety program shall be submitted in writing to Owner for review, 14 days prior to issuance of Notice to Proceed with Work on Site. Proposed safety program shall include name, experience, and qualifications of Contractor's proposed Safety Supervisor. Implementation and enforcement of safety program for forces of Contractor and all Subcontractors shall be the responsibility of Contractor.

B. Responsibilities of Safety Personnel - For each of the responsibilities named below, Contractor shall list name and title of responsible individual, scope of his authority, title of person he reports to, and outside duties assigned to him.

1. Safety Program execution responsibility.

2. Worksite Inspection responsibility.

3. Worksite first aid medical treatment responsibility and emergency first aid program.

C. Safety Program shall include:

1. Accident Prevention including indoctrination and safety education of new employees; Worksite Inspections -- Scope and Frequency; Employee Protective Devices including personal devices required and available, safety devices required and available.

2. Protection of Public, including pedestrian control, traffic control, and protective devices available.

3. Accident Procedures including Doctor/Hospital arrangements – emergency and non-emergency; Worksite Accident Devices: First aid supplies, substitute ambulance, other; Accident investigation and paperwork handling.

4. Subcontractor Safety including responsibility for subcontractor safety; inclusion of safety program in subcontract; specific requirements of subcontractor to promote safety and health.

5. Other Safety and Health Features of Program including site conditions/security, housekeeping procedures and security responsibilities and procedures.

6. Health Facilities and Concerns: Changing rooms, adverse weather plans, other.

7. Other loss control procedures to be used beyond specification minimum requirements, and as required in Contract Documents.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION -Not Used

END OF SECTION 01 4500

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. General and Supplementary Conditions

B. Section 01 1400 Work Restrictions

1.2 DESCRIPTION

A. Work included - Temporary facilities and controls required for this work include, but are not necessarily limited to:

1. Temporary utilities.
2. Enclosures such as tarpaulins, barricades, and canopies.
3. Fire protection.
4. Temporary heat.
5. Temporary hoisting facilities
6. Traffic maintenance and control.

1.2 PRODUCT HANDLING

A. Protection - Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

B. Replacements - In the event of loss or damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 UTILITIES

A. Temporary Utilities: Provide and pay all costs for telephone required for performance of the Work unless otherwise noted below. The Owner will pay for reasonable utility costs for natural gas, electricity, water and sewer.

1. Temporary water: Contractor may use on-site water supply and shall protect from freezing. Provide required connections and extend system to work area. Upon completion of the work, remove all such temporary piping.

2. Temporary electricity:

a. Furnish and install all necessary temporary wiring and associated equipment. Upon completion of the work, remove all temporary wiring.
b. Ascertain where electrical service is available; provide required connections and extend system to work area.

2.2 TEMPORARY SANITARY FACILITIES

A. Contractor to provide portable toilets on-site as needed. Owner's toilets are not to be used.

2.3 ENCLOSURES AND BARRICADES

A. Furnish, install, maintain, throughout the duration of construction, all required barricades, scaffolds, enclosures, warning signs, and other temporary construction necessary for proper completion of the Work in compliance with all pertinent safety regulations, other regulations, and Manufactures Installation Recommendations.

B. Provide barriers; temporary doors with secure locks; and signage as needed to prevent ACS employee and public entry to the construction; staging; storing; parking; and secure areas and to protect adjacent areas from damage by construction operations.

1. The Contractor shall provide and maintain signage and barriers around all material storage and equipment at any interior and exterior staging areas. Barriers must allow public access at public sidewalks, building parking areas, public and employee entries and exits.

2. The Contractor shall provide and maintain signage, fencing and barriers as needed to protect public from overhead hazards from cranes and lifting equipment while equipment is in operation.

3. The Contractor shall provide facility wide barriers and signage as necessary to allow normal, safe, and secure business operation.

2.4 TEMPORARY FIRE PROTECTION

A. Provide fire protection equipment during entire construction period as required by authority having jurisdiction.

B. Provide and maintain necessary facilities and equipment to safeguard project against fire damage.

2.5 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat, fuel and services as necessary to protect all Work and materials against injury and damage from dampness and cold until final acceptance of all Work and material in the Contract.

B. Provide temporary heat and ventilation throughout enclosed construction area to maintain existing ambient temperatures and humidity levels at occupied areas of building, and to provide adequate ventilation to meet health regulations for safe working environment.

C. Maintain ventilated areas in clean condition to avoid undue circulation of dust and air-borne particles.

2.6 TRAFFIC MAINTENANCE CONTROL

A. Whenever Contractor's operations affect public or employee vehicular or pedestrian traffic, Contractor shall be responsible for installation and maintenance of any and all traffic control devices as deemed necessary by authority having jurisdiction.

PART 3 EXECUTION

3.1 REMOVAL

A. Maintain all temporary facilities and controls as long as needed for safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by Owner. Clean and repair damage caused by temporary installations or use of temporary facilities. Restore existing facilities and Site to specified or original condition.

END OF SECTION 01 5000

SECTION 01 7100
CLEANING

PART 1 GENERAL

1.1 GENERAL

A. Work included: Throughout the construction period, maintain the project site where Work is carried out in a standard of cleanliness as described in this section.

B. Related Work described elsewhere: In addition to standards described in this section, comply with all requirements for cleaning as described in other various sections of the Contract Documents.

1.2 QUALITY ASSURANCE

A. Inspection: Conduct daily inspections and more often, if necessary, to verify that requirements of cleanliness are being met.

B. Codes and Standards: In addition to the standard described in this section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

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

PART 3 EXECUTION

3.1 PROGRESS CLEANING

A. General: Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work or caused as a result of the Work. Provide adequate storage for all items, awaiting removal from the job site, observing all requirements for fire prevention and protection of the ecology.

1. Retain all stored items in an orderly arrangement allowing maximum access. Do not impede drainage or traffic and provide required protection of materials.

2. Weekly, and more often, if necessary, inspect all arrangements of materials stored on the site; restack, tidy or otherwise service.

3. Maintain the interior and exterior areas of Work and Site in a neat and orderly condition at all times to the satisfaction of the Owner.

4. Construction activities shall be monitored on a daily basis to determine if tracking of dirt and debris from construction areas onto the adjacent

areas, floors, desks, office furniture or equipment has occurred. Any cleanup necessary, including sweeping, vacuuming, dusting, or stain removal, shall be accomplished on a daily basis by the Contractor. Washing dirt and debris into the storm drains is not permitted.

5. If additional cleaning by janitorial personnel is required due to contractor related construction activities the contractor will be charged.

B. Dust Control:

1. Maintain continuous cleaning and wetting procedures to control dust pollution at the project site and haul routes as required by governing authorities and Contract Documents. Use power sweepers for street cleaning. Schedule cleaning so that resultant dust and contaminants will not fall on newly coated surfaces.

2. Prevent dust and particle infiltration into interior and exterior air intakes, diffusers, vents, and ductwork, and above ceiling plenum areas. Contain all dust and debris within project areas. Provide cleaning as needed to control and contain dust.

C. Any additional cleaning deemed necessary by the Owner shall be provided by the Contractor as soon as requested.

3.2 CLOSEOUT CLEANING

A. Execute prior to Substantial Completion.

B. Employ skilled workmen for final cleaning.

C. Fully clean all project work areas, project storage, staging and transport areas.

D. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, temporary labels, protection films, and other foreign matter from sight exposed interior and exterior surfaces.

E. Clean all interior and exterior surfaces exposed to view. Polish wood, clean transparent and glossy surfaces, vacuum carpeted and soft surfaces, clean hard flooring surfaces as per manufacturer recommendations. Clean equipment and fixtures to a sanitary condition.

D. Hose clean exterior paved surfaces at material and equipment storage locations.

E. Clean all light fixture and lenses of dust and dirt. Clean or replace filters on mechanical equipment.

F. As necessary and as may be directed by Owner, clean duct interiors, grilles, louvers, dampers of all dust and dirt.

END OF SECTION 01 7100

SECTION 01 7200
PROJECT RECORD DRAWINGS

PART 1 GENERAL

1.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:

1. Contract Drawings, Specifications and Addenda
2. Change Orders and other modifications to the Contract.
3. Approved shop drawings, product data, manufacturer's certificates and samples.
4. Copies of Permits, Approvals, and Inspection Certificates.
5. RFIs and Field Memos

B. Store record documents and samples in the field office apart from the document used for construction.

C. Label and file record documents and samples in accordance with section number listings in Table of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

D. Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.

E. Keep record documents and samples available for inspection by the Architect/Engineer and Owner.

1.2 RECORDING

A. Record information on a set of blue line opaque Drawings provided by the Owner.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:

1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
2. Field changes of dimensions and detail.
3. Changes made by modifications.

4. Clarifications, verifications, or annotations to drawings made by Requests for Information.
5. Details not on original Contract Drawings.
6. References to related shop Drawings and modifications.

D. Specifications: Legibly mark each item to record actual construction, including:

1. Changes made by Change Order
2. Manufacturer, trade name and catalog number of each product actually installed particularly optional items and substitute items.
3. Changes made by addenda, RFIs, substitution approvals, and other modifications.
4. Other matter not ordinarily specified.

E. Other Documents: Maintain manufacturer certifications, inspection certifications, field test records, required by individual specification sections.

F. Keep record documents current. No progress payments will be made until record documents are verified by the Owner as being current.

1.3 SUBMITTALS

A. At Contract closeout, deliver record documents/samples for Owner review and approval prior to final pay request under provisions of Section 01740.

B. Transmit with cover letter in duplicate, listing:

1. Date.
2. Project title and number.
3. Contractor's name, address and telephone number.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of Contractor, subcontractor if applicable, or authorized representative.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION 01 7200

SECTION 01 7300
OPERATIONS AND MAINTENANCE MANUALS

PART 1 GENERAL - Not Used.

PART 2 PRODUCTS

2.1 MANUALS

A. General: Where manuals are required to be submitted covering items included in this Work, prepare all such manuals in durable plastic binders approximately 8-1/2 inches by 11 inches in size and with at least the following:

1. Identification on, or readable through, the front cover and binder stating general nature of the manual.

2. Neatly typewritten index near the front of the manual, furnishing immediate information as to location in the manual of all data.

3. Copy of all guarantees and warranties issued.

B. Operation and Maintenance instructions:

1. Prepare and include in manuals, operating and/or maintenance instructions for all equipment and/or materials that will require any adjustment, servicing, or attention for its proper operation or use.

2. These instructions shall set forth all of the information necessary for the Owner to operate and make full and efficient use of equipment and materials and perform such maintenance and servicing as would ordinarily be done by the Owner or his personnel.

3. Write instructions in simple, non-technical language, when possible, with sufficient diagrams and explanation where necessary to be readily understandable by average layman. Possible hazards shall be particularly pointed out with instructions cautioning against mistakes that might result in damage or danger to equipment, building or personnel.

4. Provide all information necessary to reorder materials, equipment and finishes provided, including make and model of material, style, pattern, texture, profile, and color of finish.

C. Extraneous data: Where contents of manuals include Manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete or otherwise clearly indicate all Manufacturer's data with which this installation is not concerned.

2.2 MANUAL CONTENT, GENERAL

A. Neatly typewritten table of contents for each volume, arranged in systematic order.

B. List:

1. Contractor, address and telephone number.

2. Each product including name, address and telephone number of subcontractor or installer, recommended maintenance contractor, and local source of replacement parts or materials. Product name and other identifying symbols as set forth in Contract Documents.

3. Product Data:
   a. Include only those sheets which are pertinent to specific product.
   b. Annotate each sheet to clearly identify specific product or part installed, and clearly identify data applicable to installation.

4. Drawings: Supplement product data with Drawings where necessary to clearly illustrate relations of component parts, scope and configuration of materials, and control and flow diagrams.

5. Warranties, Bonds and Maintenance Contracts:
   a. Provide notarized copies of all warranties. Assemble executed copies of warranties and bonds in order of specification section.
   b. For equipment put into use with the Owner's permission during construction, submit warranty within ten (10) days after first operation. For items of work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.
   c. Include proper procedures in event of failure, and instances which might affect validity of warranties, bonds or Contracts.

2.3 MANUAL FOR ARCHITECTURAL MATERIALS AND FINISHES

A. Submit all operation and maintenance information as specified as well as all Manufactures Data for all materials in all Divisions.

1. Information to include but not be limited to:
   a. Catalog number, size, profile, configuration and composition.
   b. Color, pattern, style, and texture designations.
   c. Recommended cleaning materials and methods, including cautions against detrimental cleaning materials and methods.
   d. Instructions for adjusting and operating building hardware, systems and components.
   e. Recommended cleaning and maintenance schedule.
   f. Sample of each finish material including but not limited to wood trim; wood base; wood veneers, wall paint, rubber base; plastic laminates, solid surface, stair noising, wood panel system.

2.4 MANUALS FOR MECHANICAL & ELECTRICAL EQUIPMENT AND SYSTEMS

A. Submit operation and maintenance information for the following:

1. Mechanical equipment within Divisions 20,21,22, 23 and 25.

2. Electrical equipment within Division 26 and 27.

2.5 SUBMITTAL SCHEDULE

A. Preliminary Draft: Submit two copies of proposed format, approximately 30 days before Substantial Completion. Architect will review and return one copy with comments.

B. Final Submittal: Submit two (2) copies in approved final form at substantial completion inspection for Owner to retain.

PART 3 EXECUTION

3.1 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to Substantial Completion, final acceptance and payment, provide 3 hours of instruction to Owner's personnel in necessary operation, adjustment and maintenance of products, equipment and systems. Operation and Maintenance Manuals shall be the basis of instruction. Contractor shall provide written documentation at the completion of this Instruction.

END OF SECTION 01 7300

SECTION 01 7400
CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Section 01 7100 - Cleaning.

B. Section 01 7200 - Project Record Drawings

C. Section 01 7300 - Operations and Maintenance Manuals

1.2 SUBSTANTIAL COMPLETION

A. When Contractor considers Work substantially complete, or is within 72 hours of the projected schedule for substantial completion as defined in contract conditions, Contractor shall submit to the Owner:

1. Written notice that Work is Substantially Complete or that it is scheduled to be Substantially Complete on a specific date, and that a Substantial Completion Inspection is requested.

2. List of Items to be completed or corrected.

3. Certificate of Occupancy from governing authorities, or date that the Certificate of Occupancy will be provided.

B. Owner will, as soon as practicable thereafter, make inspection to determine completion status.

1. Should Owner determine that Work is not substantially complete the Contractor will be notified in writing, giving reasons, therefore.

2. Should Owner agree that Work is Substantially Complete, the Owner will prepare and submit to the Contractor a Certificate of Substantial Completion accompanied with Contractor's list of items to be completed or corrected, as verified and amended by Owner.

1.3 FINAL INSPECTION

A. During the work week and as soon as practicable after receipt of request for Final Inspection, submitted by the Contractor, the Owner will re-inspect Work. When Owner finds the Work acceptable under Contract Documents, he will request Contractor to complete outstanding closeout submittals.

1. 4 CONTRACTOR'S CLOSEOUT SUBMITTALS TO PROJECT MANAGER

A. Wage Certification: Submit final payroll certificates and Department of Labor Notice of Completion and Wage Certification.

B. Signed Warranty of Work After Final Payment form in this section.

C. Fire Marshal's Certificate of Occupancy

D. Extra Stock materials as specified elsewhere in these Specifications. Additionally, provide Inventory Report of stock materials and salvaged materials and equipment. Receipt and approval of inventory by Project Manager to be recorded on Inventory Report.

E. Operation and Maintenance Manuals in accordance with Section 01730.

F. Project Record Documents in accordance with Section 01720.

G. Executed Warranties: See Technical Specification Sections Requirements.

H. Completed Test Results: See Technical Specification Sections Requirements.

1.5 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

A. Contractor shall submit to the Project Manager the following items, duly signed and executed (forms attached):

1. Consent of Surety Company to Final Payment

2. Contractor's Affidavit of Payment of Debt and Claims

3. Contractor's Affidavit of Release of Liens

4. Complete and legally effective releases or waivers signed by each of Contractor’s direct subcontractors and direct material suppliers, and all persons who have notified Contractor or Owner of a right to make a claim under AS 36.35.020.

5. Certificate of Compliance form in this section.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION 01 7400

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: Boney Courthouse Generator Replacement, #ANC-C-24-0005

TO OWNER:
Alaska Court System
820 W. 4th Avenue
Anchorage, AK 99501

ARCHITECT:
MCG Explore Design LLC

CONTRACTOR:

WORK ON THE ABOVE PROJECT GENERALLY INCLUDES:
Remove existing generator, associated duct work, and electrical panels and associated wiring.
Provide and install new generator, associated duct work, and electrical panels and associated wiring.

DEFINITION OF DATE OF SUBSTANTIAL COMPLETION: The date of substantial completion of the Work is the date determined by the Owner when the Work is substantially complete in accordance with, and as defined in, the Contract Documents.

CERTIFICATION BY CONTRACTOR OF SUBSTANTIAL COMPLETION:
I certify that the Work is substantially complete, in accordance with, and as defined in, the contract documents. A list of items to be completed or corrected will be prepared by the Owner and the Engineer and appended hereto. The failure to include any items on such list does not alter the responsibility of the undersigned to complete the Work in accordance with the contract documents. The date of commencement of warranties for items on the attached list will be the date of final payment unless otherwise agreed to in writing.

CONTRACTOR: _____ For _____
(Signature) (Company)

_____ Date _____
(Name Printed)

CERTIFICATION BY ENGINEER OF SUBSTANTIAL COMPLETION:
I certify that I have inspected the Work and certify that the Work is substantially complete, in accordance with, and as defined in, the contract documents.

ENGINEER: _____ For _____
(Signature) (Company)

_____ Date _____
(Name Printed)

CERTIFICATION BY PROJECT MANAGER OF SUBSTANTIAL COMPLETION:
I certify that I have inspected the Work and certify that the Work is substantially complete, in accordance with, and as defined in, the contract documents.

PROJECT MANAGER: _____ For ALASKA COURT SYSTEM
(Signature) (Company)

_____ Date _____
(Name Printed)

DATE OF SUBSTANTIAL COMPLETION:
In reliance upon the certification of the Contractor, the Engineer, and the Project Manager, the Owner hereby accepts the Work as substantially complete. The date of substantial completion is hereby established as _____
for all areas and components except for _____
The Contractor shall maintain all insurance, including property insurance, until final acceptance of the Work.

OWNER: ALASKA COURT SYSTEM Date _____

The responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows: _____

CONSENT OF SURETY COMPANY TO FINAL PAYMENT

Project: Boney Courthouse Generator Replacement No.: ANC-C-24-0005

Contract Date: _____

TO OWNER:
Alaska Court System
820 W. 4th Avenue
Anchorage, AK 99501

CONTRACTOR:

In accordance with the provision of the Agreement between Owner and the Contractor as indicated above, the

_____
Surety Company

on bond of Contractor

_____
Contractor

HEREBY APPROVES OF THE FINAL PAYMENT to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to

ALASKA COURT SYSTEM, OWNER

as set forth in the said Surety Company's bond. Surety expressly agrees that any and all valid claims of subcontractors and all persons supplying labor or materials to the project will be satisfied by Contractor or Surety in a timely manner.

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand this _____ day of _____, 20__.

_____
Surety Company

Attest:_____ _____
Signature of Authorized Representative

(Seal):

Title: _____

CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS AND RELEASE LIENS AND CLAIMS AGAINST PAYMENT BOND

Project: Boney Courthouse Generator Replacement No.: ANC-C-24-0005

Contract Date: _____

TO OWNER:
Alaska Court System
820 W. 4th Avenue
Anchorage, AK 99501

CONTRACTOR:

State of: ALASKA
Let it be known that the said deponent is duly authorized to make this affidavit by resolution of the Board of Directors of said company and/or corporation; that deponent knows of his own knowledge that said contract has been complied with in every particular by said contractor and that all parts of the work have been approved by the Owner's Engineers; that there are no bills remaining unpaid for labor, material, or otherwise, in connection with said contract and work, and that there are no suits pending against the undersigned as contractor or anyone in connection with the work done and materials furnished or otherwise under said contract. Deponent further says that the final estimate which has been submitted to the Owner simultaneously with the making of this affidavit constitutes all claims and demands against the Owner on account of said contract or otherwise, and the acceptance of the sum specified in said final estimate will operate as a full and final release and discharge of the Owner from any further claims, demands or compensation by contractor under the above contract. Deponent further agrees that all guarantees under this contract shall and be in full force from the date of this release as spelled out in the Contract Documents.

The undersigned, in consideration of the final payment in the amount first mentioned above, hereby waives it right to claim against the payment bond for labor, services, or materials furnished through the date first mentioned above, to the Alaska Court System, for improvements to the project described above. This waiver does not cover any retention or any labor, services, or materials furnished after the date specified.

Exceptions: (If none, write "None." If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exception.)

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. Indicate attachment: (yes) (no)

2. Contractor's Release or Waiver of Claims, conditional upon receipt of final payment.

3. Complete and legally effective releases or waivers signed by each of Contractor's direct subcontractors and direct material suppliers, and all persons who have notified Contractor or Owner of a right to make a claim under AS 36.35.020,

CONTRACTOR: Address:

BY:
Subscribed and sworn to before me this day of 20

Notary Public:

My Commission Expires:

CERTIFICATE OF COMPLIANCE
Boney Courthouse Generator Replacement
Project #ANC-C-24-0005

No final payment shall be made until the CONTRACTOR shall file with the OWNER, prior to acceptance of the Work, a notarized Certificate of Compliance on the following form:

A. The CONTRACTOR does hereby certify that all work has been performed and materials supplied in accordance with the DRAWINGS, SPECIFICATIONS, and Contract Documents for the above work, and that;

1. No less than the prevailing rates of wages as ascertained by the governing body of the Contracting Agency has been paid to laborers, workmen and mechanics employed on this Work;

2. There have been no unauthorized substitutions of subcontractors; nor have any subcontracts been entered into without the names of the subcontractors having been submitted to the OWNER prior to the start of such subcontracted Work;

3. No subcontract was assigned or transferred or performed by any subcontractor other than the original subcontractor, without prior notice having been submitted to the OWNER together with the names of all subcontractors;

4. All claims for material and labor and other service performed in the connection with these specifications have been paid.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____day of _____, year _____.

(Firm Name): _____

(Signature): _____

(Title): _____

(Attest): _____

(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

WARRANTY OF WORK AFTER FINAL PAYMENT

Boney Courthouse Generator Replacement
Project #ANC-C-24-0005

Prior to final payment, the Contractor shall furnish to the Owner a Warranty of Work After Final Payment in the following form:

The CONTRACTOR does hereby warrant all work and materials to be in full and complete accordance with the Contract Documents and Agreement Between Owner and Contractor and requirements appertaining thereto; that all work and materials are free from any defects and imperfections and fully suitable for the use and purposes for which each and every part is intended. The contractor also agrees that, should any defect develop or appear which the Project Manager or Architect finds was not caused by improper use, the Contractor shall promptly, upon demand, fully correct, substitute and make good any such defective material, without any cost to the Owner, and will save the Owner harmless against any claim, demand, loss, or damage by reasons of any breach of this warranty.

This period of this warranty shall commence on the date of Final Acceptance of the Owner.

The warranty shall continue to be in full force and effect for the period of one year, except for those items for which a longer period of warranty is specifically stated in the Warranties for work in Technical Sections of the Specifications. Warranties for work stated in Technical Sections shall continue in full force and effect for the respective periods expressly stated.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this _____day of _____, year _____.

(Firm Name): _____

(Signature): _____

(Title): _____

(Attest): _____

(SEAL IF BIDDER IS A CORPORATION)

DIVISION 02

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

1.2 DEFINITIONS

A. Remove / Demolish: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.3 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

C. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.4 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Prevent dust, fumes, and odors from entering occupied areas.
6. Sanitary Facilities: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

3.2 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.3 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

DIVISION 23

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.01 SCOPE

A. All provisions of the Contract including the General and Supplementary Conditions and the General Requirements apply to this work.

1.02 WORK INCLUDED

A. The work to be included in these and all other mechanical subsections shall consist of providing, installing, adjusting and setting into proper operation complete and workable systems for all items shown on the drawings, described in the specifications or reasonably implied. This shall include the planning and supervision to coordinate the work with other crafts and to maintain a proper time schedule for delivery of materials and installation of the work.

B. Division 01 of the specifications is to be specifically included as well as all related drawings.

1.03 RELATED WORK

A. Related Work Specified Elsewhere:
1. Electrical Specifications: Division 26.
2. Motors and Connections: Division 26.
3. Starters and Disconnects: Division 26.

B. Unless otherwise indicated on the electrical drawings or the electrical schedules, provide all mechanical equipment motors, motor starters, thermal overload switches, control relays, time clocks, thermostats, motor operated valves, damper motors, electric switches, electrical components, wiring and any other miscellaneous Division 23 controls. Disconnect switches are included in the electrical work, unless specifically called out on mechanical plans.

C. Carefully coordinate all work with the electrical work shown and specified elsewhere.

1.04 REFERENCED CODES - LATEST ADOPTED EDITION

A.	NFPA 70	National Electrical Code (NEC).
B.	IMC	International Mechanical Code.
C.	UPC	Uniform Plumbing Code.
D.	IECC	International Energy Conservation Code.
E.	IFC	International Fire Code.

F. IFGC International Fuel Gas Code.

G. IBC International Building Code.

1.05 PROJECT RECORD DRAWINGS

A. In addition to other requirements of Division 01, mark up a clean set of drawings as the work progresses to show the dimensioned location and routing of all mechanical work which will become permanently concealed. Show routing of work in concealed blind spaces within the building. Show exact dimensions of buried piping off of columns or exterior walls.

B. Maintain record documents at job site in a clean, dry and legible condition. Keep record documents available for inspection by the Project Manager.

C. Show the location of all valves and their appropriate tag identification.

D. At completion of project, deliver these drawings to the Owner and obtain a written receipt.

1.06 SUBMITTALS

A. See General Conditions and the General Requirements in Division 01 regarding submittals.

B. Submit by specification section complete and all at one time; partial submittals will not be considered. Submittals shall be provided in electronic PDF Format. The data in the electronic file shall be arranged and indexed under basic categories in order of the Specification Sections. An index shall be included with bookmarks and identifying tabs between sections and references to sections of specifications.

C. Catalog sheets shall be complete and the item or model to be used shall be clearly marked, and identified as to which item in the specifications or on the drawings is being submitted and with drawing fixture number where applicable.

D. Only submit on items specifically required by each specification section. If a submittal has not been requested, it will not be reviewed.

1.07 OPERATING AND MAINTENANCE MANUALS

A. See General Conditions and the General Requirements in Division 01 regarding Operating and Maintenance Manuals.

B. Submit maintenance manuals to the Engineer covering all equipment, fixtures, devices, etc. installed by the Contractor.

C. The operation and maintenance manuals shall be submitted by specification section complete and all at one time; partial operations and maintenance manual submittals will not be considered. The Operation and maintenance manuals shall be provided in electronic PDF Format. The data in the electronic file shall be arranged and indexed under basic categories. An index shall be included with bookmarks and identifying tabs between sections and references to sections of specifications. The manual shall contain, but not limited to, the following types of information:

1. Cover sheet with name, address, telephone number of Contractor, General Contractor and major equipment suppliers.
2. Catalog cuts of all equipment, fixtures, etc. installed (Marked to identify the specific items used).
3. Manufacturer's maintenance and overhaul instruction booklets including exploded views.
4. Identification numbers of all parts and nearest sources for obtaining parts and services.
5. Reduced scale drawings of the control system and a verbal description of how these controls operate.
6. A copy of the final test and balance report.
7. Written summary of instructions to Owner.
8. All manufacturers' warranties and guarantees.
9. Contractors Warranty Letter.

D. A periodic maintenance form that includes all of the equipment shall be provided with the maintenance manual. The form shall list each piece of equipment and how often maintenance is required (daily, weekly, monthly, annually). Opposite each task shall be squares for check-off for a full year (initials) to verify that the tasks are being done.

1.08 HANDLING

A. See General Conditions and the General Requirements in Division 01 regarding material handling.

B. Deliver packaged materials to job site in unbroken packages with manufacturer's label, and store to facilitate inspection and installation sequence. All items must be labeled and identified as to make, size and quality.

1.09 SUBSTITUTIONS

A. See General Conditions and the General Requirements in Division 01 for substitution request procedures.

B. In accordance with the General Conditions and the General Requirements in Division 01, Substitution and Product Options, all substitute items must fit in the available space, and be of equal or better quality including efficiency performance, size, and weight, and must be compatible with existing equipment. The Engineer shall be the final authority regarding acceptability of substitutes.

1.10 DIMENSIONS

A. Before ordering any material or doing any work, the Contractor shall verify all dimensions, including elevations, and shall be responsible for the correctness of the same. No extra charge or compensation will be allowed on account of differences between actual dimensions and measurements indicated on the drawings.

B. Any differences, which may be found, shall be submitted to the Engineer for consideration before proceeding with the work.

1.11 MANUFACTURER'S DIRECTIONS

A. All manufactured articles shall be applied, installed and handled as recommended by the manufacturer, unless specifically called out otherwise. Advise the Architect/Engineer of any such conflicts before installation.

1.12 PERMITS, FEES, ETC.

A. The Contractor under each Division of these specifications shall arrange for a permit from the local authority. The Contractor shall pay for any inspection fees or other fees and charges required by ordinance, law, codes and these specifications.

1.13 TESTING

A. The Contractor under each section shall perform the various tests as specified and required by the Architect, Engineer and as required by applicable code, the State and local authorities. The Contractor shall furnish all labor, fuel and materials necessary for making tests.

1.14 TERMINOLOGY

A. Whenever the words "furnish", "provide", "furnish and install", "provide and install", and/or similar phrases occur, it is the intent that the materials and equipment described be furnished, installed and connected under this Division of the Specifications, complete for operation unless specifically noted to the contrary.

B. Where a material is described in detail, listed by catalogue number or otherwise called for, it shall be the Contractor's responsibility to furnish and install the material.

C. The use of the word "shall" conveys a mandatory condition to the contract.

D. "This section" refers to the section in which the statement occurs.

E. "The project" includes all work in progress during the construction period.

F. In describing the various items of equipment, in general, each item will be described singularly, even though there may be a multiplicity of identical or similar items.

1.15 SCHEDULE OF WORK

A. The work under the various sections must be expedited and close coordination will be required in executing the work. The various trades shall perform their portion of the work at such times as directed so as to meeting scheduled completion dates, and to avoid delaying any other trade. The Architect will set up completion dates. Each contractor shall cooperate in establishing these times and locations and shall process work so as to ensure the proper execution of it.

1.16 COOPERATION AND CLEANING UP

A. The Contractor for the work under each section of the specifications shall coordinate the Contractors work with the work described in all other sections of the specifications to the end that, as a whole, the job shall be a finished one of its kind, and shall carry on the work in such a manner that none of the work under any section of these specifications shall be handicapped, hindered or delayed at any time.

B. At all times during the progress of the work, the Contractor shall keep the premises clean and free of unnecessary materials and debris. The Contractor shall, on direction at any time from the Architect, clear any designated areas or area of materials and debris. On completion of any portion of the work, the Contractor shall remove from the premises all tools and machinery and all debris occasioned by the work, leaving the premises free of all obstructions and hindrances.

1.17 WARRANTY

A. Unless a longer warranty is hereinafter called for, all work, materials and equipment items shall be warrantied for a period of one year after acceptance by the Owner. All defects in labor and materials occurring during this period, as determined by the Architect/Engineer, shall be repaired and/or replaced to the complete satisfaction of the Architect/Engineer. Guarantee shall be in accordance with Division 01.

1.18 COMPLETION REQUIREMENTS

A. In accordance with the General Conditions and the General Requirements in Division 01, Project Closeout; before acceptance and final payment, the Contractor shall furnish:
   1. Accurate project record drawings, shown in red ink on prints, showing all changes from the original plans made during installation of the work.
   2. Contractors One Year Warranty.
   3. All Manufacturers' Guarantees.
   4. Test and Balance Reports.
   5. Operation and Maintenance Manuals.

1.19 INSPECTION OF SITE - REMODEL PROJECTS

A. The accompanying plans do not indicate completely the existing plumbing and mechanical installations. The bidders for the work under these sections of the specifications shall inspect the existing installations and thoroughly acquaint themselves with conditions to be met and the work to be accomplished in removing and modifying the existing work, and in installing the new work in the present building and underground serving to and from that structure. Failure to comply with this shall not constitute grounds for any additional payments in connection with removing or modifying any part of the existing installations and/or installing any new work.

1.20 RELOCATION OF EXISTING INSTALLATIONS

A. There are portions of the existing plumbing, mechanical and electrical systems, which shall remain in use to serve the finished building in conjunction with the indicated new installations. By actual examination at the site, each bidder shall determine those portions of the remaining present installations, which must be relocated to avoid

interference with the installations of new work of the Contractors particular trade and that of all other trades. All such existing installations, which interfere with new installations, shall be relocated by the Contractor.

1.21 SALVAGE MATERIALS

A. The Contractor shall remove existing equipment, duct, grilles and other items associated with the mechanical systems where no longer required for the project. Where such items are exposed to view or uncovered by any cutting or removal of general construction and has no continuing function (as determined by the Architect/Engineer), they shall be removed.

B. All items or materials removed from the project shall be made available for the Owner's inspection. The Owner retains the option to claim any item or material. Contractor shall deliver any claimed item or material in good condition to the place designated by the Owner. All items not claimed become the property of the contractor and shall be removed from the site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All equipment shall be regularly cataloged items of the manufacturer and shall be supplied as a complete unit in accordance with the manufacturer's standard specifications along with any optional items required for proper installation unless otherwise noted. Maintain manufacturer's identification, model number, etc. on all equipment at all times.

B. Where more than one of an item is to be provided, all of the items shall be identical manufacture, make, model, color, etc.

2.02 RESTRICTED MATERIALS

A. No materials containing asbestos in any form shall be allowed.

B. No solder or flux containing lead shall be used on this project.

C. Where materials or equipment provided by this Contractor are found to contain restricted materials, such items shall be removed and replaced with non-restricted materials items. Entire cost of restricted materials removal and disposal and cost of installing new items shall be the responsibility of the Contractor for those restricted materials containing items installed by the Contractor.

2.03 ELECTRICAL MOTORS

A. Motors: Furnish electric motors designed for the specific application and duty applied, and to deliver rated horsepower without exceeding temperature ratings when operated on power systems with a combined variation in voltage and frequency not more than + 10% of rated voltage. Motors for pumps and fans shall be selected to be non-overloading.

B. Verify from the drawings and specifications the available electrical supply characteristics and furnish equipment that will perform satisfactorily under the conditions shown and specified.

C. All motors for use with equipment with variable frequency drives shall be inverter ready motors. Verify compatibility and sizing of motor with variable frequency drive.

D. Size motors for 1.15 service factor and not to exceed 40º C temperature rise above ambient.

E. Fractional horsepower motors to have self-resetting thermal overload switch.

F. Provide Premium Efficiency, motors for all three phase motors one horsepower and larger. Standard efficiency motors will not be acceptable.

PART 3 - EXECUTION

3.01 DRAWINGS

A. The drawings are partly diagrammatic, not necessarily showing all offsets or exact locations of piping and ducts, unless specifically dimensioned. The contractor shall provide all materials and labor necessary for a complete and operable system. Complete details of the building which affect the mechanical installation may not be shown. For additional details, see Electrical Drawings. Coordinate work under this section with that of all related trades.

3.02 INSTALLATION

A. All work shall comply with the latest adopted applicable codes and ordinances including, but not limited to, the IMC, UPC, IBC, NFPA, IECC, IFGC and IFC Standards; all local and state amendments to all codes and standards.

B. Obtain and pay for all inspection fees, connection charges and permits as a part of the Contract.

C. Compliance with codes and ordinances shall be at the Contractor's expense.

3.03 MEASUREMENTS

A. Verify all measurements on the job site.

B. Locate all equipment and fixtures on the centers of walls, openings, spaces, etc., unless specified otherwise.

C. Check all piping, ducts, etc. to clear openings.

D. Rough-in dimensions shall be per manufacturer's recommendations and in compliance with current ADA and ANSI 117.1 standards.

3.04 OPERATING INSTRUCTIONS

A. Before the facility is turned over to the Owner, instruct the Owner or Owner's personnel in the operation, care and maintenance of all systems and equipment under the jurisdiction of the Mechanical Division. These instructions shall also be included in a written summary in the Operating Maintenance Manuals.

B. The Operation and Maintenance Manuals shall be utilized for the basis of the instruction. Provide a minimum of four hours of on-site instruction to the owner designated personnel.

C. When required by individual specification sections provide additional training on HVAC systems and equipment as indicated in the respective specification section.

3.05 SYSTEM ADJUSTING

A. Each part of each system shall be adjusted and readjusted as necessary to ensure proper functioning of all controls, proper air distribution, elimination of drafts, noise and vibration.

B. Balance air and water systems for volume quantities shown and as required to ensure even temperature and the elimination of drafts. Balancing shall be done by a qualified firm acceptable to the Engineer. Provide balancing log to the Engineer before substantial completion.

3.06 CUTTING, FITTING, REPAIRING, PATCHING AND FINISHING

A. Arrange and pay for all cutting, fitting, repairing, patching and finishing of work by other trades where it is necessary to disturb such work to permit installation of mechanical work. Perform work only with craftsmen skilled in their respective trades.

B. Avoid cutting, insofar as possible, by setting sleeves, frames, etc. and by requesting openings in advance. Assist other trades in securing correct location and placement of rough-frames, sleeves, openings, etc. for ducts and piping.

C. Cut all holes neatly and as small as possible to admit work. Include cutting where sleeves or openings have been omitted. Perform cutting in a manner so as not to weaken walls, partitions or floors. Drill holes required to be cut in floors without breaking out around holes.

3.07 PAINTING

A. Perform all of the following painting in accordance with provisions of Division 09 with colors as selected by the Architect. Provide the following items as a part of mechanical work:
   1. Factory applied prime and finish coats on mechanical equipment.
   2. Factory applied prime and finish coat on all air registers, grilles and diffusers, unless otherwise specified.
   3. Factory applied prime coat on access doors.
   4. Pipe identification where specified.

B. If factory finish on any equipment furnished is damaged in shipment or during construction, refinish to equal original factory finish.

3.08 INSTALLATION OF EQUIPMENT

A. Unless otherwise indicated, mount all equipment and install in accordance with manufacturer's recommendations and approved submittals.

B. Maintain manufacture recommended minimum clearances for access and maintenance.

C. Where equipment is to be anchored to structure, furnish and locate necessary anchoring and vibration isolation devices.

D. Furnish all structural steel, such as angles, channels, beams, etc. required to support all piping, ductwork, equipment and accessories installed under this Division. Use structural supports suitable for equipment specified or as indicated. In all cases, support design will be based upon data contained in manufacturer's catalog. Provide Seismic Restraint in Accordance with Specification Section 23 05 48.

E. Openings: Arrange for necessary openings in buildings to allow for admittance and reasonable maintenance or replacement of all equipment furnished under this Contract.

END OF SECTION

SECTION 23 05 19 - METERS AND GAUGES FOR HVAC PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Pressure Gauges.
2. Pressure Gauge Taps.
3. Thermometers.

B. PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THE SECTION
1. Section 23 21 13 - Hydronic Piping: Installation of thermometer wells, pressure gauge tappings.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 09 23 - Direct Digital Control System for HVAC.

C. Section 23 09 93 - Sequence of Operations for HVAC Controls.

D. Section 23 21 16 - Hydronic Piping Specialties.

1.03 REFERENCE STANDARDS

A. ASTM E1 - Specification for ASTM Thermometers.

B. ASTM E77 - Verification and Calibration of Liquid-in-Glass Thermometers.

C. ASTM E1 - Standard Specification for ASTM Thermometers.

1.04 SUBMITTALS

A. Product Data: Submit engineering data for each component, include list which indicates use, operating range, total range and location for manufactured components.

B. Submit manufacturer's installation instructions under provisions of Division 01.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual location of all instrumentation and gauges.

B. Operation and Maintenance Data.

1.06 WARRANTY

A. Furnish one year manufacturer warranty for HVAC instrumentation.

PART 2 - PRODUCTS

2.01 INSTRUMENTATION FOR HVAC

A. Manufacturers:
1. Dwyer
2. Trerice.
3. Weiss.
4. Substitutions: In accordance with Division 01.

2.02 PRESSURE GAUGES

A. 4-1/2 inch diameter cast aluminum case, phosphor bronze bourbon tube, rotary bronze movement, brass socket, [with silicone fluid dampening] black figures on white background, one percent mid-scale accuracy, scale calibrated in psi. Model 600CB as manufactured by Trerice or approved equal.

2.03 PRESSURE GAUGE TAPS

A. Gauge Isolation Valve: Lever handle ball valve, forged brass body, chrome plated brass ball, viton o-rings for maximum 150 psig. Model Mini T-82-M as manufactured by Jomar or equal.

B. Needle Valve: Brass for maximum 150 psig. Model 735 as manufactured by Trerice or equal.

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections. Series 870 as manufactured by Trerice.

D. Coil Siphon: Brass, ¼", male pipe thread each end. 885 series.

2.04 STEM TYPE THERMOMETERS

A. Analog Thermometers: 9 inch scale, universal adjustable angle, organic spirits, lens front tube, cast aluminum case with blue/black metallic finish and clear Lexan window, extended brass stem, cast aluminum adjustable joint with positive locking device, 2 percent of scale accuracy to ASTM E77, scale calibrated in both degrees F and degrees C, range per schedule. BX9 series as manufactured by Trerice or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide two pressure gauges per pump, installing taps on suction and discharge of pump. Pipe to gauge with isolation valve to each tapping.

C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Select bulb length to reach centerline of pipe. Coat thermometer stem with conductive compound.

D. Install thermometer sockets and flanges adjacent to controls system thermostat, transmitter, or sensors. Refer to Section 23 09 23.

E. Provide instruments with scale ranges selected according to service with largest appropriate scale.

F. Install gauges and thermometers in locations where they are easily read from normal operating level.

3.02 PRESSURE GAUGE SCHEDULE

LOCATION	SCALE RANGE
Pumps less than 40' TDH	0 - 30 PSIG
Pumps more than 40' TDH	0 - 60 PSIG
Glycol water system	0 - 30 PSIG
Others	As applicable

3.03 THERMOMETER SCHEDULE

LOCATION	SCALE RANGE
Glycol water system	0 - 200° F

END OF SECTION

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Pipe, Duct, and Equipment Hangers, Supports, and Associated Anchors.

B. Hanger Rods.

C. Inserts.

D. Equipment Curbs.

E. Equipment Bases and Supports.

F. Formed Steel Channel.

G. Sleeves and Seals.

1.02 PRODUCTS FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

A. Furnish hanger and support sleeves for placement into formwork.

B. Placement of equipment roof support curbs.

1.03 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 05 48 - Vibration and Seismic Controls for HVAC.

C. Section 23 07 00 - HVAC Insulation.

D. Section 23 31 16 - Hydronic Piping.

1.04 REFERENCES

A. ASME B31.1 - Power Piping.

B. ASME B31.9 - Building Services Piping.

C. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM E119 - Method for Fire Tests of Building Construction and Materials.

E. ASTM A 194 - Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure and/or High Temperature Service.

F. ASTM A 307 - Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

G. ASTM A 575 - Steel Bars, Carbon, Merchant Quality, M-Grades.

H. ASTM A 653 - Steel Sheet, Zinc-Coated (Galvanized).

I. ASTM A 675 - Steel Bars, Carbon, Hot-Wrought, Special Quality.

J. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.

K. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

L. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

M. ANSI/MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

N. ANSI/MSS SP69 - Pipe Hangers and Supports - Selection and Application.

O. AWS D1.1 - Structural Welding Code - Steel.

P. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.

Q. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.

R. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

S. UL 1479 - Fire Tests of Penetration Firestops.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for support of hydronic piping.

1.06 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings: Indicate system layout with location and detail of supports.

C. Product Data: Provide manufacturers catalog data including load capacity.

D. Manufacturer's Installation Instructions: Indicate special procedures and assembly of components.

1.07 QUALITY ASSURANCE

A. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

1.08 DELIVERY, STORAGE AND HANDLING

A. Delivery, storage and handle products under provisions of the Supplementary Conditions.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

PART 2 - PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. Acceptable Manufacturers:
1. Anvil.
2. PHD Manufacturing, Inc.
3. Michigan Hanger Company.
4. B-Line Systems, Inc.

B. Hydronic Piping:
1. Conform to ANSI/MSS SP58.
2. Hangers for Pipe Sizes ½ to 1-½ Inch: Malleable iron, adjustable swivel, split ring for steel pipe, copper swivel for copper pipe.
3. Hangers for Hot Pipe Sizes 2 to 4 Inches and Cold Pipe Sizes 2 Inches and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels or strut with hanger rods. Cast iron roll and stand for hot pipe sizes 6 inches and over.
5. Wall Support for Pipe Sizes to 3 Inches: Strut triangular bracket with pipe clamp and cushion insulator.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roll for hot pipe sizes 6 inches and over.
7. Vertical Support: Steel riser clamp.
8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated with felt isolation pad or all copper ring or swivel.

C. Shield for Insulated Piping 1-½ Inches and Smaller: 18 gauge galvanized steel shield over insulation in 180º segments, minimum 12 inches long at pipe support.

D. Shield for Insulated Piping 2 Inches and Larger: Hard block, calcium silicate insert, 180° segment, 12 inch minimum length, block thickness same as insulation thickness, flame resistant vapor barrier covering and 18 gauge galvanized shield.

E. Shields for Vertical Copper Pipe Risers: Galvanized steel pipe.

F. Design hangers to allow installation without disengagement of supported pipe.

G. Copper Plating: All hanger elements in metal-to-metal contact with copper pipe, except hanger rings with factory-applied 1/16 inch minimum thick plastic or tape cushion strip over all contact surfaces.

H. Strut Type Pipe Hanging System: Unistrut P-1000 series; framing members shall be No. 12 gage formed steel channels, 1-5/8 inch square, conforming to ASTM A653 GR33, one side of channel shall have a continuous slot with inturned lips; framing nut with grooves and spring 1/2 inch size, conforming to ASTM 675 GR60; screws conforming to ASTM A 307; fittings conforming to ASTM A 575; all parts enamel painted or electro-galvanized.

2.02 HANGER RODS

A. Steel Hanger Rods: Mild steel, threaded both ends, threaded one end, or continuous threaded.

2.03 ANCHOR BOLTS

A. Anchor (Expansion) Bolts: Shall be carbon steel to ASTM A 307; nut shall conform to ASTM A194; shall be drilled-in type. Design values for shear and tension shall be not more than 80 percent of the allowable load.

2.04 EQUIPMENT CURBS

A. Fabricate curbs of steel beam, unless specifically called out otherwise.

2.05 SLEEVES

A. Sleeves for Pipes Through Non-fire Rated Floors: Form with 18 gauge galvanized steel for 4 inch diameter and larger, 22 gauge up to 3" diameter.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Form with steel pipe or 18 gauge galvanized steel for 4 inch diameter and larger, 22 gauge up to 3" diameter.

C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fireproofing: UL listed caulking system.

D. Fire Stopping Insulation: Mineral fiber type, non- combustible.

E. Caulk: Fire stop sealant in compliance with ASTM E814, UL 1479 and Division 07.

F. Mechanical Sleeve Seals: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.06 FORMED STEEL CHANNEL

A. Manufacturers:
1. Allied Tube & Conduit Corp.
2. B-Line Systems.
3. Midland Ross Corporation, Electrical Products Division
4. Unistrut Corp.
5. Substitutions under provisions of Division 01.

B. Product Description: Galvanized 12 gauge (2.8 mm) thick steel. With holes 1-1/2 inches (38 mm) on center.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install pipe hangers in accordance with ANSI/MSS-SP-69.

3.02 PIPE HANGERS AND SUPPORTS

A. Support piping as follows:

Pipe Size	Max. Hanger Spacing	Hanger Diameter
½ to 1-¼ inch	6'-0"	3/8"
1-½ to 2 inch	10'-0"	3/8"
2-½ to 3 inch	10'-0"	½"

Notes:
[a] See piping manufacturer installation instructions for additional requirements.

B. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.

C. Place a hanger within 12 inches of each horizontal elbow.

D. Use hangers with 1-½ inch minimum vertical adjustment.

E. Support vertical piping at every floor.

F. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

G. Support riser piping independently of connected horizontal piping.

H. Design hangers for pipe movement without disengagement of supported pipe.

I. Provide copper plated hangers and supports for copper piping.

3.03 EQUIPMENT BASES AND SUPPORTS

A. Provide equipment bases of steel were shown on plans and where required by equipment manufacturer installation instructions.

B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

C. Construct equipment support of steel members. Brace and fasten with flanges bolted to structure.

3.04 FLASHING

A. Provide flexible flashing and metal counter-flashing where piping penetrates weather or waterproofed walls, floors, and roofs.

3.05 SLEEVES

A. Set sleeves in position in construction. Provide reinforcing around sleeves.

B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

C. Extend sleeves through floors one inch above finished floor level. Pack and caulk sleeves full depth and provide floor plate.

D. Where piping or ductwork penetrates floor, ceiling, or wall, install sleeve, close off space between pipe or duct and adjacent work with fire stopping insulation and caulk seal. Use fire rated caulking where area or occupancy separation walls are penetrated. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

E. Install chrome plated steel escutcheons at finished surfaces.

3.06 INSTALLATION OF EQUIPMENT

A. Unless otherwise indicated, mount all equipment and install in accordance with manufacturer's recommendations and approved submittals.

B. Maintain manufacture recommended minimum clearances for access and maintenance.

C. Where equipment is to be anchored to structure, furnish and locate necessary anchoring and vibration isolation devices.

D. Furnish all structural steel, such as angles, channels, beams, etc. required to support all piping, ductwork, equipment and accessories installed under this Division. Use structural supports suitable for equipment specified or as indicated. In all cases, support design will be based upon data contained in manufacturer's catalog.

E. Openings: Arrange for necessary openings in buildings to allow for admittance and reasonable maintenance or replacement of all equipment furnished under this Contract.

END OF SECTION

SECTION 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section provides minimum acceptance requirements for vibration isolation and seismic/wind restraints for all HVAC piping, ductwork equipment and piping.

1.02 GENERAL

A. The requirements for seismic protection measures to be applied to plumbing equipment and systems specified herein are in addition to any other items called for in other sections of these specifications.

1.03 HVAC PIPING, DUCTWORK AND EQUIPMENT

A. This section provides minimum acceptance requirements for vibration isolation and seismic/wind restraints for all HVAC equipment, piping and ductwork. HVAC equipment shall include all items on mechanical plans or in other sections of the Division 23 specifications. Equipment shall include but not be limited to:
   1. Expansion tanks
   2. Glycol Tanks.
   3. Pumps.
   4. Heat Exchangers.
   5. Radiators.

1.04 RELATED WORK SPECIFIED ELSEWHERE

A. Vibration isolation and seismic/wind restraints for plumbing systems are specified elsewhere in Division 22.

B. Vibration isolation and seismic restraints for electrical systems are provided in Division 26.

1.05 QUALITY ASSURANCE

A. The following codes and standards will apply:
   1. International Building Code.
   2. American Society of Civil Engineers (ASCE) 7-16.

B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of vibration control and wind restraint products of type, size, and capacity required, whose products have been in satisfactory use in similar service for not less than 5 years.

C. The following guides may be used for supplemental information on typical seismic installation practices:

1. Federal Emergency Management Agency (FEMA) manuals 412, Installing Seismic Restraints for Mechanical Equipment and 414, Installing Seismic Restraints for Ductwork and Pipe.
2. Sheet Metal and Air-conditioning Contractors' National Association's (SMACNA) Seismic Restraint Manual Guidelines for Mechanical Systems.
3. American Society for Heating, Refrigerating and Air-conditioning Engineers' (ASHRAE) A Practical Guide to Seismic Restraint.
4. Manufacturers Standardization Society of the Valve and Fittings Industry MSS SP-127-2014, Bracing for Piping Systems, Seismic - Wind - Dynamic, Design, Selection, Application.

1.06 COMPONENT IMPORTANCE FACTOR

A. In order to identify systems requiring seismic restraint and to define those from which restraints may be excluded, utility components are assigned an ASCE 7 Importance Factor (Ip) on the basis of the following:

Ip = 1.5 All piping, or equipment associated with Life-safety systems which are required to function after a seismic event including fire protection sprinkler systems.

Fuel oil piping, petroleum based liquid piping, and any other piping carrying hazardous materials.

Ip = 1.0 All other components.

1.07 SUBMITTALS

A. Submit shop drawings and manufacturer's data in accordance with Division 01.

B. Provide calculations for selection of seismic/wind restraints in accordance with IBC and ASCE 7, certified by a qualified professional engineer, licensed in the state of the project.

C. Submit adequate number of City Plan Review department set of shop drawings and seismic calculations for their review. Submit to City plan review and owner concurrently. Submit plan review approved set to Engineer when available. The submittals must include a licensed engineer's stamp and signature and shall be provided as deferred submittal.

D. All outdoor mounted equipment shall be restrained for the highest wind speed as specified by the project's structural engineer, the governing building code(s) or the authority having jurisdiction.

E. Submit shop drawings for all devices specified herein and as indicated and scheduled on the drawings. Submittals shall indicate full compliance with the device specification in Part 2. Any deviation shall be specifically noted and subject to engineer approval. Submittals shall include device dimensions, placement, attachment and anchorage requirements.

F. Provide Shop drawings along with catalog cuts, templates and erection and installation details, as appropriate, for the items listed. Submittals shall be complete in detail; shall indicate thickness, type, grade, class of metal; and dimensions; and shall show

construction details, reinforcement, anchorage, and installation with relation to the building construction.

1. Sway Braces.
2. Vibration Isolators.
3. Seismic Cable Restraint.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Vibration isolators and Seismic Restraint shall be manufactured by:
   1. Amber/Booth.
   2. Cooper Industries.
   3. International Seismic Application Technology.
   4. Kinetics Noise Control.
   5. Mason Industries.
   6. Vibro-Acoustics.
   7. Substitutions: Items of same function and performance are acceptable in conformance with Division 01.

2.02 SEISMIC BRACING AND SUPPORT OF SYSTEMS AND COMPONENTS

A. General:
   1. Seismic restraint designer shall coordinate all attachments.
   2. Design analysis shall include calculated dead loads, static seismic loads, and capacity of materials utilized for the connection of the equipment or system to the structure.
   3. Analysis shall detail anchoring methods, bolt diameter, and embedment depth.
   4. All seismic restraint devices shall be designed to accept without failure the forces calculated per the applicable building code and as summarized in installation requirements.
   5. The total height of the structure (h) and the height of the system to be restrained within the structure (z) shall be determined in coordination with architectural plans and the General Contractor.

B. Friction from gravity loads shall not be considered resistance to seismic forces.

2.03 SEISMIC BRACING COMPONENTS

A. Steel strut shall be 1-5/8 wide in varying heights and mig-welded combinations as required to meet load capacities and designs indicated. A material heat code, part number, and manufacturer's name shall be stamped on all strut and fittings to maintain traceability to material test reports.
   1. Material for epoxy painted strut: ASTM A1011, SS, Grade 33.
   2. Material for pre-galvanized strut: ASTM A653, SS, Gr. 33.
   3. Material for Hot-Dip Galvanized strut: ASTM A1011, SS, Grade 33 and hot-dip galvanized after fabrication in accordance with ASTM A123.
   4. Material for fittings and accessories: ASTM A907 Gr. 33, Structural Quality or ASTM A1011, SS. Gr.33.
   5. Fittings and accessories: Products shall be of the same manufacturer as strut and designed for use with that product.

2.04 RESTRAINTS

A. Provide positive attachment for seismic restraints on those systems and components required by the applicable building code and by the local authority having jurisdiction.

B. Provide restraint devices as required, specified, and as scheduled for isolated and non-isolated systems and equipment. Provide calculations to determine restraint loadings for all restrained systems and equipment resulting from seismic forces.

C. Corrosion Protection: All springs shall be powder-coated enamel. Housings shall be hot dipped galvanized, powder-coated enamel, or painted with rust-resistant paint.

D. Bases:
   1. Steel Equipment Base: Bases shall be constructed of structural steel members with cross members to form an integral support platform. Steel deflection shall be limited to l/360 the longest span but not to exceed 1/4". Bases for exterior use shall be painted or hot-dipped galvanized for complete corrosion resistance. Minimum clearance under steel equipment bases shall be 1" (25 mm).
   2. Concrete Anchors: Post-installed anchors in concrete shall be qualified for seismic/wind restraint application.
      a. Mechanical anchor bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. (In accordance with ACI 355.2 and ICC-ES AC193)
      b. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. (In accordance with ACI 355.4 and ICC-ES AC308)

PART 3 - EXECUTION

3.01 GENERAL

A. Coordinate locations and sizes of structural supports with locations of vibration isolators and seismic restraints.

3.02 SEISMIC/WIND RESTRAINTS

A. General:
   1. All equipment shall be restrained to resist seismic forces per the applicable building code(s) as a minimum. Restraint attachments shall be made by bolts, welds or a positive fastening method. Friction shall not be considered. All attachments shall be proven capable of accepting the required wind load by calculations. Additional requirements specified herein are included specifically for this project.
   2. Install seismic restraint devices per the manufacturer's submittals. Any deviation from the manufacturer's instructions shall be reviewed and approved by the manufacturer.
   3. Where rigid restraints are used on equipment, support rods for the equipment must be supported by anchors rated for seismic use. Post-installed concrete anchors must be in accordance with ACI 355.2.

B. Concrete Anchor Bolts:
   1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre- or post-tensioned tendons, electrical and telecommunications conduit, and gas lines.
   2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
   3. Mechanical Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
   4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
   5. Set anchors to manufacturer's recommended torque, using a torque wrench.

C. Equipment Restraints:
   1. Seismically restrain equipment as indicated on the schedule. Install fasteners, straps and brackets as required to secure the equipment.
   2. As indicated on the schedule, install seismic snubbers on HVAC equipment supported by floor-mounted, non-seismic vibration isolators. Locate snubbers as close as possible to vibration isolators and attach to equipment base and supporting structure as required.
   3. Install neoprene grommet washers on equipment anchor bolts where clearance between anchor and equipment support hole exceeds 1/8" (3.2 mm).
   4. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

END OF SECTION

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING, DUCTWORK AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this section.

1.02 SUMMARY

A. Section Includes identification of HVAC piping, ductwork and equipment installed under Division 23.

1.03 REFERENCES

A. ANSI/ASME A13.1 - Scheme for the Identification of Piping Systems.

1.04 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Include product data on: Nameplates, tags, stencil and paint, and pipe markers.

1.05 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Seton.

B. Marking Services Inc.

C. Craftmark Identification Systems.

D. Substitutions: Under provisions of Division 01.

2.02 MATERIALS

A. Color: Unless specified otherwise, conform with ANSI/ASME A13.1.

B. Plastic Nameplates: Laminated three-layer plastic with engraved black or white letters on contrasting background color. Plate size minimum ¾" X 2-½".

C. Plastic Tags: Laminated three-layer plastic with engraved black or white letters on contrasting background color. Tag size minimum 1-½ inch square.

D. Metal Tags: Brass with stamped letters; tag size minimum 1-½ inch diameter with smooth edges.

E. Stencils: With clean cut symbols and letters of following size:

Outside Diameter of Insulation or Pipe	Length of Color Field	Size of Letters
¾" - 1-¼"	8"	½"
1-½" - 2"	8"	¾"
2-½" - 6"	12"	1-¼"
Equipment	------	2-½"

F. Stencil Paint: Semi-gloss enamel, colors and lettering size conforming to ASME A13.1.

G. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and fluid being conveyed. Larger sizes may have maximum sheet size with spring fastener.

H. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

PART 3 - EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Division 09 for stencil painting.

3.02 INSTALLATION

A. Apply stencil painting in accordance with Division 09.

B. Install identifying devices after completion of coverings and painting.

C. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

D. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

E. Install tags using corrosion resistant chain. Number tags consecutively by location.

F. Equipment: Identify fans, pumps, heat transfer equipment, and tanks with plastic nameplates. Small devices, such as in-line pumps, may be identified with plastic or metal tags.

G. Identify control panels and major control components outside panels with plastic nameplates.

H. Identify valves in main and branch piping with tags showing service and valve number.

I. Identify piping, concealed or exposed, with plastic pipe markers. Tags may be used on small diameter piping. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

J. Locations: Nameplates shall be located so as to be readily visible to maintenance personnel. Motor nameplates shall be readily visible on accessible, three phase motors, otherwise a duplicate motor nameplate shall be permanently affixed to the driven machinery in a visible location.

END OF SECTION

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Air Systems:
   1. Constant Volume Air Systems.

B. Hydronic Systems:
   1. Constant Flow Systems.

1.02 SCOPE

A. Furnish the professional services of a qualified and approved balancing and testing firm to perform the work of this specification section.

B. The work of this section includes but is not necessarily limited to:
   1. Testing and balancing new remote radiator piping systems as indicated on drawings.
   2. Testing and balancing radiator fan.
   3. Testing and balancing new liquid heat transfer systems.
   4. Working directly with the control subcontractor to obtain proper system adjustments.

1.03 APPLICABLE CODES AND STANDARDS

A. SMACNA Manual for the Balancing and Adjustment of Air Distribution Systems.

B. AMCA Publication 203, Field Performance Measurements.

C. American Air Balancing Council (AABC) Recommended Procedures

D. National Environmental Balancing Bureau (NEBB) Recommended Procedures

1.04 QUALIFICATION OF THE BALANCING FIRM OR COMPANY

A. Subcontractor minimum qualifications include:
   1. NEBB Certified in Testing, Adjusting and Balancing of Air and Hydronic Systems or Demonstration of satisfactory completion of five projects of similar scope in the State of Alaska during the past five years. Provide references if requested.

1.05 TIMING OF WORK

A. Do not begin balancing and testing until the systems, including controls, are completed

and in full working order.

B. Schedule the testing and balancing work in cooperation with other trades.

C. Complete the testing and balancing at least one week before the date of substantial completion and before any occupancy occurs

1.06 CONTRACTOR RESPONSIBILITY TO BALANCING AGENCY

A. Award the test and balance contract to an approved firm or company upon receipt of contract to allow the Balance and Testing Agency to schedule this work in cooperation with other trades involved and comply with completion date.

B. Put all heating and ventilating systems, equipment, and controls into full operation for the Balancing Agency and continue the operation of same during each working day of testing balancing.

C. Provide scaffolding, ladders and access to each system for proper testing balancing.

D. Ensure that the building enclosure is complete, including but not limited to, structural components, windows and doors installed, door hardware complete, ceilings complete, stair, elevator and mechanical shafts complete, roof systems complete, all plenums sealed, etc.

E. Make any changes in pulleys, belts and dampers, or add any dampers as required for correct balance as recommended by the Balance and Testing Agency at no additional cost to the Owner.

F. Complete installation, programming (including design parameters and graphics), calibration, and startup of all building control systems.

G. Require that the building control system firm provide access to hardware and software, or onsite technical support required to assist the TAB effort. The hardware and software or the onsite technical support shall be provided at no cost to the TAB firm.

1.07 REPORT

A. Certified Reports shall be included in project O & M manuals. Reports shall include: testing, adjusting, and balancing reports bearing the signature of the Test and Balance Agency Representative. The reports shall be certified proof that the systems have been tested, adjusted, and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed; are a true representation of how the systems are operating at the completion of the testing, adjusting and balancing procedures; and are an accurate record of all final quantities measured, to establish normal operating values of the system. Follow the procedures and format specified below:

1. Draft Reports: Upon completion of testing, adjusting and balancing procedures, prepare draft reports on the approved forms. Draft reports may be hand written, but must be complete, factual, accurate, and legible. Organize and format draft

reports in the same manner specified for the final reports.

2. Final Reports: Upon verification and approval of the draft report; prepare final reports, typewritten, organized and formatted as specified below.
3. Report Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted and balanced. Report shall be provided in electronic PDF Format. The data in the electronic file shall be arranged and indexed. Divide the contents into the below listed sections, with bookmarks for each section:
   a. General Information and Summary.
   b. Air Systems.
   c. Hydronic Systems.
   d. Temperature Control Systems.
   e. Special Systems.
   f. System Deficiency Reports and Corrective Actions.
4. Report Contents: Provide the following minimum information, forms and data:
   a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency; contractor; owner, architect, engineer and project. Include addresses, contact names and telephone numbers. Also, include a certification sheet containing the name, address, telephone number and signature of the Certified Test and Balance Personnel. Include in this division a listing of the instrumentation used for the procedures along with the proof of calibration.
   b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC for each respective item and system. Prepare a schematic diagram for each item of equipment and system to accompany each respective report form.
   c. Calibration Reports: Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

1.08 SUBMITTALS

A. Submit in accordance with Division 01.

B. Submit balancing agency qualifications and sample balancing forms.

C. Provide list of equipment to be used and date of last calibration.

D. Submit preliminary balance report a minimum of one week prior to substantial completion inspection.

PART 2 - PRODUCTS

2.01 INSTRUMENTS

A. Maintain all instruments accurately calibrated and in good working order. Use instruments

with the following minimum performance characteristics.

1. Air Velocity Instruments: Direct reading in feet per minute, 2% accuracy.
2. Static Pressure Instruments: Direct reading in inches' water gauge, 2% accuracy.
3. RPM Instruments: Direct reading in revolutions per minute, .5% accuracy; or revolution counter accurate within 2 counts per 1,000.
4. Pressure Readout: Direct reading in feet of water or PSI, .5% accuracy.
5. Temperature Instruments - Direct reading in degrees F, +.5% accuracy.
6. Water Flow Instruments: Differential pressure type; direct reading in feet of water or PSI, accuracy, suitable for readout balancing valve provided.
7. Sound Measuring Instrument: Octave Band Analyzer which essentially complies to AASA Standards SI.6 1960 with a range of 24DB to 150 DB sound pressure level ref. .0002 microbar. Calibrate sound test instrument before use to a closed coupler and a driving loudspeaker that produces a know-sound pressure level at the microphone of the analyzer.

PART 3 - EXECUTION

3.01 GENERAL PROCEDURES FOR ALL SYSTEMS

A. In cooperation with the control manufacturer's representative, coordinate adjustments of automatically operated dampers and valves to operate as specified, indicated and/or noted.

B. Use manufacturer's ratings on all equipment to make required calculations.

C. Mark equipment and balancing device settings (including damper-control positions, valve position indicators, fan-speed-controls, and similar controls and devices) with paint or other suitable permanent identification material to show final settings.

3.02 FLUID SYSTEM TESTING AND BALANCING

A. Preparation of system - Phase I:

1. Complete air balance before beginning fluid balance.
2. Clean all strainers.
3. Examine fluid in system to determine if treated and clean.
4. Check pump rotation.
5. Verify expansion tanks are not air bound and system full of fluid.
6. Verify all air vents at high points of fluid systems are installed properly and are operating freely. Make certain all air is removed from circuiting system.
7. Open all valves to full flow position including coil and heater stop valves, close bypass valves and open return line balancing cocks. Set temperature controls so that automatic valves are open to full flow through apparatus.
8. Check and set operating temperature of boilers and heat exchangers to design requirements when balancing by temperature drop.
9. Adjust all flows to 110% of design flows as shown.

B. Test and Balance Procedure - Phase II:

1. Set pumps to proper GPM delivery and set proper GPM delivery in main piping runs from boiler room. Note flow variations for additive alternates.
2. Adjust flow of fluid through primary equipment.
3. Check leaving fluid temperatures and return fluid temperatures and pressure drop through major equipment. Reset to correct design temperatures.
4. Check fluid temperature at inlet side of coils and other heat transfer equipment. Note rise or drop of temperatures from source.
5. Balance each coil and all other heat transfer apparatus in system.
6. Upon completion of flow readings and adjustments, mark all settings and record all data.

C. Test and Balance Procedure - Phase III:

1. After making adjustments to coils and apparatus, recheck settings at pumps and major equipment. Readjust if required.
2. Attach pressure gauges on each coil, then read pressure drop through coil at set flow rate on call for full flow through coil. Set pressure drop across bypass valve to match coil full flow pressure drop. This prevents unbalanced flow conditions when coils are on full bypass.
3. Check and record the following items with flows set at 100% of design.
   a. Inlet and leaving fluid and air temperatures at each piece of equipment.
   b. GPM flow of each piece of equipment.
   c. Pressure drop of heat exchangers and radiator.
   d. Pump operating suction and discharge pressures and final total developed head.
   e. Pump GPM.
   f. Rated and actual running amperage and voltage of pump motor.
   g. Full nameplate data of all pumps and equipment.
   h. Electrical overloads/heaters sizes and ranges of motors.
4. Permanently mark adjusted position of all balancing valves. Stamp indicator plate of circuit setters and other balancing valves without memory stop.

END OF SECTION

SECTION 23 07 00 - HVAC INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Piping Insulation.

B. Equipment Insulation.

C. Jackets and Accessories.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC Systems.

B. Section 23 05 19 - Meters and Gages for HVAC Piping.

C. Section 23 21 13 - Hydronic Piping.

D. Section 23 21 16 - Hydronic Specialties.

E. Section 23 57 00 - Heat Exchangers for HVAC.

1.03 REFERENCES

A. ASTM B209 - Aluminum and Aluminum-alloy Sheet and Plate.

B. ASTM C195 - Mineral Fiber Thermal Insulating Cement.

C. ASTM C450 - Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging.

D. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

E. ANSI/ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

F. ANSI/ASTM C547 - Mineral Fiber Pipe Insulation (Preformed).

G. ANSI/ASTM C552 - Cellular Glass Thermal Insulation.

H. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).

I. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

J. ASTM C1427 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

K. ASTM D774 - Standard Test Method for Bursting Strength of Paper.

L. ASTM D1000 - Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications.

M. ASTM E84 - Surface Burning Characteristics of Building Materials.

N. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

O. UL 723 - Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Include product description, thickness for each service, and locations.

C. Submit manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

A. Applicator: Company specializing in piping insulation application with three years minimum experience.

B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.

C. Materials: Flame spread/smoke developed rating of 25/50 in accordance with UL 723, ASTM E84, or NFPA 255.

D. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Division 01 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

C. Shipment of materials from manufacturer to installation location shall be in weather tight transportation.

D. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesive, mastics, and insulation cements.

1.08 FIELD MEASURMENTS

A. Verify field measurements prior to fabrication.

1.09 WARRANTY

A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Certain-Teed.

B. IMCOA.

C. Johns Manville.

D. Knauf.

E. Owens-Corning.

F. Manson.

G. Nomaco.

H. Pittsburgh - Corning.

I. Armstrong.

J. Substitutions: Under provisions of Division 01.

2.02 INSULATION - PIPING

A. Type A: Glass fiber, rigid, molded, non-combustible insulation; ANSI/ASTM C547; 'k' value of 0.23 at 75º F, rated from 0º F to 850º F, vapor retarder jacket of Kraft paper bonded to aluminum foil, self-sealing lap and butt strips; Johns Manville "Micro-Lok" or approved equal.

B. Type F: Type F: Hydrous calcium silicate; ANSI/ASTM C533; rigid white; asbestos free; 'k' value of 0.44 at 300º F, rated to 1,200º F; Johns Manville "Thermo 12 Gold" or approved equal.

2.03 FIELD APPLIED PIPING JACKET

A. Vapor Barrier Jackets: Kraft reinforced foil vapor barrier with self-sealing adhesive joints.

B. PVC Jackets and solvent welding adhesive: One piece, pre-molded type, Johns Manville “Zeston 2000”, fitting covers and jacketing material. Johns Manville “Perma-Weld” solvent welding adhesive.

2.04 INSULATION - EQUIPMENT

A. Type H: Reusable Thermal Insulation Covers, HVAC Equipment: 2” thermal insulating wool, 2.4 lb./cu.ft. density, maximum temperature rating of 1000 Deg. F; Interior/Exterior Fabric: 17 oz./sq. yd. silicone coated fiberglass cloth, maximum temperature range of -80 to 500 Deg F; Securement: Lacing Anchors, fourteen gauge stainless steel with 1.5” diameter stainless steel speed washers; Sewing Thread: Kevlar/Stainless Steel S-110 Natural with stainless steel core, all blanket seems to be single sewn lock stitch interior seams, six to nine stitches per inch; Drawcord: 0.125" diameter #4 ultra-strength polyester. Thermal Energy Products "Energy-Wrap EW.2T.NM.SH.SC” or approved equal.

B. Type I: Reusable Valve Wrap Insulation Covers: Removable and reusable wraps packaged with a 1” thick fiberglass blanket insert to completely cover the insulated equipment. The outer cover of the shall be made of DuPont Tychem® QC that is secured with a Velcro closure. Tychem® QC consists of a durable Tyvek® substrate quality coated with polyethylene that is impermeable to water. K= .28 @ 100º F; Temperature Limits 0°F to 450°F; Water Vapor Transmission ASTM E 96 0.01 Perms at 37.8C/100F-RH/100%; Breaking Strength Grab (md/cd) ASTM D5034-90 43/49 lbs; Tearing Strength Trapezoid (md/cd) ASTM D1117-80 7/5 lbs; Weatherable Grade; UV resistant; White/gloss finish; UL25/50 rating and are non-combustible per ASTM E 136. NOSWEAT Reusable Valve Wraps or approved equal.

C. Type J: Reusable Thermal Insulation Covers, Generator Exhaust Systems: 2” thermal insulating wool, 8 lb./cu.ft. density, maximum temperature rating of 1200 Deg. F; Interior/Exterior Fabric: 32 oz./sq. yd. silicone coated fiberglass cloth; Hot Face Liner: 0.011” diameter Type 321 stainless steel wire mesh. Securement: Lacing Anchors, fourteen gauge stainless steel with 1.5” diameter stainless steel speed washers; Sewing Thread: Kevlar/Stainless Steel S-110 Natural with stainless steel core, all blanket seems to be single sewn lock stitch interior seams, six to nine stitches per inch; Drawcord: 0.125" diameter #4 ultra-strength polyester.

2.05 INSULATION - DUCTWORK

A. Type M: Duct Liner: Rigid Fiber Board; ASTM C1071; 'k' value of 0.23 at 75º F; coated air side for maximum 6,000 ft./min. air velocity, UL listed adhesive galvanized steel pins. Johns Manville “Permacote Linacoustic R-300" or approved equal.

2.06 FIELD APPLIED EQUIPMENT JACKETS

A. Re-Wettable Canvas Jacketing: Fiberglass cloth made from texturized yarns, impregnated throughout with an inorganic fire retardant asbestos free adhesive; 20x14 thread count, 14.5 oz./sq.yd, 0.04 inch thickness, 1,000º F upper temperature limit; GLT Products “Style 1989” or approved equal.

2.07 INSULATION ACCESSORIES

A. Adhesives: Waterproof and fire-retardant type.

B. Lagging Adhesive: Fire resistive to NFPA 255.

C. Impale Anchors: Galvanized steel, 12 gauge, self-adhesive pad.

D. Joint Tape: Glass fiber cloth, open mesh.

E. FSK Joint Tape; ASTM C1136 Foil-Scrim-Kraft (FSK) lamination coated with solvent acrylic pressure sensitive adhesive; capable of adhering to fibrous and sheet metal surfaces; tri-directionally reinforced 2x3 squares per inch fiberglass scrim; 9.5 mils thick, -40 to 240º F service temperatures; Venture Tape “1525CW” or approved equal.

F. Tie Wire: Annealed steel, 16 gauge.

G. Insulated pipe supports: Calcium silicate with galvanized steel jacket (min. 24 gauge); ANSI/ASTM C533; rigid white; 'k' value of 0.37 at 100º F, rated to 1,200º F; Thermal Pipe Shields “T-1000 Calsil” or equal.

PART 3 - EXECUTION

3.01 PREPARATION

A. Install materials after piping, equipment and ductwork has been tested and approved.

B. Clean surfaces for adhesives.

C. Prepare surfaces in accordance with manufacturer's recommendations.

3.02 INSTALLATION – PIPING INSULATION

A. Install materials in accordance with manufacturer's recommendations, building codes and industry standards.

B. Continue insulation vapor barrier through penetrations except where prohibited by code.

C. Locate insulation and cover seams in least visible locations.

D. Neatly finish insulation at supports, protrusions, and interruptions.

E. For insulated pipes conveying fluids above ambient temperature, secure jackets with self-sealing lap or outward clinched, expanded staples. Bevel and seal ends of insulation at equipment, flanges, and unions. Insulate complete system, including under fitting jackets.

F. Provide insulated piping supports on piping 1-½" inch diameter to 3 inch diameter. Insulation inserts shall not be less than the following lengths:

1-½" to 2-½" pipe size	10" long

3" to 6" pipe size 12" long

G. For exterior applications, provide weather protection jacket or coating. Insulated pipe, fittings, joints, and valves shall be covered with PVC jacket. Jacket seams shall be located on bottom side of horizontal piping.

H. Fully insulate all piping including all spaces under jacketing.

I. Jackets:
1. Indoor, Concealed Applications: Insulated pipes shall have vapor barrier jackets, factory-applied. Vapor barrier PVC fittings may also be used provided joints are sealed with solvent welding adhesive approved by the jacket manufacturer.
2. For pipe exposed in mechanical equipment rooms or in finished spaces below 10 feet above finished floor, finish with PVC jacket and fitting covers or metal jacket.

3.03 SCHEDULE – PIPING

PIPING	TYPE	PIPE SIZE	MINIMUM INSULATION THICKNESS
ACC Supply and Return	A	1-1/4” and Smaller	1"
ACC Supply and Return	A	1-1/2" and Larger	1-1/2"
JW Supply and Return	A	1-1/4” and Smaller	1-1/2"
JW Supply and Return	A	1-1/2" and Larger	2”

3.04 INSTALLATION - EQUIPMENT

A. Install materials in accordance with manufacturer's instructions.

B. Do not insulate factory insulated equipment.

C. Apply insulation as close as possible to equipment by grooving, scoring, and beveling insulation, if necessary. Secure insulation to equipment with studs, pins, clips, adhesive, wires, or bands. Minimum 2" overlap on blanket material.

D. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface.

E. Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.

F. When equipment with insulation requires periodical opening for maintenance, repair, or cleaning, install insulation in such a manner that it can be easily removed and replaced without damage.

G. Where canvas jacketing is indicated, apply mastic in sufficient thickness to completely cover the texture of the canvas material.

3.05 SCHEDULE - EQUIPMENT

EQUIPMENT	INSULATION TYPE	THICKNESS
Heat Exchangers	H	2"
Valves 2” and Larger	I	1”
Engine Exhaust Piping and Silencer	J, F	2”

3.06 INSTALLATION – DUCTWORK INSULATION

A. Install materials in accordance with manufacturer's instructions.

B. Fiberglass Duct Liner (Type m) Application:
   1. Adhere insulation with approved adhesive for 100 percent coverage. Secure insulation with mechanical fasteners on 15 inch centers maximum on top and side of ductwork with dimension exceeding 20 inches. Butt joints together tightly then seal and smooth. Thoroughly coat ends of liner with adhesive. Do not use nail-type fasteners. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
   2. Ductwork dimensions indicated are net inside dimensions required for air flow. Increase ductwork to allow for insulation thickness.
   3. Install liner as indicated on plans.

3.07 SCHEDULE - DUCTWORK

DUCTWORK	TYPE	INSULATION THICKNESS	FINISH
Internal Acoustic Lining	M	1"	N/A

END OF SECTION

SECTION 23 09 23 - DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. Section 23 05 00 - Common Work Results For HVAC.

B. Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

C. Section 23 21 13 - Hydronic Piping.

D. Section 23 21 16 - Hydronic Specialties.

E. Section 23 33 00 - Air Duct Accessories.

F. Section 23 36 00 - Air Terminal Units.

G. Division 26 - Electrical Specifications

1.02 GENERAL REQUIREMENTS

A. This section specifies the requirements for the Building Automation System (BAS) to be installed in conjunction with this project.

B. The BAS contractor shall furnish and install a fully integrated building automation system, incorporating direct digital control (DDC) for energy management, equipment monitoring and control, and subsystems as specified herein to connect to the existing BAS system installed in the facility.

C. The BAS contractor shall be responsible for all BAS and temperature control wiring for a complete and operable system. All wiring shall be done in accordance with Division 26 of this specification and all local and national codes.

D. A new PC client workstation is not required. The existing Siemens APOGEE server at Facilities Maintenance shall be updated at the completion of this project to reflect any additions and changes made during this project.

E. All graphics, programming and host databases shall be updated to reflect any changes or additions made under this contract. Programming shall follow the latest revision of the established building automation system standards of the Alaska Court System.

F. The internal components of the legacy BAS control panels (i.e. SCU, MBC or MEC-type panels) shall be upgraded to the latest version of the Siemens PXC-Modular or PXC-Compact digital control panel as necessary. Existing panel enclosures, raceways and wiring may be reused wherever practical.

G. Verify that any existing or new Fire Alarm and Security system monitoring points are connected to the BAS and are functional.

H. Verify that the existing sequences of operation are functional at the completion of these upgrades.

1.03 WORK BY OTHERS

A. Products furnished by the BAS contractor for installation by the Mechanical contractor:
   1. Control valves.
   2. Wells for hydronic temperature sensors.

B. Products provided and installed by Mechanical contractor:
   1. Gauges, thermometers, instrumentation and thread-o-lets for sensor wells.
   2. Control dampers.

C. The Electrical contractor (Division 26) provides:
   1. Wiring of all power feeds through disconnects and starters to electrical motors.
   2. Wiring of any remote start/stop switches and manual or automatic motor speed control devices not furnished by the BAS contractor
   3. Power wiring.

1.04 SUBMITTALS / O&M MANUALS

A. All submittals will be bound in white D-ring binders with sufficient ring capacity available for future additions. Electronic submittals are acceptable if directed by the owner.

B. Progression from Submittal to O&M Manual can take place using the same binders as long as all applicable material is properly updated.

C. Prior to beginning on-site installation, the BAS contractor will submit four (4) complete sets of documentation containing the following:
   1. Sequence of Operations (Designer to provide electronic text version)
   2. Riser Diagrams
   3. Control Diagrams
   4. Panel layout(s)
   5. Valve Schedule
   6. Point Summary Report
   7. Product Data

D. The O&M Manuals will consist of the following:
   1. Sequence of Operations
   2. Riser Diagrams
   3. Control Diagrams
   4. Panel layouts
   5. Valve Schedule
   6. Point Summary Report
   7. Commented Program Code
   8. Trend Logs
   9. Product Data

1.05 SYSTEM COMMISSIONING

A. The Contractor will completely check out, calibrate and test all connected hardware and software to ensure that the system performs in accordance with the approved specifications and sequences of operation.

B. Provide complete demonstration of system operation to the owners representative at the project substantial completion inspection. The Contactor will demonstrate to the Owner's satisfaction that all equipment and systems operate in accordance with the sequence of operation as outlined under Section 23 09 93. Demonstration will include all equipment controlled by the Direct Digital Control System.

C. Building management station demonstration will consist of:
1. Running sample point log and system configuration reports as requested.
2. Display and demonstrate each data entry to show site specific customizing capability. Demonstrate parameter changes.
3. Step through penetration tree, display all graphics, demonstrate dynamic update and direct access to graphics.
4. Execute system commands in graphic mode including operation of control system set points, schedules, valves, dampers and control relays. Commands shall be executed as necessary to demonstrate the system is controlling in accordance with the sequence of operations.
5. Demonstrate update, and alarm responsiveness.
6. Demonstrate digital system configuration graphics with interactive upload and download, and demonstrate specified diagnostics.

1.06 INSTALLATION SCHEDULING AND COORDINATION

A. If this is an existing facility, it may require interface with the existing system. Provide appropriate interface with the existing system as required. Maintain operation of the existing DDC system during construction as required.

B. Wherever possible, remove any existing controls-related wiring, pneumatic tubing and electrical conduit that is not reused as part of the new building automation system.

PART 2 - PRODUCTS

2.01 APPROVED BUILDING AUTOMATION SYSTEMS

A. Siemens Industry, Inc.

2.02 NETWORKING COMMUNICATIONS

A. The design of the BAS shall network the stand-alone DDC Controllers. The network architecture shall consist of three levels; a campus-wide Management Level Network (MLN) Ethernet network based on TCP/IP protocol, a high performance peer-to-peer building level network (BLN) and DDC Controller floor level local area networks (FLN). Access to the system shall be totally transparent to the user when accessing data or developing control programs.

B. The design of the BAS shall allow the co-existence of both new and existing DDC Controllers on the same network without the use of gateways, protocol converters, or third-party interface devices.

C. Management Level Network (MLN)
1. The Management Level Network shall not impose a maximum constraint on the number of operator workstations.
2. Simultaneous user access to the network shall be limited to number of user licenses currently issued.
3. DDC controllers residing on the peer-to-peer building level network shall connect directly to the Ethernet network.
4. Any PC on the Ethernet Management Level Network shall have transparent communication with controllers on the building level networks connected via Ethernet as well as directly connected building level networks. Any PC shall be able to interrogate any controller on the building level network in addition to being able to download program changes to individual controllers.
5. The Management Level Network shall reside on industry standard Ethernet utilizing standard TCP/IP, IEEE 802.3. The Ethernet system will be provided and maintained by UAF.
6. Access to the system database shall be available from any client workstation on the Management Level Network.

D. Peer-to-Peer Building Level Network (BLN)
1. Data transfer on the Building Level Network (BLN) shall be via Ethernet on all new DDC panel installations.

E. Floor Level Network (FLN)
1. The Floor Level Network (FLN) communication shall support a family of application specific controllers and shall communicate with the peer-to-peer network through DDC Controllers for transmission of global data.

2.03 PERSONAL COMPUTER OPERATOR WORKSTATION

A. A new personal computer workstation is not required. The existing workstation shall be reused and updated at the completion of this project to reflect any additions and changes made during this project.

2.04 HVAC CONTROLLERS

A. New digital HVAC controllers shall be the PXC-Modular or PXC-Compact series manufactured by Siemens. Controllers shall be a 12-bit stand-alone, multi-tasking, multi-user, real-time digital control processors consisting of modular hardware with plug-in enclosed processors.

B. Each HVAC Controller shall have sufficient memory to support its own operating system and databases, including:
1. Control processes
2. Energy management applications
3. Alarm management applications including custom alarm messages for each level alarm for each point in the system.
4. Historical/trend data for points specified
5. Maintenance support applications
6. Custom processes

7. Operator I/O
8. Remote communications

C. HVAC Controllers shall provide a RS-232C serial data communication port for operation of operator I/O devices such as industry standard printers, operator terminals, modems and portable laptop operator's terminals

D. HVAC Equipment Controllers shall provide local LED status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device.

E. Each HVAC Equipment Controller shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all components. The HVAC Equipment Controller shall provide both local and remote annunciation of any detected component failures, low battery conditions or repeated failure to establish communication

F. All controllers will be mounted in enclosed control panels with screwed, removable covers.

G. All control devices located in exposed areas subject to outside weather conditions shall be mounted inside weatherproof enclosures. Location of each panel shall be convenient for adjustment service.

H. Nameplates shall be provided beneath each panel face mounted control device describing the function of each device. Nameplates shall have white letters engraved on black Lamicoid plates that identify the panel name and number.

I. All control panels shall bear a UL label compatible with the application.

J. All electrical devices within the panel shall pre-wired to terminal strips with all inter-device wiring within the panel completed prior to installation of the system.

2.05 AUTOMATIC CONTROL VALVES

A. All automatic control valves shall be fully proportioning with modulating plugs for equal percentage or linear flow characteristics. The valves shall be sized by the BAS contractor and be provided with actuators of sufficient power for the duty intended. Valve body and actuator selection shall be sufficient to handle system pressure and shall close against the differential pressures expected to be encountered on the project.

B. Valves - 1/2 in. through 1 in. diameter: Valves shall be constructed with cast iron, brass or stainless bodies. Trim shall consist of a removable cage providing valve plug guiding throughout the entire travel range. A stainless steel stem shall be provided. Bonnet, cage and the stem and plug assembly shall be removable for servicing. Actuator shall be cast aluminum with spring-return piston operated by synthetic rubber diaphragm. Body rating shall be 400-PSI at 150 degrees F.

C. Valves - 1-1/2 in. through 2 in. diameter: Valves shall be constructed with cast iron, brass or stainless bodies. For special duty, valves may be selected by the BAS contractor to have either bronze or cast iron bodies with screwed or flanged ends. Valves shall have either piston or diaphragm actuators as required.

D. Valves - 2-1/2 in. diameter and above: Valves shall be constructed with cast iron, brass or stainless bodies and have flanged connections.

E. Valves shall be selected for maximum 3.0-PSI pressure drop through valve at design flow.

F. Heating valves shall fail normally open, cooling valves normally closed. Terminal unit control valves may fail at last position to maintain occupant comfort.

2.06 TEMPERATURE SENSORS

A. All electronic temperature sensors shall be standard resistance type for all temperature ranges. All electronic temperature sensors shall be factory calibrated and of tamper proof construction requiring no field calibration. Temperature sensor accuracy shall be a minimum of +/- 1%. To ensure system accuracy, a common sensor shall be used for each control loop to provide control, indication (local and central), alarm indication (local and central) and where multi-control functions, such as discharge temperature control with compensation and positive high and low limits are used.

B. Where the sensor is used for sensing of mixed air temperature or air handler coil discharge temperatures, and/or the duct area cross-section is in excess of 14 square feet, the instrument shall incorporate an averaging element. Outside air sensing shall be accomplished using a sensing element and transmitter shielded from the effects of sunlight.

C. Sensors shall be furnished in scale ranges compatible with system operating range.

D. Where sensors are used for sensing liquid temperatures, they shall be furnished with separable wells or appropriate material.

E. Electronic Room Temperature Sensors: Shall be thermistor type with 55 degree F to 95 degree F range. Optional features include: LED display, temperature adjustment and night override button. Covers shall be robust, of institutional quality, and suitably finished. Provide sensing-only, stainless-steel flush-mount covers where indicated on the drawings or as required.

2.07 PRESSURE GAUGES AND THERMOMETERS

A. To be provided and installed by the mechanical contractor as specified elsewhere.

2.08 INTERPOSING RELAYS AND SIGNAL TRANSMITTERS

A. All necessary interposing relays and signal transmitters shall be furnished to make the system a full and operable system as required by the Sequence of Operations.

2.09 LIQUID PRESSURE TRANSMITTERS

A. Provide integral pressure transducer and transmitter in enclosure suitable for exposed mechanical room or panel mounting. 4-20ma output proportional to the input pressure span. Internal components shall be selected appropriate for the sensed medium taking temperature, pressure, corrosive properties and medium consistency into account. Transmitter range shall be selected so that the normal operating setpoint is midway between the upper and lower range of the transmitter. Transmitter shall be rated for a minimum of 125% of maximum expected system operating pressures.

B. For differential pressure sensing applications, provide transmitter unit with 3-valve manifold to allow unit to be serviced without draining system. Each transmitter shall have field adjustable span and zero adjustments for field calibration.

C. Accuracy + 1.0% of full scale. Linearity + 0.1%. Ashcroft, Robinson-Halpern, Johnson-Yokogawa, Rosemount or equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Modify existing control system devices as indicated. Extend and modify the existing wiring and control system power source to accommodate indicated direct digital control system devices.

B. Before beginning installation of new system components, test the existing system devices that are being reused in modified control systems for proper operation and report any devices in need of replacement or repair to the Project Manager. At the option of the Project Manager, he will issue a contract amendment to replace or repair the defective devices or he will have Owner maintenance personnel replace or repair the defective devices. The Contractor shall be responsible for providing new devices to replace existing devices that are not brought to the Project Manager's attention before beginning installation of new system components.

C. Work must comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards. Perform work by persons qualified to produce workmanship of specified quality. If required by the State of Alaska workers shall be licensed. If requested provide copy of license.

D. Do not install control devices in locations where they are subject to damage or malfunction due to normally encountered ambient temperatures.

E. Schematics and diagrams, when indicated on the Drawings, show approximate functional relationships and sequences only. All required devices are not shown. Contractor is responsible for providing all components required for a complete functioning system selected to meet the specific functional requirements of each application.

F. Hard wire control devices. Do not use power line carriers.

G. Ensure that the direct digital controller network, and power wiring will support both a 15 percent increase in network length, and a 10 percent increase in controllers similar to those installed without having to add additional network repeaters, increase power wire size or circuit breaker capacity.

H. Unless indicated otherwise, connect the primary sensing input and the associated output for each control loop to the same controller. A secondary or resetting input may be attached to any controller and communicated over the network.

I. After the final inspection and subsequent punch list inspections provide wiring schematic and Control Drawings with written sequence of operations, 11 inches by 17 inches in size, produced from the as-built Control Drawings. Provide one copy in each Operation and Maintenance Manual, and one copy, at its applicable control panel. Provide one set of

system backup on USB drive to restart and reload all programmable devices used in the control system.

J. Tune control loops to respond quickly to control fluctuations without hunting.

K. Label control devices mounted in the field and within control cabinets with 1/4 inch high white embossed letters and black tape background. Dymo or equal. Tags to match tags used on Control Drawings.

3.02 DEMOLITION

A. Remove existing valves, dampers, operators, sensors, and controllers that are replaced by new devices or that are not reused. Present all removed equipment to owner for first right of refusal before disposing of equipment. Review copy of existing system "As-Built" control schematics for existing device location and extent of required demolition.

B. Existing conduit and wiring may be reused when available and when wiring is rated for application. Remove existing unused conductors.

C. Demolish unused pneumatic tubing back to main air connection. Plug tubing with brass fittings.

D. Repairs: Any portion of the facility damaged, cut back or made inoperable shall be repaired with similar materials as the existing structure and/or damaged item as instructed by the Project Manager.

3.03 SHUT DOWN OF EXISTING SYSTEMS

A. Refrigeration, Heating and Ventilation are critical to the function of the facility. Schedule any required shutdowns with Project Manager. Provide a minimum of 5 days written notification to the Project Manager.

B. This building depends on operation of the ventilation systems for space heating and cooling. During system shutdowns the contractor is responsible for maintaining all spaces within the building at a minimum temperature of 68 deg F. and maximum of 77 deg F.

3.04 WIRING AND RACEWAYS

A. Permanently label electrical or electronic wiring at each end indicating location and the device at opposite end. At the direct digital controller end use either the I/O address, if it describes the connected device, or the unique control device tag used on the control schematics. At the device end indicate both the terminal number and the controller connected at the other end. For color coded multi-conductor cable, label cable sheath not individual conductors.

B. At field devices where conductors are not wired to terminal strips wire using a unique color for each conductor connected to that device.

C. Install wiring in a neat and orderly manner generally running along building lines.

D. Support low voltage wiring run without conduit at a maximum of 4 feet between anchors.

E. Seal conduit penetrations at floor and wall penetrations with firestopping installed as indicated. Note that this applies to all floor and wall penetrations, not just fire barrier penetrations. At all mechanical rooms or other rooms containing floor drains, except those with slab on grade floors, make penetration watertight and extend sleeve 3 inches above the floor.

F. Wire all electrical controls and switches furnished under this Section of the Specifications.

G. Make wire connections using factory fabricated jack assemblies, terminal strips, or solder connections. Use crimp connectors on stranded wire unless connecting to terminal strips approved for direct stranded wire connection. Insulate solder connections with heat shrink tubing. Field connections in control power wiring circuits may be made using wire nuts.

H. Avoid splices in signal wire, where unavoidable connect with solder connections and label on each side of splice. Use identical wire type and color on each side of splice.

I. Conceal wiring in finished areas. Unless otherwise noted, install wiring inside conduit or fully enclosed metallic raceway.

J. Low voltage wiring installed in concealed accessible locations may be run without conduit. Sleeve wiring at wall penetrations.

K. Metal raceways crossing expansion joints make provision for 3 way movement. For conduits 1 & 1/2 inch and larger use O-Z type DX fittings, or equal.

L. At raceway penetrations of the vapor barrier provide a double splice patch (one on each side of vapor barrier) by cutting a square piece of vapor barrier 12 inches larger on all sides than the pipe. Cut a round hole in the center of the square splice patch, smaller than the pipe, to form a stretched fit. Force the pipe through the splice patch and tape all sides to the vapor barrier and seal the vapor barrier to the pipe at the penetration with an adhesive compatible with the vapor barrier material.

M. Securely seal at both ends, raceways running from a warm area to a cold area. Ductseal or equal.

N. Install all wiring in accordance with National Electrical Code, and State and Local Codes and Ordinances.

3.05 PANELS

A. Provide UL listed panel assemblies when required by local authorities.

3.06 SENSORS AND SWITCHES

A. Differential pressure transducers shall be used to sense differential pressure unless indicated otherwise.

B. Fill immersion fluid temperature sensor wells with heat conducting compound. At 1-1/2 inches and smaller piping install wells in pipe tees one size larger than line size.

C. Provide sensors and thermostats installed on exterior surfaces with insulated bases such that actual room temperature not wall surface temperature is sensed.

3.07 TESTING AND ADJUSTING

A. Upon completion of the installation, the contractor shall initiate operation of the control system and perform all necessary testing and diagnostics to ensure proper operation. A formal commissioning procedure shall be utilized to insure complete system integrity and conformance to these specifications. This procedure shall consist of two separate steps incorporating point verification and program verification. Commissioning forms shall address all field devices, field controllers, software statements, and software points. Submit for approval a written testing procedure indicating how each of these steps will be accomplished at least two weeks prior to the start of the commissioning process.

B. Verify correct installation and wiring of all points.

C. Prior to commissioning the system, submit for approval Point Verification Commissioning Forms listing all points for the system.

D. Confirm that all devices are installed correctly. Verify that terminations are tight and of correct polarity. Document and signoff the results on Point Verification form.

E. Coordinate the final adjustments and "fine tuning" of control functions and devices so that the building, the mechanical systems, and the control systems operate and respond as an integrated, comfortable and energy efficient component of this facility.

F. Verify that all points are wired to the correct termination block at the control panel by verifying continuity between the device and the panel termination. Document and signoff results on Point Verification form. Verify that each sequence performs as specified in contract documents. Tune each loop as required for proper operation.

G. Document and signoff the results on Program Verification form.

H. Command all digital output points on and off and confirm proper operation of the associated output device. Command all analog output points to various levels within their range and confirm proper operation of the associated output device. Activate all digital input sensors and confirm proper point status at the panel. Measure conditions at all analog input sensors with an independent reference device, calibrate as required, and confirm proper point status at the panel. Document and signoff the results on Point Verification form.

I. Deficiencies revealed by failed test(s) shall be repaired and corrected and the test(s) repeated until successful.

J. Provide Substantial inspection data to consist of the following as a minimum:
   1. Provide signed off Point Verification commissioning forms to mechanical engineer and owner prior to owner acceptance walkthrough.
   2. Provide signed off Point Verification forms indicated the correct execution of all sequence of operations for each piece of equipment. List test procedure and results.
   3. Point logs indicated point values with time and date stamp.

3.08 WARRANTY

A. Upon completion of the project, as defined in the Contract Conditions, a warranty period of one (1) year shall commence. The warranty shall consist of a commitment by the BAS contractor to provide, at no cost to the Owner, parts and labor as required to repair or replace such parts of the control system that prove inoperative due to defective materials

or installation practices. The warranty expressly excludes routine service such as instrument calibration.

3.09 TREND LOGS

A. BAS contractor shall prepare trend logs for all points required to show system calibration and stability.

B. These logs shall document building operation after the installation, balancing and calibration is completed and after the control system is fully operational. Setpoints, valve positions, etc. shall be adjusted to artificially induce the sequences to occur.

3.10 COMMISSIONING AND SYSTEM DEMONSTRATION

A. The BAS contractor shall demonstrate proper operation of all systems per the Sequence of Operations.

B. Prior to the system demonstration, review and test entire installation for conformance with contract documents. Test shall include thorough field check of sequence of operations for each system and piece of equipment including simulation of all possible modes of operation. With the call for inspection, verify in writing that this system review and test has been performed and anything not conforming to contract documents shall be so noted.

C. During the Substantial inspection Contractor personnel shall provide on-site assistance to inspection personnel required for a complete and thorough inspection.

D. During the Substantial inspection Contractor personnel shall demonstrate that the control system performs in accordance with the contract documents. Provide material and personnel required to perform the demonstration.

E. The demonstration shall include, but not necessarily be limited to, the following:
1. Review of the Trend Logs.
2. Complete and proper operation of control systems including simulations.
3. Access to all devices for required maintenance.
4. Review of associated graphics on the operator workstation.

3.11 TRAINING

A. Eight (8) hours of on-site instruction will be provided by the BAS contractor to familiarize operating personnel with the control system. instructions will include:
1. A brief description of the controls' sequence of operation.
2. A discussion and explanation of all alarms, switches and gauges.
3. A summary and explanation of steps to be taken in response to specific alarms or control malfunctions.
4. Building walk-through to physically locate and examine all control devices and demonstrate control setpoint adjustment procedures.
5. Instructions regarding adjustment procedures shall emphasize methods for continual building "fine-tuning".

END OF SECTION

SECTION 23 09 93 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Engine Jacket Coolant System.

B. Engine Aftercooler Cooling System.

C. Glycol Mix Tank.

1.02 RELATED SECTIONS

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 09 23 - Direct Digital Control System for HVAC.

C. Section 23 21 23 - Hydronic Pumps.

1.03 SYSTEM DESCRIPTION

A. This Section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other Sections.

1.04 SUBMITTALS

A. Submit under provisions of Division 01.

B. Submit diagrams indicating mechanical system controlled and control system components. Label with settings, adjustable range of control and limits. Include written description of control sequence.

C. Include flow diagrams for each control system, graphically depicting control logic.

D. Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.

1.05 PROJECT RECORD DOCUMENTS

A. Submit documents under provisions of Division 01.

B. Accurately record actual setpoints and settings of controls, including changes to sequences made after submission of shop drawings.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.01 ENGINE JACKET COOLANT SYSTEM

A. Alarms:
1. Low system pressure at engine inlet (<3 psig adjustable).
2. Low water level pre-alarm at expansion tank.
3. Low water level alarm at radiator.
4. High temperature at engine outlet (> 210 deg F. adjustable).
5. High temperature at engine inlet (>197 deg F. adjustable).
6. Low temperature at engine inlet (< 175 deg F. adjustable).
7. Radiator fan failure.
8. Pump Alarm.

B. Electronic Control and Indication:
1. Engine ON/OFF status.
2. JWS temperature leaving engine indication.
3. JWS pressure leaving engine indication.
4. JWR temperature entering engine indication.
5. JWR pressure entering engine indication.
6. JWR temperature set point (192 deg F adjustable).
7. ECS temperature into heat exchanger indication.
8. ECS temperature out of heat exchanger indication.
9. ECS temperature into radiator indication.
10. ECS temperature out of radiator indication.
11. Three-way mixing valve percentage open to radiator indication.
12. Radiator fan On/Off control.
13. Radiator fan On/Off Status.
14. Circulating pump ON-OFF control (CP-RAD-1).
15. Circulating pump ON-OFF indication (CP-RAD-1).
16. Alarm setpoints.

C. Automated Control:
1. When engine starts, indicate status and start circulating pump. Coordinate with the engine and switchgear supplier for required contacts. ECS/ECR three-way modulating valve shall maintain coolant return temperature setpoint to the generator.
2. Upon rise in ECR coolant return temperature to the generator above the set point the radiator fan shall be started. Once fan is started, 3-way control valve shall modulate open to allow flow through the radiator. The 3-way valve shall modulate open as required to cool the ECR. Minimum radiator fan run time shall be three minutes.
3. Upon drop in coolant temperature to setpoint reverse the above sequence.
4. When generator is off for a minimum of 5 minutes, stop circulating pump.

3.02 ENGINE AFTERCOOLER COOLING SYSTEM

A. Alarms:
1. Low system pressure at engine inlet (< 3 psig adjustable).
2. Low water level pre-alarm at expansion tank.

3. Low water level shut-off at expansion tank.
4. High temperature at after cooler inlet (> 135 deg. F adjustable).
5. Radiator fan failure.
6. Generator Alarm.
7. Pump Alarm.

B. Electronic Control and Indication:
1. Generator ON/OFF status.
2. ACCS temperature leaving after cooler indication.
3. ACCR temperature entering after cooler indication.
4. ACCS temperature entering after cooler set point (120 deg. F adjustable).
5. ACCS temperature into after cooler radiator indication.
6. ACCR temperature out of after cooler radiator indication.
7. Three-way mixing valve percentage open to heat exchanger indication.
8. Radiator fan On/Off control.
9. Radiator fan On/Off Status.
10. Circulating pump ON-OFF control (CP-RAD-2).
11. Circulating pump ON-OFF indication (CP-RAD-2).
12. Alarm setpoints.

C. Automated Control:
1. When engine starts, indicate status on screen and start circulating pump and radiator fan. Coordinate with the engine and switchgear supplier for required contacts.
2. ACCS/ACCR three-way valve shall modulate to maintain the return temperature setpoint to the after cooler.
3. Upon drop in coolant temperature to setpoint reverse the above sequence.
4. When generator is off for a minimum of 5 minutes, stop circulating pump.

3.03 GLYCOL MIX TANK (GT-1)

A. Alarms:
1. Low level, tank 1.
2. Low level, tank 2

B. Digital Control and Indication:
1. Tank Level Alarm 1.
2. Tank Level Alarm 2.

C. Automated Control:
1. System shall normally be off. Utilize supervised fill procedure only. Package controls shall cycle pumps on as required to obtain system operating pressure.
2. Monitor low tank alarms by DDC system.

END OF SECTION

SECTION 23 11 13 - FACILITY FUEL-OIL PIPING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Fuel Oil Piping - Above Ground.

B. Unions and Flanges.

C. Valves.

D. Pipe Hangers and Supports.

E. Flexible Connectors.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

1.03 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME B16.3 - Malleable Iron Threaded Fittings.
2. ASME B31.1 - Power Piping.
3. ASME B31.9 - Building Services Piping.

B. ASTM International:
1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

C. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

D. International Mechanical Code - IMC, latest adopted edition.

E. National Fire Protection Association:
1. NFPA 30 - Flammable and Combustible Liquids Code.
2. NFPA 31 - Standard for the Installation of Oil-Burning Equipment.

F. Underwriters Laboratories Inc.:
1. UL 567 - Pipe Connectors for Flammable Liquids and Combustible Liquids and LP-Gas.
2. UL 842 - Valves for Flammable Fluids.
3. UL 913 - Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous Locations.

1.04 SUBMITTALS

A. Submittal Procedures under provisions of the Division 01.

B. Product Data:
1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
2. Valves: Submit manufacturer's catalog information with valve data and ratings for each service.
3. Fuel Piping Specialties: Submit manufacturer's catalog information including capacity, rough-in requirements, and service sizes.

C. Test Reports: Submit written test results for piping system pressure test.

D. Manufacturer's Installation Instructions: Submit piping system and piping.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves, piping system, and system components.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with NFPA 31.

B. Perform Work in accordance with authority having jurisdiction.

1.07 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum three years documented experience or approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle under the provisions of the Division 01.

B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

A. Under the provisions of the Division 01.

1.11 WARRANTY

A. Under the provisions of the Division 01.

PART 2 - PRODUCTS

2.01 FUEL OIL PIPING - ABOVE GROUND

A. Steel Pipe: ASTM A53/A53M or ASME B36.10M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M wrought carbon steel and alloy steel welding type.
   2. Joints in Mechanical Room: Threaded or Viega MegaPress G.

2.02 UNIONS AND FLANGES

A. Unions:
   1. Ferrous Piping: Class 150, malleable iron, threaded.
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.03 GATE VALVES

A. No allowed.

2.04 GLOBE VALVES

A. Not Allowed.

2.05 BALL VALVES

A. 1/4 inch to 1 inch: MSS SP 110, Class 125, two piece, threaded ends, bronze body; chrome plated bronze ball, reinforced Teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, full port.

2.06 HANGERS AND SUPPORTS

A. Conform to NFPA 31.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or Carbon steel, adjustable swivel, split ring.

2.07 FLEXIBLE CONNECTORS

A. Manufacturers:
   1. Flex-Hose Co., Inc.
   2. Flex-Weld, Inc.
   3. The Metraflex Company.

4. Substitutions: Under the provisions of the Division 01.

B. Corrugated Type 304 stainless steel inner hose with single layer of Type 304 stainless steel exterior braiding. Maximum working pressure 200 psig.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with ASTM F708, MSS SP 69 and MSS SP 89.

B. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.

C. Place hangers within 12 inches of each horizontal elbow.

D. Install hangers to allow 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

E. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

3.03 INSTALLATION - ABOVEGROUND PIPING

A. Install fuel oil piping in accordance with IMC and NFPA 31.

B. Route piping in orderly manner and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Provide access where valves and fittings are not exposed.

G. Install identification on piping systems including underground piping. Refer to Section 23 05 53.

H. Install valves with stems upright or horizontal, not inverted.

I. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

END OF SECTION

SECTION 23 21 13 - HYDRONIC PIPING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Pipe and Pipe Fittings.

B. Flexible Pipe Connectors.

C. Valves.

D. Hydronic Piping.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 05 19 - Meters and Gages for HVAC Piping.

C. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

D. Section 23 05 48 - Vibration and Seismic controls for HVAC.

E. Section 23 05 53 - Identification for HVAC Piping, Ductwork and Equipment.

F. Section 23 07 00 - HVAC Insulation.

G. Section 23 09 23 - Direct Digital Control System for HVAC.

H. Section 23 21 16 - Hydronic Piping Specialties.

I. Section 23 21 23 - Hydronic Pumps.

J. Section 23 57 00 - Heat Exchangers for HVAC.

1.03 REGULATORY REQUIREMENTS

A. Conform to ANSI/ASME B31.9.

1.04 QUALITY ASSURANCE

A. Valves: Manufacturer's name and pressure rating marked on valve body.

1.05 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Include data on pipe materials, pipe fittings, valves, and accessories.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

C. Deliver and store valves in shipping containers with labeling in place.

PART 2 - PRODUCTS

2.01 HYDRONIC PIPING

A. Steel Pipe: ASTM A53, Schedule 40, for sizes 4 inch and over, black.
   1. Fittings: ANSI/ASTM B16.3, malleable iron or ASTM A234, steel welding type fittings.
   2. Joints: Screwed, or ANSI/AWS D1.1, welded.

B. Copper Tubing: ASTM B88, Type L, hard drawn.
   1. Fittings: ANSI/ASME B16.18 Cast Copper Alloy Solder Joint Pressure Fittings or ANSI/ASME B16.22 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
   2. Joints: ASTM B32, solder, Grade 95TA or ANSI/AWS A5.8, BCuP silver braze; Flux: ASTM B813.
   3. Press Fittings: Viega ProPress Fittings are allowed. Sealing elements for press fittings shall be EPDM.Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press end shall have Smart Connect feature design leakage path. Smart Connect™ (SC Feature) In ProPress ½" to 4" dimensions the Smart Connect Feature assures leakage of liquids and/or gases from inside the system past the sealing element of an un-pressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

2.02 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.

B. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping.

2.03 FLEXIBLE PIPE CONNECTORS

A. Copper Piping:
   1. Manufacturers:
      a. Mercer Rubber Co., Model BBF.
      b. Hyspan, series 4500.
   2. Inner Hose: Bronze

3. Exterior Sleeve: Braided bronze.
4. Pressure Rating: 125 psig WSP and 450º F, 200 psig WOG and 250º F and 70º F.
5. Joint: As specified for pipe joints.
6. Size: Use pipe sized units
7. Maximum offset: ¾ inch on each side of installed center line.

2.04 GATE VALVES

A. Gate valves will not be permitted. Use ball or butterfly valves for isolation.

2.05 GLOBE VALVES

A. Globe valves will not be permitted. Use ball or butterfly valves for throttling.

2.06 ACCEPTABLE MANUFACTURERS - ALL VALVE TYPES

A. Apollo.

B. Crane.

C. FNW.

D. Hammond.

E. Milwaukee.

F. NIBCO.

G. Red-White Valve Corp.

H. Substitutions: Under provisions of Division 01.

2.07 BALL VALVES

A. Up to 2 Inches: 600 PSI CWP Bronze two piece body, full port, forged brass, chrome plated ball, Teflon seats and stuffing box ring, lever handle [and balancing stops], solder or threaded ends. Seat material to be compatible with fluid handled.

B. Over 2 Inches: Cast steel, two piece body, full port chrome plated steel ball, Teflon seat and stuffing box seals, lever handle, flanged. Seat material to be compatible with liquid handled.

2.08 HIGH PERFORMANCE BUTTERFLY VALVES

A. Body: One-piece wafer, lug or double flanged design with extended neck to allow for 2” of piping insulation. ASME 150 Flange. Provided with top and bottom stem bearings consisting of a 316 stainless steel shell with a TFE/glass fabric liner bearing surface. Equipped with an externally adjustable stem packing system that allows packing

adjustment without removing the actuator. Internal over-travel stop shall be provided to prevent over-travel of the disc and minimize possible seat damage.

B. Disc: Disc edge shall be hand polished for minimum torque and maximum sealing capability.

C. Stem: One-piece design provided with blow-out proof stem retention system to assure full retention of the stem in the unlikely event of an internal stem failure.

D. Seat: Design shall consist of a resilient energizer totally encapsulated by the seat. Seat retainer shall be full-faced and firmly attached by bolts located outside the sealing area to protect them from corrosion. The seat assembly shall be locked in the body recess by the full-faced retainer. The seat shall be self-adjusting for wear and temperature changes. The seat shall be easily field replaceable.

E. Valve shall be tested for tight shut-off per API 598 requirements.

F. Provide with multi position valve operator/lever handle.

G. Bray/McCannalok High Performance Butterfly Valve or Approved Equal.

2.09 SWING CHECK VALVES

A. Up to 2 Inches: Bronze 45º swing disc, solder ends.

B. Over 2 Inches: Iron body, bronze trim, 45º swing disc, renewable disc and seat, flanged ends.

2.10 SPRING LOADED CHECK VALVES

A. Iron body, bronze trim, stainless steel spring, renewable composition disc, screwed, wafer or flanged ends.

2.11 RELIEF VALVES

A. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

2.12 HYDRONIC SYSTEM CLEANER

A. Acceptable Products:
   1. CH2O Boil Out Liquid
   2. Oatey Hercules Boiler and Heating System Cleaner.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. After completion, fill, clean, and treat systems.

3.02 INSTALLATION

A. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

B. Install piping to conserve building space, and not interfere with use of space and other work.

C. Group piping whenever practical at common elevations.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 16.

E. Provide clearance for installation of insulation, and access to valves and fittings.

F. Provide access where valves and fittings are not exposed.

G. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.

H. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

I. Prepare pipe, fittings, supports, and accessories for finish painting. Refer to Division 09.

J. Install valves with stems upright or horizontal, not inverted.

K. Support all piping in accordance with International Mechanical Code and Manufacturer installation instructions. Where there is a conflict between requirements of the Mechanical Code and Manufacturer installation instructions, the more restrictive requirement shall apply.

3.03 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.

C. Install ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install ball or butterfly valves for throttling, bypass, or manual flow control services.

E. Provide spring loaded check valves on discharge of condenser water pumps.

F. Provide ¾ inch ball drain valves at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

3.04 CLEANING OF THE HYDRONIC SYSTEM

A. Prior to starting work, verify system is complete. Thoroughly flush and drain the system. Clean all strainer baskets and start-up screens on pump suction diffusers. Re-install strainer baskets and start-up screens and refill system.

B. Fill the hydronic piping systems with the system cleaner in accordance with cleaning compound directions for use.

C. Boil out system for a minimum period of four (4) hours or as recommended by system cleaner, generator instructions at a system design operating temperature.

D. Upon completion of boil out, completely flush system and drain all low points. Remove and clean and re-install all strainer baskets. Remove start-up screens on pump suction diffusers.

E. Fill system with glycol as indicated on the plans. Feed water to system through make-up line with pressure regulator, venting system high points. Set to fill at 12 psig. Pressure system cold at 5 psig, adjust when hot to 12 psig. See Specification Section 23 21 16 for glycol fill procedures.

F. Submit a written and signed statement to the Owner that the above referenced cleaning procedures have been completed.

3.05 TESTING

A. Test all heating water and glycol piping hydrostatically at 100 psig or 150 percent of working pressure, whichever is greater, for a period of 4 hours. Observe piping during this period and repair all leaks.

END OF SECTION

SECTION 23 21 16 - HYDRONIC SPECIALTIES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Air Vents.

B. Strainers.

C. Balance Valves.

D. Relief Valves.

E. Glycol Specialties.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

C. Section 23 05 48 - Vibration and Seismic controls for HVAC.

D. Section 23 09 23 - Direct Digital Control System for HVAC.

E. Section 23 21 23 - Hydronic Pumps.

F. Section 23 57 00 - Heat Exchangers for HVAC.

1.03 REFERENCES

A. ANSI/ASME - Boilers and Pressure Vessels Code.

1.04 REGULATORY REQUIREMENTS

A. Conform to ANSI/ASME Boilers and Pressure Vessels Code Section 8D for manufacture of tanks.

1.05 QUALITY ASSURANCE

A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

1.06 SUBMITTALS

A. Submit product data under provisions of Division 01 and Section 23 05 00.

B. Submit glycol solution test results with glycol percentage and PH after system fill procedures are completed.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Division 01.

B. Include installation instruction, assembly views, lubrication instructions, and replacement parts list.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

1.09 EXTRA STOCK

A. Provide one extra 50 gallon drum of ethylene glycol.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - AIR VENTS

A. Taco.

B. Amtrol.

C. Bell & Gossett.

D. Substitutions: Under provisions of Division 01.

2.02 AIR VENTS

A. Manual Type: Disk type vent with built-in check valve for manual or automatic operation, discs replaceable without draining system, 1/8 inch shank, rated at 50 psi; Hoffman No. 508 or equal.

2.03 ACCEPTABLE MANUFACTURERS - STRAINERS

A. Bell & Gossett.

B. Taco.

C. Armstrong.

D. Substitutions: Under provisions of Division 01.

2.04 STRAINERS

A. Size 2-½ inch to 4 inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.

2.05 ACCEPTABLE MANUFACTURERS - BALANCE VALVES

A. Armstrong.

B. Taco.

C. Bell & Gossett.

D. Substitutions: Under provisions of Division 01.

2.06 BALANCE VALVES

A. Angle or straight pattern, inside screw globe valve for 125 psig working pressure, with bronze body and integral union for screwed connections, renewable composition disc, plastic wheel handle for shut-off service, and lockshield key cap for balancing service.

2.07 ACCEPTABLE MANUFACTURERS - RELIEF VALVES

A. Watts.

B. Taco.

C. Bell & Gossett.

D. Substitutions: Under provisions of Division 01.

2.08 RELIEF VALVES

A. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled.

2.09 GLYCOL SYSTEM

A. HDPE storage/mixing tank with two distinct tanks for separate glycol systems. Two independent 110V, 60Hz autonomous pumping assemblies, steel frame, removable lids, protective lower water cut-off alarms, HOA controls, magnetic starters, pressure reducing valves, pressure gauges, system isolation valves, and remote alarm signal.

B. Glycol Solution: Dow Frost SR-1, Inhibited ethylene glycol and water solution mixed 50-50 suitable for operating temperatures of -30º F. The glycol shall be delivered to site in sealed containers, provide with color dye red.

PART 3 - EXECUTION

3.01 INSTALLATION AND APPLICATION

A. Install specialties in accordance with manufacturer's instructions to permit intended performance.

B. Support tanks inside building from in accordance with manufacturer's instructions.

C. Provide valved drain and hose connection on strainer blow down connection.

D. Provide shutoff valves on water inlet to all terminal equipment, including heat exchangers.

E. Provide balancing valves as noted on the plans.

F. Provide relief valves on pressure tanks, low pressure side of reducing valves, and heat exchangers.

G. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.

H. Pipe relief valve outlet to glycol tank.

I. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

3.02 GLYCOL APPLICATION

A. Clean and flush piping system before adding glycol solution. See Specification Section 23 21 13 for hydronic system cleaning procedures.

B. Feed glycol solution to system through make-up line with pressure regulator, venting system high points. Set to fill at 12 psig. Pressure system cold at 5 psig, adjust when hot to 12 psig.

C. Perform tests determining strength of glycol and water solution and submit written test results.

END OF SECTION

SECTION 23 21 23 - HYDRONIC PUMPS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. In-line Circulators.

1.02 RELATED WORK

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 05 19 - Meters and Gages for HVAC Piping.

C. Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

D. Section 23 05 48 - Vibration and Seismic controls for HVAC.

E. Section 23 05 53 - Identification for HVAC Piping, Ductwork and Equipment.

F. Section 23 09 23 - Direct Digital Control System for HVAC.

G. Section 23 21 13 - Hydronic Piping.

H. Section 23 21 16 - Hydronic Piping Specialties.

1.03 REFERENCES

A. ANSI/UL 778 - Motor Operated Water Pumps.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacture, assembly, and field performance of pumps with minimum three years' experience.

1.05 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Submit manufacturer pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Division 01.

B. Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Grundfos.

B. Substitutions: Under provisions of Division 01.

2.02 GENERAL CONSTRUCTION REQUIREMENTS

A. Balance: Rotating parts, statically and dynamically.

B. Construction: To permit servicing without breaking piping or motor connections.

C. Pump Motors: Operate at 1750 rpm unless specified otherwise.

D. Pump Connections: Flanged.

2.03 IN-LINE CIRCULATORS

A. Type: Maintenance free, self-lubricated, 3 speed industrial/commercial single stage, direct drive circulator.

B. Casing: Cast iron.

C. Impeller: Type 304 stainless steel.

D. Bearings: Upper and lower radial bearings to be aluminum oxide ceramic, tungsten carbide shaft bearing surfaces.

E. Shaft: Stainless steel with type 430F.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install pumps in accordance with manufacturer's instructions.

B. Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.

C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

D. Decrease from line size with long radius reducing elbows or reducers.

E. Support piping adjacent to pump such that no weight is carried on pump casings. In-line pumps are supported by adjacent piping.

F. Provide line sized shut-off valve and strainer on pump suction.

END OF SECTION

SECTION 23 31 00 - HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Duct Materials.

1.02 RELATED SECTIONS

A. Section 23 07 00 - HVAC Insulation: Product requirements for duct liners for placement by this section.

B. Section 23 33 00 - Air Duct Accessories: Product requirements for duct accessories for placement by this section.

1.03 REFERENCES

A. ASTM International:
   1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
   2. ASTM A90/A90M - Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
   3. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   4. ASTM A568/A568M - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
   5. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   6. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   7. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   8. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. National Fire Protection Association:
   1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
   2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
   3. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

C. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - HVAC Air Duct Leakage Test Manual.
   2. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

D. Underwriters Laboratories Inc.:
   1. UL 181 - Factory-Made Air Ducts and Connectors.

1.04 SUBMITTALS

A. See General Conditions and the General Requirements in Division 01 regarding submittals.

B. Product Data: Submit data for duct materials.

C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.

D. Manufacturer's Installation Instructions: Submit special procedures for glass fiber ducts.

1.05 CLOSEOUT SUBMITTALS

A. Division 01 - Execution and Closeout Requirements: Closeout procedures.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.

B. Maintain one copy of each document on site.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Division 01 - Product Requirements.

B. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.

C. Maintain temperatures during and after installation of duct sealant.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Division 01 - Execution and Closeout Requirements: Product warranties and product bonds.

PART 2 - PRODUCTS

2.01 DUCT MATERIALS

A. Galvanized Steel Ducts: ASTM A653/A653M galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A90/A90M.

B. Fasteners: Rivets, bolts, or sheet metal screws.

C. Hanger Rod: ASTM A36/A36M; galvanized; threaded both ends, threaded one end, or continuously threaded.

2.02 ACOUSTICAL DUCTWORK FABRICATION

A. Construct outer duct in accordance with low and medium pressure listed above. Provide 22 gauge perforated interior facing with 3/32” holes on 5/32” centers. Construct ductwork 1” thick packed with duct liner in accordance with Section 23 07 00. All dimensions are inside clear dimensions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Division 01 - Administrative Requirements: Coordination and project conditions.

B. Verify sizes of equipment connections before fabricating transitions.

3.02 INSTALLATION

A. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Use crimp joints with or without bead or beaded sleeve couplings for joining round duct sizes 12” and smaller.

D. Install duct hangers and supports in accordance with Section 23 05 00.

E. Use double nuts and lock washers on threaded rod supports.

3.03 SCHEDULES

A. Ductwork Material Schedule:

Air System	Material
Radiator Outlet	Steel

END OF SECTION

SECTION 23 37 00 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Louvers.

1.02 REFERENCES

A. ADC 1062 - Certification, Rating and Test Manual.

B. AMCA 500 - Test Method for Louvers, Dampers and Shutters.

C. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

D. ARI 650 - Air Outlets and Inlets.

E. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

F. SMACNA - HVAC Duct Construction Standard.

1.03 QUALITY ASSURANCE

A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.

B. Test and rate performance of louvers in accordance with AMCA 500.

1.04 REGULATORY REQUIREMENTS

A. Conform to ANSI/NFPA 90A.

B. Earthquake tabs, in seismic zones, in accordance with IBC Standards.

1.05 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Provide product data for items required for this project.

C. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - LOUVERS

A. Greenheck.

B. Ruskin.

C. Penn.

D. Carnes.

E. Substitutions: Under provisions of Division 01.

2.02 LOUVERS

A. Provide 6-inch-deep louvers with blades on 45 degree slope with center baffle and return bend, heavy channel frame, birdscreen with 1/2 inch square mesh for exhaust and 3/4 inch for intake.

B. Fabricate of 16-gauge galvanized steel or 12-gauge extruded aluminum, welded assembly, with factory baked enamel finish.

C. Fabricate louver penthouses with mitered corners and reinforce with structural angles.

D. Model ELF6375DX as manufactured by Ruskin.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

END OF SECTION

SECTION 23 51 00 - BREECHINGS, CHIMNEYS, AND STACKS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Generator Exhaust Piping

1.02 RELATED SECTIONS

A. Section 23 05 00 - Common Work Results for HVAC

1.03 REFERENCES

A. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacture of products specified in this Section with minimum three years documented experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to NFPA 31 for installation of oil burning appliances and equipment.

1.06 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Product Data: Submit data indicating factory-built piping, including dimensional details of components and rain shield, dimensions and weights and connection requirements.

C. Engineering Data: Submit stack sizing calculations confirming proper stack sizing for the specific equipment used on this project.

D. Manufacturer's Installation Instructions: Submit assembly, support details, and connection requirements.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication, adjust layout as required to avoid conflict with structure.

PART 2 - PRODUCTS

2.01 DIESEL EXHAUST PIPING

A. Provide exhaust piping to connect to existing for new diesel generator exhaust, complete with all fittings and accessories as required to complete installation. All exhaust connections to be welded or flanged.

B. Exhaust piping shall be schedule 40 steel ASTM A53 or A106 c/w butt welded fittings. Insulate interior piping per Section 23 07 00 - HVAC Insulation.

C. Caulk: Fire stop sealant in compliance with ASTM E814, UL 1479.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with drawings and manufacturer's instructions.

B. Support piping from building structure, rigidly with suitable ties, braces, hangers and anchors to hold to shape and prevent buckling. See Structural.

C. Level and plumb vertical exhaust piping, slope horizontal piping to drain.

D. Connect exhaust silencer to generator using flexible connections.

END OF SECTION

SECTION 23 57 00 - HEAT EXCHANGERS FOR HVAC

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Brazed Plate Heat Exchangers.

B. Accessories and Trim.

1.02 RELATED SECTIONS

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 05 19 - Meters and Gauges for HVAC piping.

C. Section 23 21 13 - Hydronic Piping.

D. Section 23 21 16 - Hydronic Specialties.

1.03 REFERENCES

A. ANSI/ASME - Boilers and Pressure Vessels Code.

1.04 REGULATORY REQUIREMENTS

A. Conform to Section 8D of the ANSI/ASME Boilers and Pressure Vessels Code for manufacture of tubular heat exchangers and heat exchanger shells.

1.05 SUBMITTALS

A. Submit product data under provisions of Division 01.

B. Indicate dimensions, locations, and size of tappings and performance data.

C. Submit manufacturer's installation instructions under provisions of Division 01.

D. Submit design data in sufficient detail to verify that heat exchangers meet or exceed specified requirements.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Division 01.

B. Include start up and shut down instructions, assembly drawings, and spare parts lists.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

C. Protect internals from entry of foreign material by temporary caps on flanged openings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS – BRAZED PLATE TYPE HEAT EXCHANGERS

A. Alfa-Laval.

B. Kelvion.

C. ONDA Advanced Heat Exchangers.

D. Substitutions: Under provisions of Division 01.

2.02 BRAZED PLATE TYPE HEAT EXCHANGER

A. Plates: Stainless steel Type 316L, vacuumed brazed together with high temperature copper braze, ASME Certified

B. Nozzles: Threaded connections.

C. Maximum working pressure 300 psig, maximum working temperature 350 Degrees F.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Support heat exchangers on welded steel pipe and angle floor stand.

C. Pipe relief valves to nearest floor drain.

D. Pipe drain valves to nearest floor drain.

3.02 WATER TO WATER HEAT EXCHANGER TRIM

A. Water Inlets and Outlets: Thermometer wells, pressure gauge tappings.

B. Heated Water Outlet: Thermometer well for temperature regulator sensor, ASME rated pressure relief valve, valved drain.

END OF SECTION

DIVISION 26

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General Requirements specifically applicable to Division 26, in addition to Division 01 provisions.

B. The electrical system equipment and installation shall comply with all provisions and requirements of this specification, as well as any and all applicable national, state and local codes and standards.

1.02 COORDINATION

A. Coordinate the Work specified in this Division under provisions of Division 01.

B. Prepare drawings showing proposed rearrangement of Work to meet job conditions, including changes to Work specified under other Sections. Obtain permission of Architect prior to proceeding.

1.03 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code, latest adopted edition including all state and local amendments.

B. NECA - Standard of Installation.

C. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

D. Electrical Reference Symbols: The Electrical "Legend" on drawings is standardized version for this project. All symbols shown may not be used on drawings. Use legend as reference for symbols used on plans.

E. Electrical Drawings: Drawings are diagrammatic; complimentary to the Architectural drawings; not intended to show all features of work. Install material not dimensioned on drawings in a manner to provide a symmetrical appearance. Do not scale drawings for exact equipment locations. Review Architectural, Civil, Structural, and Mechanical Drawings and adjust work to conform to conditions shown thereon. Field verification of dimensions, locations and levels is directed.

1.04 REGULATORY REQUIREMENTS

A. Conform to ANSI/NFPA 70.

B. Conform to the latest adopted edition of the International Building Code and the International Fire Code including all state and local amendments thereto.

C. Obtain electrical permits, plan review, and inspections from authority having jurisdiction.

1.05 SUBMITTALS

A. Submittal review is for general design and arrangement only and does not relieve the Contractor from any requirements of Contract Documents. Submittal not checked for quantity, dimension, fit or proper operation. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provisions of a complete and satisfactory working installation is the sole responsibility of the Contractor.

B. In addition to requirements referenced in Division 01, the following is required for work provided under this division of the specification.
   1. Provide material and equipment submittals containing complete listings of material and equipment shown on Electrical Drawings and specified herein. Separate from work furnished under other divisions.
   2. Submittals shall be provided in PDF format with each section indexed in the PDF document. Submittals for Division 26 shall be complete and submitted at one time. Unless given prior approval, partial submittals will be returned unreviewed.
   3. Clearly identify all material and equipment by item, name or designation used on drawings and in specifications.
   4. Submit only pages which are pertinent; mark catalog sheets to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring diagrams and controls; component parts; finishes; dimensions; and required clearances.
   5. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.
   6. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
   7. Coordinate submittals with requirements of work and of Contract Documents.
   8. Certify in writing that the submitted shop drawings and product data are in compliance with requirements of Contract Documents. Notify Architect/Engineer in writing at time of submittal, of any deviations from requirements of Contract Documents.
   9. Do not fabricate products or begin work which requires submittals until return of submittal with Architect/Engineer acceptance.
   10. Equipment scheduled by manufacturer's name and catalog designations, manufacturer's published data and/or specification for that item, in effect on bid date, are considered part of this specification. Approval of other manufacturer's item proposed is contingent upon compliance therewith.

1.06 SUBSTITUTIONS

A. In accordance with the General Conditions and the General Requirements, Substitution and Product Options, all substitute items must fit in the available space, and be of equal or better quality including efficiency performance, size, and weight, and must be compatible with existing equipment.

1.07 PROJECT RECORD DRAWINGS

A. Maintain project record drawings in accordance with Division 01.

B. In addition to the other requirements, mark up a clean set of drawings as the work progresses to show the dimensioned location and routing of all electrical work which will become permanently concealed. Show routing of work in permanently concealed blind spaces within the building. Show complete routing and sizing of any significant revisions to the systems shown.

C. Record drawing field mark-ups shall be maintained on-site and shall be available for examination of the Owner's Representative at all times.

1.08 OPERATION AND MAINTENANCE MANUALS

A. Provide operation and maintenance manuals for training of Owner's Representative in operation and maintenance of systems and related equipment. In addition to requirements referenced in Division 01, the following is required for work provided under this section of the specifications.

B. Manuals shall be separate from work furnished under other divisions. Prepare a separate chapter for instruction of each class of equipment or system. Index and clearly identify each chapter and provide a table of contents.

C. Unless otherwise noted in Division 01, provide one copy of all material for approval.

D. The following is the suggested outline for operation and maintenance manuals and is presented to indicate the extent of items required in manuals.
   1. List chapters of information comprising the text. The following is a typical Table of Contents:
      a. Electrical power distribution.
      b. Standby generator.
      c. Other chapters as necessary.
   2. Provide the following items in sequence for each chapter shown in Table of Contents:
      a. Describe the procedures necessary for personnel to operate the system including start-up, operation, emergency operation and shutdown.
         1) Give complete instructions for energizing equipment and making initial settings and adjustments whenever applicable.
         2) Give step-by-step instructions for shutdown procedure if a particular sequence is required.
         3) Include test results of all tests required by this and other sections of the specifications.
      b. Maintenance Instructions:
         1) Provide instructions and a schedule of preventive maintenance, in tabular form, for all routine cleaning and inspection with recommended lubricants if required for the following:
            a) Distribution equipment.
            b) Standby generator.
         2) Provide instructions for minor repair or adjustments required for preventive maintenance routines, limited to repairs and adjustments which may be performed without special tools or test equipment and which requires no special training or skills.

3) Provide manufacturers' descriptive literature including approved shop drawings covering devices used in system, together with illustrations, exploded views, etc. Also include special devices provided by the Contractor.
4) Provide any information of a maintenance nature covering warranty items, etc., which have not been discussed elsewhere.
5) Include list of all equipment furnished for project, where purchased, technical representative if applicable and a local parts source with a tabulation of descriptive data of all electrical-electronic spare parts and all mechanical spare parts proposed for each type of equipment or system. Properly identify each part by part number and manufacturer.

c. Inspection Certificate: Include copy of certificate of final inspection and acceptance from the Authority Having Jurisdiction.

1.09 DEMONSTRATION OF ELECTRICAL SYSTEMS

A. During substantial completion inspection:
1. Conduct operating test for approval under provisions of Division 01.
2. Demonstrate installation to operate satisfactorily in accordance with requirements of Contract Documents.
3. Should any portion of installation fail to meet requirements of Contract Documents, repair or replace items failing to meet requirements until items can be demonstrated to comply.
4. Have instruments available for measuring light intensities, voltage and current values, and for demonstration of continuity, grounds, or open circuit conditions.
5. Provide personnel to assist in taking measurements and making tests.

1.10 WARRANTY

A. In addition to the requirements of Division 01, or as specified in other sections. Warrant all materials, installation and workmanship for one (1) year from date of acceptance.

B. Copies of manufacturer product warranties for all equipment shall be included in the operation and installation manuals.

1.11 INSTRUCTION OF OPERATING PERSONNEL

A. In accordance with the requirements of Division 01 and this section provide services of qualified representative of supplier of each item or system listed below to instruct designated personnel of Owner in operation and maintenance of item or system.

B. Make instruction when system is complete, of number of hours indicated, and performed at time mutually agreeable.

System or Equipment	Hours of Instruction
Standby power system	4

C. Certify that an Anchorage based authorized service organization regularly carries complete stock of repair parts for listed equipment or systems, that organization is available and will furnish service within 48 hours after request. Include name, address and telephone number of service organization.

D. Have approved operation and maintenance manuals and parts lists for all equipment on hand at time of instruction.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. All Materials and Equipment shall be new.

B. All Materials and Equipment shall be listed by Underwriter's Laboratories or equivalent third party listing agency for the use intended.

C. Materials and Equipment shall be acceptable to the authority having jurisdiction as suitable for the use intended when installed per listing and labeling instructions.

D. No materials or equipment containing asbestos in any form shall be used. Where materials or equipment provided by this Contractor are found to contain asbestos such items shall be removed and replaced with non-asbestos containing materials and equipment at no cost to the Owner.

E. In describing the various items of equipment, in general, each item will be described singularly, even though there may be numerous similar items.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. Install Work using procedures defined in NECA Standard of Installation and/or the manufacturer's installation instructions.

3.02 TESTS

A. Notify the Owner’s representative at least 72 hours prior to conducting any tests.

B. Following completion of installation, test system ground in accordance with the requirements of NETA ATS 7.13. and all feeders in accordance with NETA ATS 7.3. Submit logs of values obtained, and nameplate data of instruments used prior to final inspection. Include a copy of all data in the power distribution section of the Operation and Maintenance Manuals.

C. Perform additional tests required under other sections of these specifications.

D. Perform all tests in the presence of the Owner's representative.

3.03 PENETRATIONS OF FIRE BARRIERS

A. Related information to this section appears in Division 07, Fire Stopping.

B. All holes or voids created to extend electrical systems through fire rated floors, walls or ceiling shall be sealed with an asbestos-free intumescent fire stopping material capable of expanding 8 to 10 times when exposed to temperatures 250ºF or higher.

C. Materials shall be suitable for the fire stopping of penetrations made by steel, glass, plastic and shall be capable of maintaining an effective barrier against flame, smoke and gases in compliance with the requirements of ASTM E814 and UL 1479.

D. The rating of the fire stops shall be the same as the time-rated floor, wall or ceiling assembly.

E. Install fire stopping materials in accordance with the manufacturer's instructions.

F. Unless protected from possible loading or traffic, install fire stopping materials in floors having void openings of four (4) inches or more to support the same floor load requirements as the surrounding floor.

END OF SECTION

SECTION 26 05 05 - SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electrical Demolition.

1.02 RELATED SECTIONS

A. Division 01 - Alteration Project Procedures.

B. Division 02 - Minor Demolition for Remodeling.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify field measurements and circuiting arrangements are as shown on Drawings.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition Drawings are based on a non-destructive walkthrough and existing record documents. Report discrepancies to Owner before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

B. Existing Generator: Provide provisions for a temporary generator to be connected within 30 minutes of a power outage in the event that an outage occurs after the existing system is demolished and before the new system is installed. Obtain permission from Owner at least 24 hours before partially or completely disabling system. Minimize outage duration.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Demolish and extend existing electrical work under provisions of Division 01, Division 02, and this Division.

B. Remove, relocate, and extend existing installations to accommodate new construction.

C. Remove abandoned wiring to source of supply.

D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

E. Where abandoned conduit is installed below existing slab not scheduled for demolition, remove the conductors, cut conduit flush with floor, and patch surface.

F. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

G. Disconnect and remove abandoned panelboards and distribution equipment.

H. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

I. Repair adjacent construction and finishes damaged during demolition and extension work.

J. Maintain access to existing electrical installations which remain active.

K. Extend existing installations using materials and methods as specified.

L. Where materials or equipment are to be turned over to Owner or reused and installed by the Contractor, it shall be the Contractor's responsibility to maintain condition of materials and equipment equal to the existing condition of the equipment before the work began. Repair or replace damaged materials or equipment at no additional cost to the Owner.

3.04 EXISTING PANELBOARDS

A. Ring out circuits in existing panel affected by the Work. Where additional circuits are needed, reuse circuits available for reuse. Install new breakers.

B. Tag unused circuits as spare.

C. Where existing circuits are indicated to be reused, use sensing measuring devices to verify circuits feeding Project area or are not in use.

D. Remove existing wire no longer in use from panel to equipment.

E. Provide new updated directories where more than three circuits have been modified or rewired.

3.05 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions.

3.06 INSTALLATION

A. Install relocated materials and equipment under the provisions of Division 01.

3.07 DISPOSAL

A. Dispose of all hazardous waste in accordance with all local, State and Federal requirements.

END OF SECTION

SECTION 26 05 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Building Wire.

B. Cable.

C. Wiring Connections and Terminations.

1.02 RELATED SECTIONS

A. Section 26 05 53 – Identification for Electrical Systems.

1.03 REFERENCES

A. Federal Specification FS-A-A59544 – Cable and Wire, Electrical (Power, Fixed Installation).

B. Federal Specification FS-J-C-30B – Cable Assembly, Power, Electrical.

C. ANSI/NEMA WC 70-2009 – Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

D. NETA ATS – Acceptance testing specifications for Electrical Power Distribution and Systems.

E. NFPA 70 – National Electrical Code.

F. NFPA 262 – Standard Method of test for flame travel and smoke of wires and cables for use in air-handling spaces.

G. UL 62 – Flexible Cords and Cables.

H. UL 83 – Thermoplastic Insulated Wire and Cable.

I. UL 1063 – Standard for Machine and Tool Wire and Cable.

J. UL 1479 – Standard for Fire Tests of Through Wall Penetration Fire Stops.

K. UL 1581 – Reference Standard for Electrical Wires, Cables and Flexible Cords.

1.04 SUBMITTALS

A. Submit data under provisions of Division 01 and Section 26 05 00.

B. Product Data: Submit product data for all components provided which fall under this section showing configurations, finishes, and dimensions. Each catalog sheet should be clearly marked to indicate exact part number provided, including all options and accessories.

1.05 QUALITY ASSURANCE

A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5m) when tested in accordance with NFPA 262.

PART 2 - PRODUCTS

2.01 BUILDING WIRE

A. Thermoplastic-insulated Building Wire: NEMA WC 70.

B. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, THW, THHN/THWN or XHHW-2 as indicated.

C. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation, THHN/THWN or XHHW-2. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid or stranded conductor.

D. Branch Circuit Wire Color Code:
   1. Color code wires by line or phase as follows:
      a. Black, red, blue and white for 120/208V systems.
      b. Brown, orange, yellow and gray for 277/480V systems.
   2. For conductors 6 AWG and smaller, insulation shall be colored. For conductors 4 AWG and larger, identify with colored phase tape at all terminals, splices, and boxes.
   3. Grounding conductors 6 AWG and smaller shall have green colored insulation. For 4 AWG and larger, use green tape at both ends and at all other visible points in between, including pull and junction boxes.

E. Control Circuits: Copper, stranded conductor 600 volt insulation, THHN/THNN or XHHW-2.

2.02 REMOTE CONTROL AND SIGNAL CABLE

A. Control Cable for Class 1 Remote Control and Signal Circuits: Copper conductor, 600 volt insulation, rated 90º C, individual conductors twisted together, shielded, and covered with an overall PVC jacket; UL listed.

B. Control Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 90º C, individual conductors twisted together, and covered with a PVC jacket; UL listed.

C. Plenum Cable for Class 2 or Class 3 Remote Control and Signal Circuits: Copper conductor, 300 volt insulation, rated 90º C, individual conductors twisted together, and

covered with a nonmetallic jacket; UL listed for use in air handling ducts, hollow spaces used as ducts, and plenums.

2.03 WIRING CONNECTIONS AND TERMINATIONS

A. For conductors 8 AWG and smaller:
   1. Dry interior areas: Spring wire connectors, pre-insulated "twist-on" rated 105 degrees C per UL 468C. Where stranded conductors are terminated on screw type terminals, install crimp insulated fork or ring terminals. Thomas & Betts Sta-Kon or equal.
   2. Motor connections: Spring wire connectors, pre-insulated "twist-on" rated 105 degrees C per UL 468C. Provide a minimum of 8 wraps of Scotch 33+ electrical tape around conductors and connector to eliminate connector back off.
   3. Wet or exterior: Spring wire connectors, pre-insulated "twist-on", resin filled rated for direct burial per UL 486D.

B. For conductors 6 AWG and larger:
   1. Bus lugs and bolted connections: 600 V, 90 degrees C., two hole long barrel irreversible compression copper tin plated. Thomas & Betts or approved equal.
   2. Motor connection: 600 V, 90 degrees C., copper tin plated compression motor pigtail connector, quick connect/disconnect, slip on insulator. Thomas & Betts or approved equal.
   3. Two way connector for splices or taps: 600 V, 90 degrees C., compression long barrel, copper tin plated. Thomas & Betts or approved equal. Insulate with Scotch 23 rubber insulating base covering and Scotch 33+ outer wrap.

PART 3 - EXECUTION

3.01 GENERAL WIRING METHODS

A. Use no wire smaller than 12 AWG for power and lighting circuits, and no smaller than 18 AWG for control wiring.

B. Use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 75 feet, and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.

C. Splice only in junction or outlet boxes.

D. Neatly train and lace wiring inside boxes, equipment, and panelboards.

E. Make Conductor lengths for parallel circuits equal.

F. Do not share neutral conductors. Provide a dedicated neutral conductor for each branch circuit that requires a neutral.

3.02 WIRING INSTALLATION IN RACEWAYS

A. Pull all conductors into a raceway at the same time. Verify that raceway is complete and properly supported prior to pulling conductors. Use UL listed wire pulling lubricant for pulling 4 AWG and larger wires.

B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.

C. Do not install XHHW-2 conductors when ambient temperatures are below –5 degrees C and THHN/THWN conductors when ambient temperatures are below 0 degrees C.

D. Conductors shall be carefully inspected for insulation defects and protected from damage as they are installed in the raceway. Where the insulation is defective or damaged, the cable section shall be repaired or replaced at the discretion of the Owner and at no additional cost to the Owner.

E. Place an equal number of conductors for each phase of a circuit in same raceway or cable.

F. Route conductors from each system in independent raceway system and not intermix in the same raceway, enclosure, junction box, wireway, or gutter as another system unless otherwise shown on the plans.

G. No more than six current carrying conductors shall be installed in any homerun unless otherwise indicated on the drawings or without prior approval from the Engineer.

H. Completely and thoroughly swab raceway system before installing conductors.

I. When two or more neutrals are installed in one conduit, identify each with the proper circuit number in accordance with Section 26 05 53.

3.03 CABLE INSTALLATION

A. Provide protection for exposed cables where subject to damage.

B. Support cables above accessible ceilings; do not rest on ceiling tiles. Use spring metal clips or cable ties to support cables from structure. Do not support cables from ceiling suspension system. Include bridle rings or drive rings.

C. Use suitable cable fittings and connectors.

3.04 WIRING CONNECTIONS AND TERMINATIONS

A. Stranded wire shall not be wrapped around screw terminals.

B. Splice only in accessible junction boxes.

C. Thoroughly clean wires before installing lugs and connectors.

D. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

E. Terminate spare conductors with twist on connectors or heat shrink insulation to proper voltage rating.

F. Control systems wiring in conjunction with mechanical, electrical or miscellaneous equipment to be identified in accordance with wiring diagrams furnished with equipment.

G. Code sound and signal systems wiring and any special equipment in accordance with manufacturer's diagrams or recommendations.

H. Do not exceed manufacturer's recommended pull tensions.

3.05 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01 and Section 26 01 26.

B. Inspect wire and cable for physical damage and proper connection.

C. Torque conductor connections and terminations to manufacturer's recommended values.

3.06 WIRE AND CABLE INSTALLATION SCHEDULE

A. All Locations: Building wire and/or remote control and signal cable in raceways.

END OF SECTION

SECTION 26 05 26 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Power System Grounding.

B. Electrical Equipment and Raceway Grounding and Bonding.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, Section 26 05 00 – Common Work Results for Electrical.

B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.

1.03 REFERENCE STANDARDS

A. ANSI/NFPA 70 – National Electrical Code.

B. ASTM B 3 – Standard Specification for Soft or Annealed Copper Wire.

C. AWS A5.8/A5.8M – Specification for Filler Metals for Brazing and Braze Welding.

D. IEEE Std 142 – Recommended Practice for Grounding of Industrial and Commercial Power System.

E. UL 467 – Standard for Grounding and Bonding Equipment.

1.04 SYSTEM DESCRIPTION

A. Provide a complete grounding system for services and equipment as required by State and Local Codes, NEC, applicable portions of other NFPA codes, and as indicated herein.

1.05 SUBMITTALS

A. Product Data: Submit product data for all components provided, showing material type and dimensions. Each catalog sheet should be clearly marked to indicate exact part number provided, including all options and accessories.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bonding Conductors: Solid bare copper wire for sizes No. 8 AWG and smaller diameter. Stranded bare copper wire for sizes No. 6 AWG and larger diameter. Conductors may be insulated conductors if used provide green insulation.

B. Grounding Conductors: Copper conductor bare or green insulated.

C. Mechanical Grounding and Bonding Connectors: Non-reversible crimp type lugs only. Use factory made compression lug for all terminations.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Provide a separate, insulated equipment-grounding conductor in all feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing. Multiple conductors on single lug not permitted. Each grounding conductor shall terminate on its own terminal lug.

B. Bond together system neutrals, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, and receptacle ground connectors.

C. Grounding conductors for branch circuits shall be sized in accordance with NEC, except minimum size grounding conductor shall be No. 12 AWG.

D. Grounding conductor is in addition to neutral conductor and in no case shall neutral conductor serve as grounding means.

3.02 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Continuity Test: Continuity test shall be performed on all power receptacles to ensure that the ground terminals are properly grounded to the facility ground system.

END OF SECTION

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Section included hangers and supports for Power Systems.

B. Conduit Supports.

C. Formed Steel Channel.

D. Spring Steel Clips.

E. Equipment Bases and Supports.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

B. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems.

1.03 REFERENCES

A. International Building Code (IBC), Chapter 16 – Structural Design.

1.04 SUBMITTALS

A. Division 01: Requirements for submittals.

B. Product Data: Submit product data for specialty supports.

1.05 QUALITY ASSURANCE

A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 - PRODUCTS

2.01 CONDUIT SUPPORTS

A. Manufacturers:
1. Allied Tube & Conduit Corp.
2. Minerallac Fastening Systems.
3. O-Z Gedney Co.
4. Substitutions: per Division 01

B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit clamps - general purpose: One-hole malleable iron for surface mounted conduits.

F. Cable Ties: High strength nylon temperature rated to 185 degrees F. self-locking.

2.02 FORMED STEEL CHANNEL

A. Manufacturers:
1. B-Line Systems.
2. Allied Tube & Conduit Corp.
3. Unistrut Corp.
4. Substitutions: per Division 01.

B. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Division 01: Verification of existing conditions before starting work.

3.02 PREPARATION

A. Obtain permission from Owner’s Representative before using powder-actuated anchors.

B. Obtain permission from Owner’s Representative before drilling or cutting structural members.

3.03 INSTALLATION - GENERAL

A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using precast insert system, expansion anchors, preset inserts, beam clamps, or spring steel clips.

B. Use toggle bolts or hollow wall fasteners in hollow masonry partitions and walls; expansion anchors or preset inserts in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

C. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

D. Fabricate supports from structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

E. Install surface-mounted cabinets and panelboards with minimum of four anchors.

F. Securely fasten fixtures and equipment to building structure in accordance with manufacturer's recommendations and to provide necessary earthquake anchorage.

G. Provide wall attached equipment weighing less than 50 pounds with backing plates of at least 1/8" x 10" sheet steel or 2" x 10" fire retardant treated wood securely built into the structural walls. Submit attachment details of heavier equipment for approval.

H. Earthquake Anchorages:
1. Equipment weighing more than 50 pounds shall be adequately anchored to the building structure to resist lateral earthquake forces.
2. Total lateral (earthquake) forces shall be 1.5 times the equipment weight acting laterally in any direction through the equipment center of gravity. Provide adequate backing at structural attachment points to accept the forces involved.

I. Power-driven fasteners are prohibited for tension load applications (such as supporting conduit racks from ceiling above). Use drilled-in expansion anchors, or drilled and screw-in anchors such as Kwik-Con II or Tapcon.

END OF SECTION

SECTION 26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal Conduit.

B. Flexible Metal Conduit.

C. Liquidtight Metal Conduit.

D. Electrical Metallic Tubing.

E. Fittings and Conduit Bodies.

F. Wall and Ceiling Outlet Boxes.

G. Pull and Junction Boxes.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 - General Requirements and Section 26 05 00 – Common Work Results for Electrical.

B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.

C. Section 26 05 26 – Grounding and Bonding for Electrical Systems.

D. Section 26 05 29 – Hangers and Supports for Electrical Systems.

E. Section 26 05 53 – Identification for Electrical Systems.

F. Section 26 27 26 – Wiring Devices.

1.03 REFERENCES

A. American National Standards Institute (ANSI):
   1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
   2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

B. American Society for Testing and Materials (ASTM):
   1. ASTM A 123 – Specification for Zinc Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strip.

C. National Electrical Manufacturers Association (NEMA):
   1. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

2. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
3. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. Underwriters Laboratory (UL):
1. UL 6 - Rigid Steel Conduit, Zinc Coated.
2. UL 514B – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

E. International Building Code (IBC):
1. IBC chapters 16 and 17 seismic requirements.

1.04 RACEWAY AND BOX INSTALLATION SCHEDULE

A. In or through CMU walls:
1. Raceway: Provide rigid steel conduit or intermediate metal conduit. EMT conduit may penetrate through CMU walls where the EMT is installed in a sleeve and does not come in direct contact with the CMU. All conduit in contact with concrete or block shall be rigid steel conduit half lapped wrapped with pipe wrap or be plastic-coated conduit.
2. Boxes and Enclosures: Provide concrete tight cast and sheet metal steel metal boxes.

B. Damp or Wet Interior Locations:
1. Raceway: Provide rigid steel conduit or intermediate metal conduit.
2. Boxes and Enclosures: Provide weatherproof malleable iron for branch circuit junction and outlet boxes. Provide weatherproof NEMA 3R sheet metal enclosures for safety and disconnect switches and NEMA 4 sheet metal enclosures with gaskets for motor controllers and control panels.
3. Fittings: Provide galvanized malleable iron with gaskets. Provide Myers threaded hubs for all conduit entries into top and side of sheet metal enclosures.

C. Concealed Dry Locations:
1. Raceway: Provide rigid steel conduit, intermediate metal conduit, or electrical metallic tubing.
2. Boxes and Enclosures: Provide sheet-metal boxes.
3. Fittings: Provide galvanized malleable iron and steel.

D. Exposed Dry Locations:
1. Raceway: Provide rigid steel conduit or intermediate metal conduit. EMT conduit may be used where exposed conduit is allowed where it is not subject to physical damage or where installed on the ceiling or a minimum of ten feet above the floor.
2. Boxes and Enclosures: Provide sheet-metal boxes with raised steel covers.
3. Fittings: Provide galvanized malleable iron and steel.
4. Surface Raceway and Boxes. Where specifically noted on the Drawings, provide surface raceway and boxes.

E. Branch Circuits 60 Amperes or Larger and Feeders:
1. Raceway: Provide rigid steel conduit or intermediate metal conduit.
2. Boxes and Enclosures: Provide sheet-metal boxes.
3. Fittings: Provide galvanized malleable iron and steel.

F. Equipment Connections: Provide short extensions (three feet maximum) of flexible metal conduit for connections to motors, transformers, vibrating equipment or equipment that requires removal for maintenance or replacement. Use Liquidtight flexible conduit and fittings for motors and equipment in damp or wet locations or subject to spilling of liquids as at pumps, in mechanical rooms, boiler rooms, pump rooms, etc.

1.05 DESIGN REQUIREMENTS

A. Raceway Minimum Size:
   1. Above Grade: Provide 1/2 inch minimum, unless otherwise noted.
   2. Line Voltage Circuits: Raceway is sized on the drawings for copper conductors with 600-Volt type XHHW insulation, unless otherwise noted. Where a raceway size is not shown on the drawings, it shall be calculated to not exceed the percentage fill specified in the NEC Table 1, Chapter 9 using the conduit dimensions of the NEC Table 4, Chapter 9 and conductor properties of the NEC Table 5, Chapter 9.
   3. Fire Alarm, Telecom and other Low-Voltage Circuits: Where installed in raceways, the raceway size shall be calculated to not exceed the percentage fill specified in the NEC Table 1, Chapter 9, using the conduit dimensions of the NEC Table 4, Chapter 9, and cable diameter provided by the manufacturer.

B. Box Minimum Size: Provide all boxes sized and configured per NEC Article 370 and as specified in this section.

C. Seismic Support: Provide support in accordance with section 26 05 29 – Hangers and Supports for Electrical Systems and 26 05 48 – Vibration and Seismic Support for Electrical Systems.

1.06 SUBMITTALS

A. Product Data: Submit data for products to be provided.

PART 2 - PRODUCTS

2.01 RIGID METAL CONDUIT (RMC)

A. Rigid Steel Conduit: ANSI C80.1, UL 6.

B. Fittings and Conduit Bodies: NEMA FB 1, UL 514B; Galvanized malleable iron with threaded hubs for all conduit entries. Provide threaded connections and couplings only. Set Screw and running thread fittings are not permitted.

C. Provide insulated throat bushings at all conduit terminations.

2.02 INTERMEDIATE METAL CONDUIT (IMC)

A. Product Description: ANSI C80.6, UL 1242; Galvanized Steel Conduit.

B. Fittings and Conduit Bodies: NEMA FB 1, UL 514B; use fittings and conduit bodies specified above for rigid steel conduit.

C. Provide insulated throat bushings at all conduit terminations.

2.03 FLEXIBLE METAL CONDUIT (FMC)

A. Product Description: UL 1, FS WW-C-566; galvanized or zinc-coated flexible steel, full or reduced-wall thickness.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron with insulated throat bushings. Die cast zinc or threaded inside throat fittings are not acceptable.

2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Product Description: UL 360, flexible metal conduit with interlocked steel construction and PVC jacket.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; liquid tight steel or malleable iron with insulated throat bushings. Die cast fittings are not acceptable.

2.05 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3, UL 797; galvanized steel tubing.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel or malleable iron, compression or set screw type with insulated throat bushings. Zinc die cast, or indentor fittings are not acceptable.

C. Maximum size shall be 2". Provide factory elbows on sizes 1-½" and larger.

2.06 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, UL514A galvanized steel, with plaster ring where applicable.
   1. Minimum Size: 4 inches square or octagonal, 1-1/2 inches deep, unless otherwise noted.
   2. Concrete and Masonry: Concrete type with field installed tape cover to prevent concrete entry to raceway system. Minimum Size: 4 inches square, 2-1/8 inches deep.

B. Wall Plates: As specified in Section 26 27 26.

2.07 PULL AND JUNCTION BOXES

A. Sheet Metal Pull and Junction Boxes: ANSI/NEMA OS 1, UL514A galvanized steel.
   1. Minimum Size: 4 inches square or octagonal, 1-1/2 inches deep, unless otherwise noted.

B. Sheet Metal Boxes Larger Than 12 Inches in Any Dimension: Hoffman or approved equal.

C. Cast Metal Boxes for Wet Location Installations: NEMA 250, Type 4; flat-flanged, surface mounted junction box, UL listed as raintight:
   1. Material: Galvanized cast iron.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover and screws.

2.08 EXPANSION FITTINGS

A. Galvanized malleable iron, galvanized with grounding bond jumper.

2.09 BUSHINGS

A. Non-grounding: Threaded impact resistant plastic.

B. Grounding: Insulated galvanized malleable iron/steel with hardened screw bond to raceway and conductor lug.

2.10 LOCKNUTS

A. Threaded Electro Zinc Plated Steel designed to cut through protective coatings for ground continuity.

2.11 WIREWAY

A. Product Description: General purpose type wireway. Size per NEC minimum fill capacity required.

B. Knockouts: Field-installed, no factory knockouts acceptable.

C. Cover: Screw cover.

D. Fittings and Accessories: Include factory couplings, offsets, elbows, adapters and support straps required for a complete system. Provide internal ground bonding jumper bonded to each section.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 26 05 26.

B. Provide seismic support and fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.

C. Identify raceway and boxes with origin and destination in accordance with Section 26 05 53.

D. Unless otherwise noted, do not inter-mix conductors from separate panelboards or any other system in the same raceway system or junction boxes.

3.02 INSTALLATION - GENERAL RACEWAY

A. Install raceway for all systems, unless otherwise noted.

B. Install an equipment grounding conductor inside of all raceways containing line voltage conductors.

C. Provide raceways concealed in construction unless specifically noted otherwise, or where installed at surface cabinets, motor and equipment connections and in Mechanical and Electrical Equipment rooms. Do not route conduits on roofs, outside of exterior walls, or along the surface of interior finished walls unless specifically noted on the plans.

D. Raceway routing and boxes are shown in approximate locations unless dimensioned. Where raceway routing is not denoted, field-coordinate to provide complete wiring system.

E. Do not route raceways on floor. Arrange raceway and boxes to maintain a minimum of 6 feet 6 inches of headroom and present a neat appearance. Install raceways level and square to a tolerance of 1/8” per 10 feet. Route exposed raceways and raceways above accessible ceilings parallel and perpendicular to walls, ceiling, and adjacent piping.

F. Maintain minimum 6-inch clearance between raceway and mechanical and piping and ductwork. Maintain 12-inch clearance between raceway and heat sources such as flues, steam pipes, heating pipes, heating appliances, and other surfaces with temperatures exceeding 104 degrees F.

G. Seal raceway penetrations of fire-rated walls, ceilings, floors in accordance with the requirements of Section 26 05 00.

H. Conduit embedded in concrete or solid masonry shall not be larger than 1/3 the thickness of the wall or slab and shall be spaced not less than three diameters apart. No cutting of reinforcing bars shall be permitted unless specifically approved. Should structural members prevent the installation of conduit or equipment, notify the Contracting Officer before proceeding.

I. Route conduits in slabs to have 1 inch minimum cover. Conduits in slab shall not compromise the structural integrity of the slab.

J. Arrange raceway supports to prevent misalignment during wiring installation. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

K. Do not attach raceway to ceiling support wires or other piping systems and do not fasten raceway with wire or perforated pipe straps. Remove all wire used for temporary raceway support during construction, before conductors are pulled. Raceway shall be installed to permit ready removal of equipment, piping, ductwork, or ceiling tiles.

L. Group raceway in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps, as specified in Section 26 05 29. Provide space on each rack for 25 percent additional raceway.

M. Cut conduit square; de-burr cut ends. Bring conduit to the shoulder of fittings and couplings and fasten securely. Where locknuts are used, install with one inside box and one outside with dished part against box.

N. Use threaded raintight conduit hubs for fastening conduit to cast boxes, and for fastening conduit to sheet metal boxes in damp or wet locations. Sealing locknuts are not acceptable.

O. Install no more than the equivalent of three 90-degree bends between boxes.

P. Install conduit bodies to make sharp changes in direction, such as around beams. “Goosenecks” in conduits are not acceptable.

Q. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch size.

R. Provide protective plastic bushings or insulated throat bushings at each raceway termination not installed to an enclosure. Bushings shall be threaded to the raceway end or connector.

S. Install fittings and flexible metal conduit to accommodate 3-axis movements where raceway crosses seismic joints.

T. Install fittings designed and listed to accommodate expansion and contraction where raceway crosses control and expansion joints.

U. Provide nylon "jet-line" or approved equal pull string in empty raceway, except sleeves and nipples.

V. Where raceway penetrates non-rated ceilings, floors or walls, provide patching, paint and trim to retain architectural aesthetics similar to surroundings.

3.03 INSTALLATION – GENERAL BOXES

A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance. All electrical box locations shown on Drawings are approximate unless dimensioned.

B. Coordinate layout and installation of boxes to provide adequate headroom and working clearance. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

C. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems and where normal and emergency power circuits occur in the same box.

D. Adjust box location up to 6 feet prior to rough-in to accommodate intended purpose.

E. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.

F. Locate and install boxes to maintain headroom and to present a neat appearance.

G. Provide knockout closures for unused openings.

H. Install boxes in walls without damaging wall insulation or reducing its effectiveness.

I. Support boxes independently of conduit.

J. Clean interior of boxes to remove dust, debris, and other material and clean exposed surfaces and restore finish.

K. Provide blank covers or plates for all boxes that do not contain devices.

END OF SECTION

SECTION 26 05 48 – VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section includes requirements for vibration and seismic restraints for electrical equipment installed in seismic categories D, E or F.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, Section 26 05 00 – Common Work Results for Electrical, Division 27 and Division 28.

B. Section 26 05 33 - Raceway and Boxes for Electrical Systems.

C. Section 26 05 29 – Hangers and Supports for Electrical Systems.

D. Section 26 32 00 – Packaged Generator Assemblies.

E. Section 26 36 23 – Automatic Transfer Switches

1.03 DESCRIPTION

A. Provide seismic anchorage and restraint of electrical systems including, equipment, raceways, cable trays, lighting fixtures, etc.

B. Seismic Category D, E and F:

1. All electrical items that are of Importance Factor (Ip) = 1.5 are required to be seismically braced. This applies to the following:
   a. The component is required to function for life safety purposes after an earthquake, including fire protection systems, fire alarm systems, emergency lighting, etc.
   b. The component contains hazardous materials.
   c. The component is in or attached to an Occupancy Category IV structure (Hospitals, fire station, police station, emergency shelters, etc. per ASCE 7-05, Table 1-1) and it is needed for continued operation of the facility or its failure could impair the continued operation of the facility.

C. All other electrical equipment shall be assigned a component importance factor (Ip) = 1.0 and are required to be seismically braced unless one of the following conditions is satisfied:

1. Component is MOUNTED (connection to structure) at less than 4' above the floor (to the center of gravity of the component), and weighs less than 400 lbs.
2. Component is mounted higher than 4' (to the center of gravity of the component), but weighs less than 50 lbs (if it is concealed).

3. Component is mounted higher than 4' (to the center of gravity of the component), but weighs less than 100 lbs (if it is exposed).
4. Flexible connections between the components and associated conduit are provided.
5. All runs or groupings of conduits on or off of trapezes shall be seismically braced, unless the distribution system (including conduit, wiring and fittings) weighs less than 5 pounds per linear foot.
6. Lighting fixtures, lighted signs and ceiling fans that are not rigidly connected to ducts or piping, that are supported by chains or otherwise suspended from structure, are not required to be seismically braced, as long as:
   a. The attachment points can carry at least 140% of the weight of the fixture, and
   b. The swinging light will not create a falling debris problem by bumping into ceiling of other finishes, and
   c. Connections to structure allow for movement of the fixture without damaging the connections.

D. In accordance with ASCE 7-10 13.6.4, all electrical components with Ip = 1.5 shall also satisfy the following requirements:
1. Provisions shall be made to eliminate seismic impact between components.
2. Loads imposed on the components by attached utility or service lines that are attached to separate structures shall be evaluated.
3. Batteries on racks shall have wrap-around restraints to ensure that the batteries will not fall from the rack. Spacers shall be used between restraints and cells to prevent damage to cases. Racks shall be evaluated for sufficient lateral load capacity.
4. Internal coils of dry type transformers shall be positively attached to their supporting substructure within the transformer enclosure.
5. Electrical control panels, computer equipment, and other items with slide-out components shall have a latching mechanism to hold the components in place.
6. Electrical cabinet design shall comply with the applicable National Electrical Manufacturers Association (NEMA) standards. Cutouts in the lower shear panel that have not been made by the manufacturer and reduce significantly the strength of the cabinet shall be specifically evaluated.
7. The attachments of additional external items weighing more than 100 lbs shall be specifically evaluated if not provided by the manufacturer.
8. Where conduit, cable trays, or similar electrical distribution components are attached to structures that could displace relative to one another and for isolated structures where such components cross the isolation interface, the components shall be designed to accommodate the seismic relative displacements defined in ASCE 7-10 Section 13.3.2.

E. Unless otherwise exempted above, electrical component supports and the means by which they are attached to the component shall be designed for the Seismic Category they are installed in accordance with ASCE 7-10 Section 13.6.5.

1.04 REFERENCE STANDARDS

A. Seismic anchorage and restraints shall be designed and installed in accordance with codes and standards as enforced by authorities having jurisdiction in [Anchorage,]Alaska. Authorities shall include Owner's insurance company.

B. Where applicable, building standards supersede those of other evaluation or listing agencies referenced in specification.

C. International Building Code (IBC), Chapter 16 – Structural Design.

D. ASCE 7-10 Chapter 13.

1.05 SUBMITTALS

A. Provide structurally engineered shop drawings for seismic restraint of all electrical equipment required by the International Building Code (IBC), Chapters 16, 17. Structural design shall be based on the Seismic Use Category and Seismic Design Category as designated in these chapters.

B. Provide complete calculations, drawings and details.

C. Shop drawings shall be stamped by a professional engineer registered in the State of Alaska.

D. Submittals shall be coordinated with building Structural engineer.

E. Submit for approval, seismic restraint calculations, drawings and details to authorities having jurisdiction as required by those authorities.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials and devices shall be in accordance with applicable codes and standards and shall be appropriate for intended use.

B. Anchors and attachments to building structure shall be as approved by building Structural engineer.

C. Seismic restraints used in conjunction with vibration isolators may consist of loose cables, telescoping pipes or box sections, angles or sections, flat plates used as limit stops or snubbers, or other types of housing used either integral with or separate from vibration isolators to accomplish necessary seismic restraint.

2.02 EQUIPMENT

A. Equipment available with seismic rating shall be provided with rating applicable to seismic zone of project location.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Secure stationary equipment, raceways and equipment supports to structure, concrete bases, or special supports to provide protection against earthquakes and to restrain lateral or vertical movement. Where vibration isolators are used, seismic restraints shall be designed to limit lateral or vertical movement during earthquake without short-circuiting vibration isolation system.

B. Coordinate seismic restraints with building Structural engineer and incorporate building Structural engineer's requirements.

C. Seismic restraint methods and materials shall be supplementary to support devices specified in other sections of this specification and together shall serve as equipment support criteria.

D. Installation of devices shall be in accordance with seismic Structural engineer's drawings and details and in accordance with seismic guidelines.

E. Coordinate installation of devices with other trades and incorporate their requirements.

F. Modify raceway and equipment locations as required for seismic restraint system.

G. Seismic restraint systems shall not interfere with installation of other building systems or access.

END OF SECTION

SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Nameplates and Tape Labels.

B. Wire and Cable Markers.

C. Working Clearance Striping.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

B. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.

C. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

D. Section 26 24 16 – Panelboards.

E. Section 26 27 26 – Wiring Devices.

1.03 SUBMITTALS

A. Division 01 and Section 26 05 00 – Common Work Results for Electrical.

B. Product Data:
   1. Submit manufacturer's catalog literature for each product required.
   2. Submit electrical identification schedule including list of wording, symbols, letter size, color-coding, tag number, location, and function.

1.04 CLOSEOUT SUBMITTALS

A. Electrical One-Line Diagrams and Panel Maps: Provide electronically in PDF format, submitted with the O&M manuals.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 - PRODUCTS

2.01 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved white letters on black background. Nameplate for service disconnect shall be engraved white letters on red background.

B. Letter Size:
1. 1/4-inch high letters for identifying individual panel or equipment.
2. 1/8-inch high letters for remaining lines with 1/8 inch spacing between lines.

C. Minimum nameplate size: 1/8 inch thick with a consistent length and height for each type of nameplate wherever installed on the project.

2.02 TAPE LABELS

A. Product Description: Adhesive tape labels, with 3/16 inch Bold Black letters on clear background made using Dymo Rhino series label printer or approved equal.

B. Embossed adhesive tape will not be permitted for any application.

2.03 WIRE MARKERS

A. Power and Lighting Description: Machine printed heat-shrink tubing, cloth or wrap-on type, for all neutrals and Phase conductors.

B. Low Voltage System Description: Self-adhesive machine printed label with unique wire number that is shown on shop drawing for system.

C. Telecommunications Cable Markers: Self-laminating vinyl with translucent band and minimum 1”W x .5”H printable area with matte white finish. Brady #B-427 series or approved equal.

2.04 WORKING CLEARANCE STRIPING

A. Product description: 2” wide epoxy yellow paint with 2 inch high block letters within the clearance area to read: “ELECTRICAL CLEARANCE – NO STORAGE WITHIN THIS ZONE”.

2.05 POWER DISTRIBUTION SYSTEM ONE-LINE DIAGRAM AND PANEL MAP

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

A. Degrease and clean surfaces to receive nameplates and tape labels.

B. Install nameplates and tape labels parallel to equipment lines.

3.02 NAMEPLATE INSTALLATION

A. Secure nameplates to equipment fronts using machine screws tapped and threaded into panelboard, or using rivets. The use of adhesives is not acceptable. Machine screws to not protrude more than 1/16 inch on back side.

B. Branch Panelboard Nameplates:
   1. Provide nameplate for each panelboard with the following information:
      a. Line 1: Panelboard name.
      b. Line 2: Source from which the panelboard is fed.
      c. Line 3: Voltage, phase and wire configuration.
      d. Line 4: AIC rating of the panelboard.

C. Transformers:
   1. Provide nameplate for each transformer with the following information:
      a. Line 1: Transformer name.
      b. Line 2: Source from which the transformer is fed.
      c. Line 3: Primary and secondary voltage, phase and wire configuration.
      d. Line 4: Secondary load and location.

D. Disconnects, Starters, or Contactors:
   1. Provide nameplate for each device with the following information:
      a. Line 1: Load served.
      b. Line 2: Panelboard and circuit number from which the device is fed.
      c. Line 3: Fuse or Circuit amperage and poles. Where fused disconnect is installed, denote the maximum fuse size to be installed.

3.03 LABEL INSTALLATION

A. Conduit Feeder Labels - Provide conduit labels on all feeder raceways as follows:
   1. Panelboards – “PANEL xxxx FED FROM MDP xxx”.

B. Spare Raceways: Provide raceway label on each individual raceway denoting the source and termination point at each end.

3.04 WIRE IDENTIFICATION

A. Provide wire markers on each conductor in panelboard gutters, pull boxes, outlet and junction boxes, and at load connection. Identification shall be as follows:
   1. Markers shall be located within one inch of each cable end, except at panelboards, where markers for branch circuit conductors shall be visible without removing panel deadfront.
   2. Each wire and cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations.
   3. Color code phases, neutral, and ground per NEC requirements and Section 26 05 19.
   4. Color-code all low-voltage system wires and cables in accordance with the individual sections in which they are specified.
   5. For power circuits, identify with branch circuit or feeder number.

6. Control Circuits: Control wire number as indicated on schematic and shop drawings.

B. Provide pull string markers at each end of all pull strings. Marker shall identify the location of the opposite end of the pull string.

3.05 JUNCTION BOX IDENTIFICATION

A. Label each lighting and power junction box with the panelboard name and circuit number.

3.06 DEVICE PLATE IDENTIFICATION

A. Label each receptacle device plate or point of connection denoting the panelboard name and circuit number.

B. Install adhesive label on the top of each plate.

3.07 PANELBOARD IDENTIFICATION

A. Provide panelboard circuit directories in accordance with Section 26 24 16.

B. Install one-line and panel map adjacent to each MDP.

3.08 WORKING CLEARANCE STRIPING

A. Working clearance striping paint shall be applied in front of all new and existing panels located in the generator room.

END OF SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Lighting and Appliance Branch Circuit Panelboards.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements, and Section 26 05 00 – Common Work Results for Electrical.

B. Section 26 05 26 – Grounding and Bonding for Electrical Systems.

C. Section 26 05 53 – Identification for Electrical Systems.

1.03 REFERENCES

A. NEMA AB 1 - Molded Case Circuit Breakers.

B. NEMA PB 1 - Panelboards.

C. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

D. UL 50 – Enclosures for Electrical Equipment.

E. UL 67 – Panelboards.

F. UL 489 – Molded Case Circuit Breakers and Circuit Breaker Enclosures.

G. Federal Specification W-C-375B/Gen – Circuit Breakers, Molded Case, Branch Circuit and Service.

1.04 SUBMITTALS

A. Submit data under provisions of Division 01 and Section 26 05 00.

B. Product Data: Submit product data for all components provided which fall under this section showing configurations, finishes, and dimensions. Each catalog sheet should be clearly marked to indicate exact part number provided, including all options and accessories.

C. Shop drawings: Submit shop drawings for each panelboard indicating features and device arrangement and size. Include outline and support point dimensions, voltage, main bus ampacity, and integrated short circuit ampere rating.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Drawings: Submit final record panel schedules as hardcopy and in Microsoft Excel format. Submit under Section 26 05 00.

B. Operation and Maintenance Manuals: Provide product data and shop drawing information including replacement parts list. Provide installation, operation and maintenance information per manufacturer.

C. Panel Schedules: Prior to Substantial Completion, submit copies of all panel schedules for review by the Owner. The Owner will note any changes to the room numbers/names and the Contractor shall provide revised typed panel schedules to reflect all changes, at no additional cost to the Owner.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Upon arrival at the site inspect equipment and report on any damage.

C. Handle carefully on site to avoid any damage to internal components, enclosures and finishes.

D. Store in a clean, dry environment. Maintain factory packaging and provide an additional heavy canvas or plastic cover to protect enclosures from dirt, water, construction debris and traffic.

1.07 WARRANTY

A. Manufacturer shall warrant specified equipment to be free of defects for a period of one year from the date of installation.

1.08 SPARE PARTS

A. Keys: Furnish 2 each to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS - PANELBOARDS

A. Square D.

B. Cutler Hammer.

C. General Electric.

D. Siemens.

E. Substitutions: Under provisions of Division 01.

2.02 BRANCH CIRCUIT PANELBOARDS

A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1; circuit breaker type.

B. Enclosure: NEMA PB 1; Type 1 or 3R as indicated on Drawings. Boxes shall be galvanized steel constructed in accordance with UL50 requirements. Interiors shall be field convertible for top or bottom incoming feed. Main lug interiors up to 400 amperes shall be field convertible to main breaker. Interior leveling provisions shall be provided for flush mounted applications.

C. Cabinet Size: 6 inches deep; 20 inches wide minimum.

D. Provide surface cabinet front as indicated on the Drawings with door-in-door cover and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

E. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide one continuous bus bar per phase each. Panelboards shall have sequentially phased branch circuit connectors suitable for bolt-on branch circuit breakers. Bussing shall be fully rated.

F. Integrated Short Circuit Rating: Provide panelboards with short circuit ratings as shown on the Drawings. Minimum ratings shall be 10,000 amperes RMS symmetrical for 250 volt panelboards; 14,000 amperes RMS symmetrical for 600 volt panelboards.

G. Main/Sub Feed Circuit Breakers: NEMA AB 1; Provide vertical mount main and/or sub feed circuit breaker in panelboards as shown on the drawings.
   1. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be nonwelding silver alloy and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.
   2. Lugs shall be UL Listed to accept copper and aluminum conductors and shall be suitable for 90^{o}C rated wire, sized according to the 75 ^{o}C temperature rating per NEC Table 310-16. Lug body shall be bolted in place.

H. Branch Circuit Breakers: NEMA AB 1; Provide panelboards with bolt-on type thermal magnetic trip circuit breakers.
   1. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free with common trip handle for all poles.
   2. Lugs shall be UL Listed to accept copper and aluminum conductors and shall be suitable for 90^{o}C rated wire, sized according to the 75 ^{o}C temperature rating per NEC Table 310-16. Lug body shall be bolted in place.
   3. Provide circuit breakers UL listed as Type SWD for lighting circuits.
   4. Provide circuit breakers UL listed as type HACR for use with heating, air conditioning and refrigeration equipment.
   5. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings.
   6. New breakers in existing panels shall be UL listed for use in the panel and have an AIC rating to match the lowest rated device in the panel.

2.03 PANELBOARD IDENTIFICATION

A. For each panelboard each new panelboard and each existing panelboard where circuits are added or modified, provide typed schedule denoting each circuit load by the load type and final name and room number actually in use in the facility. Schedule shall not be typed with names shown on the Contract Drawings unless names are acceptable to the Owner.

B. Provide panel schedule in O&M manual for every new panelboard and every existing panelboard where circuits are added or modified.

C. Where more than one nominal voltage system is present on the premises, the conductor color-coding legend shall be permanently posted at each branch circuit and distribution panelboard per NEC requirements.

D. All panelboards shall have signage for arc hazard installed. The marking shall be located to be clearly visible to qualified personnel before examination, adjustment, servicing or maintenance of the equipment. At a minimum the signage shall state the following:

Warning

Arc Flash and Shock Hazard

Appropriate PPE Required

E. Provide electronic copies of all panel schedules in Microsoft Excel format, submitted with the O&M manuals.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1.

B. Height: 6 feet, 6 inches to top of panelboard.

C. Provide filler plates for unused spaces in panelboards.

D. Panel Schedules: Revise schedules to reflect circuiting changes required to balance phase loads.

3.02 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END OF SECTION

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Enclosed Switches.

B. Enclosures.

1.02 RELATED SECTIONS

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements and Section 26 05 00 – Common Work Results for Electrical.

B. Section 26 05 26 – Grounding and Bonding for Electrical Systems.

C. Section 26 05 53 – Identification for Electrical Systems.

1.03 REFERENCE STANDARDS

A. ANSI/UL 98 Enclosed and Dead Front Switches.

B. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

C. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).

D. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.04 SUBMITTALS

A. Product Data: Submit product data for all components provided, showing electrical characteristics, material, and dimensions. Each catalog sheet should be clearly marked to indicate exact part number provided, including all options and accessories.

B. Shop Drawings: Submit shop drawings include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit current interrupting rating.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Drawings: Accurately indicate actual location of enclosed switches, circuit breakers and ratings of actual installed fuses.

1.06 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - ENCLOSED SWITCHES

A. Square D.

B. Siemens.

C. Cutler Hammer.

D. General Electric.

E. Substitutions: Under provisions of Division 01.

2.02 ENCLOSED SWITCHES

A. Nonfusible Switch Assemblies: NEMA KS 1; Heavy Duty type; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

B. Enclosures: NEMA KS 1; Type 1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install enclosed switches where indicated on Drawings, and where required for NEC required disconnect of equipment specified under other divisions, but installed under Division 26.

B. All enclosed switches and enclosed breakers shall have signage for arc hazard installed. The marking shall be located to be clearly visible to qualified personnel before examination, adjustment, servicing or maintenance of the equipment. At a minimum the signage shall state the following:

Warning

Arc Flash and Shock Hazard

Appropriate PPE Required

3.02 FIELD QUALITY CONTROL

A. Field inspecting, testing, adjusting and balancing.

3.03 ADJUSTMENTS

A. The Contractor shall perform necessary field adjustments of the circuit breakers to place the equipment in final operating condition. The settings shall be in accordance with the approved protective device coordination study or as directed by the Engineer.

END OF SECTION

SECTION 26 29 13 - ENCLOSED CONTROLLERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Combination Magnetic Motor Starters.

1.02 RELATED SECTIONS

A. Division 23 – Heating, Ventilating, and Air Conditioning (HVAC).

B. Section 26 05 29 – Hangers and Supports for Electrical Systems.

C. Section 26 05 53 – Identification for Electrical Systems.

1.03 REFERENCES

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 General Requirements.

B. ANSI/NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

C. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.

D. NEMA KS 1 - Enclosed Switches.

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 01.

B. Provide product data on motor starters and combination motor starters, relays, pilot devices, and switching and overcurrent protective devices.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include recommended maintenance procedures and intervals.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - MOTOR STARTERS

A. Square D.

B. Allen Bradley.

C. Siemens.

D. Cutler Hammer.

E. Substitutions: Under provisions of Division 01.

2.02 MAGNETIC MOTOR STARTERS

A. Magnetic Motor Starters: NEMA ICS 2; AC general-purpose Class A magnetic controller for induction motors rated in horsepower.

B. Full Voltage Starting: Non-reversing type.

C. Coil Operating Voltage: 120 or 277 volts, 60 Hertz.

D. Size: NEMA ICS 2; size as required by the load served.

E. Overload Relay: NEMA ICS 2; solid state with auto reset, 3 to 1 adjustment for trip current, phase loss, and unbalance protection.

F. Enclosure: NEMA ICS 6; Type 1 or 3R as indicated on Plans.

G. Combination Motor Starters: Combine motor starters with motor circuit protector disconnect in common enclosure.

H. Auxiliary Contacts: NEMA ICS 2; two field convertible contacts in addition to seal-in contact.

I. Indicating Lights: NEMA ICS 2; RUN: red LED light in front cover.

J. Selector Switches: NEMA ICS 2; HAND/OFF/AUTO, in front cover.

K. Control Power Transformers: 120 volt secondary, VA capacity as required by the load served in each motor starter.

L. Power Monitor: Include a three-phase power monitor in each magnetic starter connected to shut down the motor on loss of any phase, phase reversal, or low voltage on any phase. Power monitor shall automatically reset and restart motor when phase and voltage conditions return to normal. Provide oversize starter enclosures as required to install power monitor.

2.03 CONTROLLER OVERCURRENT PROTECTION AND DISCONNECTING MEANS

A. Motor Circuit Protector: NEMA AB 1; circuit breakers with integral instantaneous magnetic trip in each pole.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install motor control equipment in accordance with manufacturer's instructions.

B. Select and install heater elements in motor starters to match installed motor characteristics.

C. Motor Data: Provide neatly typed label inside each motor starter enclosure door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

D. After final connections are made, check and correct the rotation of all motors.

E. Field adjust the trip settings of all motor starter magnetic trip only circuit breakers to approximately 11 times motor full load current. Determine full load current from motor nameplate following installation.

F. Motor starting equipment shall be listed for use with the motors specified under Division 22, 23.

END OF SECTION

SECTION 26 32 00 - PACKAGED GENERATOR ASSEMBLIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Packaged engine generator system.

B. Genset accessories.

1.02 RELATED SECTIONS

A. Division 23 – HVAC.

B. Section 26 05 00 – Common Work Results for Electrical.

C. Section 26 05 19 – Low Voltage Electrical Power Conductors and Cables.

D. Section 26 05 26 – Grounding and Bonding for Electrical Systems.

E. Section 26 05 29 – Hangers and Supports for Electrical Systems.

F. Section 26 05 33 – Raceway and Boxes for Electrical Systems.

G. Section 26 05 48 – Vibration and Seismic Controls for Electrical Systems.

H. Section 26 05 53 – Identification for Electrical Systems.

1.03 REFERENCES

A. ASCE 7 Chapter 13.

B. ANSI/NEMA AB 1 – Molded Case Circuit Breakers.

C. ANSI/NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. ANSI/NEMA MG 1 - Motors and Generators.

E. ANSI/NFPA 70 - National Electrical Code.

F. ANSI/NFPA 110 – Emergency and Standby Power Systems.

G. ASTM A36 – Specification for Carbon Structural Steel.

H. ASTM A653 – Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

I. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

J. IBC, Chapter 16 – Structural Design.

K. IEEE446 - Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.

L. ISO 8528 – Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets.

M. UL 2200 – Stationary Engine Generator Assemblies.

N. UL 142 - Aboveground Flammable Storage Tanks

1.04 SYSTEM DESCRIPTION

A. Engine generator system to provide source of emergency/standby power for specific loads shown on the Drawings. The engine generator assembly shall be listed in accordance with UL 2200.

B. System Capacity: 100kW, 125 KVA, standby rated at elevation of 1000 feet above sea level, and ambient temperature between 40 and 104º F.

C. Operation: In accordance with ANSI/NFPA 110.

D. The Packaged Generator Assembly, enclosure, all dimensions, and performance data are based on Caterpillar model: C4.4. The CONTRACTOR shall make all necessary modifications required for other manufactures, at no additional cost to the OWNER, if Caterpillar Generation's equipment is not supplied.

E. Due to limited access to the generator room, the Contractor shall be responsible for disassembly and reassembly of the generator system as required for transportation to the site.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 01.

B. Submit shop drawings showing plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, and electrical diagrams including schematic and interconnection diagrams.

C. Submit product data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, vibration isolators, sub-base fuel day tank, remote radiator, and remote annunciator.

D. Provide structurally engineered shop drawings as specified in Section 26 05 48 for seismic restraint of all equipment required by the 2012 IBC, Chapter 16 (1621).

E. Submit manufacturer's installation instructions under provisions of Division 01.

1.06 PROJECT RECORD DOCUMENTS

A. Submit record documents under provisions of Division 01.

B. Accurately record location of packaged generator assembly, and all external mechanical and electrical connections.

C. Submit onsite test records showing the results of the testing per Part 3.3 below.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Division 01.

B. Include instructions for the following:
1. Normal operation.
2. Routine maintenance requirements, including replacement of filters.
3. Starting battery inspection/maintenance.
4. System coolant and other fluid inspection and replacement.
5. Oil sampling and analysis for engine wear.
6. Emergency maintenance procedures.

C. Provide manufacturer's service manuals for all equipment, including but not limited to the following: Engine, generator, radiator, and fuel tank.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in packaged generator assemblies with a minimum of five years of documented experience.

B. Supplier: Authorized distributor of the packaged generator assembly with service facilities in Anchorage, AK. Supplier shall be authorized by the manufacturer to maintain and administer the warranty and employ factory certified mechanics to perform warranty work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Division 01.

B. Store and protect products under provisions of Division 01.

C. Accept packaged engine generator set and accessories on site in crates and verify damage.

D. Protect equipment from dirt and moisture by securely wrapping in heavy plastic.

1.10 WARRANTY

A. Provide five year, 2500 hour warranty under provisions of Division 01. The complete electrical power system (generator sets, enclosure, controls, automatic transfer switches and associated switches and accessories) shall be warranted by the manufacturer against defects in materials and workmanship for a period of five years or 2500 hours, whichever occurs first from the date of beneficial occupancy. Warranty shall include parts, labor, travel

expenses and labor to remove/reinstall equipment. There shall be no deductibles applied to the warranty.

1.11 MAINTENANCE SERVICE

A. Furnish service and maintenance of packaged engine generator system for three years from Date of Substantial Completion. The maintenance service shall include two semi-annual inspections and test run the engine to perform manufacturers recommended preventative maintenance service on the equipment furnished.

1.12 EXTRA MATERIALS

A. Submit maintenance materials under provisions of Division 01.

B. Furnish one set of tools required for preventative maintenance of the engine generator system. Package tools in adequately sized metal tool box.

C. Provide two additional sets of each fuel, oil, and air filter element required for the engine generator system.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Caterpillar (Basis of Design).

B. MTU.

C. Cummins.

D. Substitutions: Under provisions of Division 01.

2.02 ENGINES

A. Type: Water-cooled inline or V-type, four stroke cycle, compression ignition internal combustion engine.

B. Rating: Emergency power rated per ISO 8528 at specified elevation and ambient limits.

C. Fuel System: Appropriate for use of #2 fuel oil.

D. Engine Speed: 1800 rpm.

E. Governor: Isochronous type to maintain engine speed within 0.5 percent, steady state, and 5 percent, no load to full load, with recovery to steady state within 2 seconds following sudden load changes.

F. Safety Devices: Engine shutdown on high water temperature, high lube oil temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer.

G. Engine Starting: Electric DC starting system capable of three complete cranking cycles without overheating. Starters shall have positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Include remote starting control circuit, with MANUAL-OFF-REMOTE selector switch on engine-generator control panel.

H. Engine Jacket Heater: UL listed and labeled thermal circulation type water heater with integral thermostatic control, sized to maintain engine jacket water at 90º F, and suitable for operation on 120 volts AC.

I. Radiator: Remote mounted radiator using 50/50 ethylene glycol coolant, with blower type fan, sized to maintain safe engine temperature in ambient temperature of 104°F and freeze protection to -40°F. Radiator air flow restriction maximum of .5 inches of water. Rotating parts shall be guarded against accidental contact.

J. Engine Accessories:
1. Oil Pump: Positive displacement, mechanical, full pressure, lubrication oil pump.
2. Fuel Pump: An engine driven, mechanical, positive displacement fuel pump. Include fuel priming pump.
3. Fuel filter with a replaceable spin-on canister element. Provide Racor or approved equal pre-filter, with water shutdown sensor tied to control panel.
4. Replaceable dry element air cleaner with restriction indicator.
5. Water pump.
6. Lube oil cooler.
7. Lube Oil Drain: Extend the lube oil drain to the outside of the generator skid using Areoequip fittings. Install a Nibco T - 113 shut off valve on the hose at an accessible location of the unit and cap the end of the hose with a ¾" NPT cap.

K. Mounting: Provide structural steel base for mounting the genset. Include vibration isolators between the genset and skid base per the manufacturer's IBC Seismic Certified package requirements.

2.03 GENERATORS

A. Generator: ANSI/NEMA MG 1; three phase, four pole, reconnectable brushless synchronous generator with brushless PMG excitation.

B. Rating: 100kW, 125 kVA, at 0.8 power factor, 480Y/277 volts, 60Hz at 1800 rpm.

C. Insulation and Temperature Rise: ANSI/NEMA MG 1, Class F, 130º C, standby.

D. Enclosure: ANSI/NEMA MG 1; open drip proof.

E. Voltage Regulation: Include generator-mounted volts per Hertz exciter-regulator to match engine and generator characteristics, with voltage regulation +/- one percent from no load to full load. Include manual controls to adjust voltage drop +/- 5 percent voltage level, and voltage gain.

F. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady state operating band within 5 seconds. On application of a 100% load step, the generator set shall recover to stable voltage within 10 seconds.

G. Frequency Regulation: Isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.

H. Transient Frequency Performance: Not more than 15 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within 5 seconds. On application of 100% load step, the generator set shall recover to stable frequency within 10 seconds..

I. Output Waveform: The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic. Telephone influence factor shall not exceed 50 in accordance with NEMA MG 1.

J. Sustained Short-Circuit Current: For a 3-phase bolted short circuit at system output terminals, the generator set shall supply a minimum of 300 percent of rated full-load current for not less than 8 seconds without damage to the generator system components. For a single-phase bolted short circuit at system output terminals, the system shall regulate both voltage and current to prevent over-voltage conditions on the non-faulted phases.

K. Start Time: Comply with NFPA 110, Level 1, Type 10 system requirements.

L. Generator Leads: The generator leads shall be brought out and terminated on a unit-mounted generator circuit breaker. The generator leads shall have sufficient length to allow for any connection configuration.

2.04 ACCESSORIES

A. Remote-Mounted Radiator:
1. General: Construct as an integral unit, rolled venturi fan ring, supporting structure, legs and cross bracing, fans and fan drives. All steel structure. Siding and decking shall be sheet steel of not less than 14-gage thickness.
2. Mechanical bond core. Replaceable core shall be vertical for horizontal air discharge with continuous copper plate fins, solder-bonded to flat brass tubes. Manifold tanks shall be removable to allow access to tube ends for inspection and cleaning. Thermal expansion and contraction differential between non-ferrous core and steel frame supports shall be compensated for. Core shall be pitched and have suitable connections to allow complete drainage. No radiator cap. Provide high point air vent tapping.
3. Fans: Aluminum airfoil fan on fixed center bearing. Airflow across the cooling coils shall be uniform. Noise level shall not exceed 74 dB at 25 feet. Industrial guards for belts, fan, core per OSHA requirements.
4. Connections: Flange connections to radiators.
5. Motors: Direct drive fan motor.
6. Provide "premium efficiency" motors.
7. Finish: Single coat of gray, semi-gloss enamel paint suitable for outdoor duty.
8. See Mechanical Sheet M001 for basis of design.

B. Heat Exchanger: Engine or base-mounted heat exchanger and expansion tank of type and capacity recommended by engine manufacturer, See Mechanical Sheet M001 for basis of design. Include solenoid shut-off valve for installation on the cooling water inlet.

C. Remote Charge Air Cooler: Engine or base-mounted air cooler and expansion tank of type and capacity recommended by engine manufacturer, See Mechanical Sheet M001 for basis of design. Include solenoid shut-off valve for installation on the cooling water inlet.

D. Supplemental Expansion Tanks: Provide supplemental expansion tanks for of type and capacity recommended by engine manufacturer, See Mechanical Sheet M001 for basis of design.

E. Day Tank: Reuse existing. Extend and reconnect.

F. Exhaust Silencers: Nelson Special “400” or approved supercritical type silencer, with a minimum overall attenuation level of 40 dB(A) and a maximum exhaust pressure drop not to exceed the engine manufacturer’s recommendations at the rated engine exhaust gas flow rate and temperature. Provide with ANSI 150# companion flanges and flexible stainless steel exhaust fitting, suitable for horizontal orientation with side entry and end exit, sized in accordance with engine manufacturer's instructions. Dual exhaust engines shall be provided with one silencer similar to the above combining the two exhaust outlets into a single outlet

G. Batteries: Heavy duty, diesel starting type lead-acid storage batteries, sized as recommended by the engine/generator set manufacturer for starting the set at 0°F ambient. Match battery voltage to starting system. Include necessary cables and clamps.

H. Battery Trays: Non-metallic battery boxes with covers and hold-downs, treated for electrolyte resistance and constructed to contain spillage of electrolyte. Provide with seismic restraints to secure batteries during earthquakes. The battery housing shall be mounted outside the engine/generator skid base

I. Battery Chargers: Dual-rate, 12-Amp, current limiting type designed to float at 2.17 volts per cell and equalize at 2.33 volts per cell. Provide overload protection, full wave rectifier, DC voltmeter and ammeter, and 120 volts AC fused input. Provide wall-mounted enclosure to meet ANSI/NEMA 250, Type 1 requirements. Operational monitors shall provide visual output along with individual form C contacts rated at 4 amp, 120 VAC, 30 VDC for remote indication of:
1. Loss of AC power: Red light.
2. Low battery voltage: Red light.
3. High battery voltage: Red light.
4. Power on: Green light, no relay contact.

J. Line Circuit Breaker: NEMA AB 1 molded case circuit breaker on generator output with integral thermal and instantaneous magnetic trip in each pole; sized in accordance with ANSI/NFPA 70. Include battery-voltage operated shunt trip, connection to open circuit breaker on engine failure. Mount unit in enclosure to meet ANSI/NEMA 250, Type 1 requirements.

K. Engine-Generator Control Panel: NEMA 250, Type 1 generator-mounted control panel enclosure with UL508 listed and labeled microprocessor based control, designed to provide automatic starting, monitoring and control functions. Include provision for padlock and provide the following equipment and features:
1. Digital Frequency Meter: 45-65 Hz range, LED display.
2. AC Output Digital Voltmeter: LED display, 2 percent accuracy, with phase selector switch.
3. AC Output Digital Ammeter: LED display, 2 percent accuracy, with phase selector switch.
4. AC Output Digital Kilowatt Meter: LED display, 2% accuracy.

5. Output Voltage Adjustment: Via touchpad on control panel.
6. Push-to-test indicator lamps, one each for low oil pressure shutdown, high water temperature shutdown, high oil temperature shutdown overspeed shutdown, overcrank shutdown, low water shutdown, low oil pressure pre-alarm and high water temperature pre-alarm, battery charger malfunction, low water temperature, and low fuel level.
7. Engine manual-off-remote selector switch.
8. Engine running time meter.
9. Oil pressure gauge.
10. Water temperature gauge.
11. Fuel pressure gauge.
12. Auxiliary Relay: 3PDT, operates when engine runs, with contact terminals prewired to terminal strip.
13. Remote Alarm Contacts: Pre-wire SPDT contacts to terminal strip for remote alarm functions.
14. Leak detection monitoring.
15. Overcrank protection with manual reset.
16. Trouble horn with silencing switch, red indicating light and reset switch.
17. Auxiliary Relay for Building Automation System Monitoring: Provide dry contact relays for monitoring of Generator Status and General Alarm by BAS. Coordination with Specification Section 23 09 23.

L. Low battery voltage lamp shall also be lighted for low cranking voltage or weak battery alarm.

M. Heaters: Provide manufacturer's recommended heaters with thermostatic controls to keep engine oil pan, engine block, generator controls, and generator windings within manufacturer's recommended temperature at 30^{o}F. Provide immersion type coolant heater in remote radiator to keep radiator within manufacturer's recommended temperature at -20^{o}F.

N. Mounting: The complete engine/generator package shall be mounted on a common, self-supporting, low profile, structural steel skid base with rubber in shear vibration isolators between the engine and base and spring type vibration isolators with seismic snubbers between the base and the module. The base shall extend from the rear end of the generator to the most forward point of the engine and shall be predrilled to accept a #2 AWG - 250 kCMIL copper grounding conductor.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work and field dimensions are as shown on Drawings.

B. Verify that required utilities are available in proper location and ready for use.

C. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Ground and bond generator and other electrical system components in accordance with NEC requirements.

3.03 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 01.

B. Generator system on-site testing shall be performed in accordance with NFPA 110 requirements for Level 2 Systems, namely Part 7.13. Coordinate scheduling of testing with Owner and Authority Having Jurisdiction a minimum of seven (7) days prior to testing.

C. Perform an initial 1.5 hour minimum on-site acceptance test utilizing all loads that are served by the EPSS, per NFPA 110 7.13.4.1. Simulate power failure by opening the normal source to all transfer switches. Observe, verify and record the following:
1. Time delay on start up.
2. Cranking time until the prime mover starts and runs.
3. Time to reach operating speed.
4. Verify engine start function by verifying operation of the initiating circuit on all transfer switches supplying EPSS loads.
5. Time to achieve a steady-state generator condition after all transfer switches have transferred to the emergency position.
6. Record real power, apparent power, voltage, frequency, amperage, oil pressure, and coolant temperature at 15 minute intervals throughout the test.
7. Time delay on retransfer to normal power for all transfer switches.
8. Time delay on generator cooldown and shutdown.

D. Upon completion of the initial acceptance test, allow the generator to cool for a minimum of 5 minutes before beginning the full load test below.

E. Provide a two (2) hour full-load test utilizing the integrated load bank, as applicable, and a portable load bank. Building loads may be utilized during this full load test if approved by the Owner prior to testing. Simulate power failure including operation of each transfer switch. Full-load testing shall be done as follows:
1. 30 minutes at 50% rated load.
2. 30 minutes at 75% rated load.
3. 1 hour at 100% rated load.
4. Record real power, apparent power, voltage, frequency, amperage, oil pressure, and coolant temperature at 15 minute intervals throughout the test.

F. Upon completion of the full-load test, test alarm and shutdown circuits by simulating conditions. Demonstrate all automatic features as directed by the Owner's Representative.

3.04 MANUFACTURER'S FIELD SERVICES

A. Prepare, start, test, and adjust systems under provisions of Division 01.

3.05 ADJUSTING

A. Adjust work under provisions of Division 01.

B. Adjust generator output voltage and engine speed.

3.06 CLEANING

A. Clean work under provisions of Division 01.

B. Clean engine and generator surfaces. Replace oil and fuel filters.

3.07 DEMONSTRATION

A. Provide systems demonstration under provisions of Division 01.

B. Describe loads connected to standby system and restrictions for future load additions.

C. Simulate power outage by interrupting normal source, and demonstrate that system operates to provide standby power.

END OF SECTION

SECTION 26 36 23 – AUTOMATIC TRANSFER SWITCHES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Complete factory assembled Automatic Transfer Switch (ATS).

1.02 RELATED SECTIONS

A. Section 26 05 53 - Identification for Electrical Systems: Engraved Nameplates.

B. Section 26 32 00 – Packaged Generator Assemblies.

1.03 REFERENCES

A. The Work under this section is subject to requirements of the Contract Documents including the General Conditions, Supplementary Conditions, and sections under Division 01 - General Requirements and Section 26 05 00 – Common Work Results for Electrical.

B. NFPA 70 - National Electrical Code.

C. NFPA 110 – Emergency and Standby Power Systems.

D. NEMA ICS 1 - General Standards for Industrial Control and Systems.

E. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers, and Assemblies.

F. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

G. NEMA ICS 10-2005 - AC Transfer Switch Equipment.

H. NEMA 250 (National Electrical Manufacturers Association) - Enclosures for Electrical Equipment (1000 Volts Maximum).

I. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.

J. IEC 947-6-1 Low-voltage Switchgear and Control gear; Multifunction equipment; Transfer Switching Equipment.

K. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

L. UL 508 - Industrial Control Equipment.

M. UL1008 - Standard for Transfer Switch Equipment.

1.04 SUBMITTALS

A. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching devices, operating logic, short circuit ratings, dimensions, enclosure details and all option provided.

B. Factory Test Report: Provide copy of factory operational test on the transfer switch prior to shipping from the factory. A certified test report shall be included in the packing list with the transfer switch. The test process shall include calibration of voltage sensors.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Drawings: Indicate actual locations and mounting heights of transfer switches on the project record drawings. Submit under Section 26 05 00.

B. O&M Manuals:
1. Provide project adjusted shop drawings indicating the final wiring and terminations with the O&M manuals.
2. Provide printout or spreadsheet indicating final settings and adjusted values of the transfer switch.
3. Include instructions for operating equipment. Include instructions for operating equipment under emergency conditions when engine generator is running.
4. Include routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience. Manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation and service in accordance with ISO 9001.

B. Supplier: Authorized distributor of specified manufacturer with minimum three years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Conform to requirements of NFPA 110 for a Level 2 system.

C. Furnish products listed and classified by UL as suitable for purpose specified and indicated.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to internal components, enclosure and finish.

1.09 FIELD MEASUREMENTS

A. Verify that field measurements are as instructed by manufacturer.

1.10 MAINTENANCE SERVICE

A. Furnish service and maintenance of transfer switch for one year from Date of Substantial Completion.

1.11 WARRANTY

A. Provide three-year manufacturer warranty of all components, parts, and assemblies against defects in materials and workmanship, with no deductible for all components.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. ASCO.

B. Cummins/Onan.

C. Caterpillar.

D. Substitutions: Under provisions of Division 01.

2.02 AUTOMATIC TRANSFER SWITCH

A. Description: NEMA ICS 2, UL 1008 listed automatic transfer switch.

B. Configuration: Double throw, electrically operated, electrically and mechanically interlocked and mechanically held transfer switch. The transfer switch shall be specifically designed so that it cannot stop in a neutral position.

C. Open Transition type.

2.03 SERVICE CONDITIONS

A. Service Conditions: NEMA ICS 1.

B. Operating Temperature: 40ºF to plus 140°F.

C. Altitude: 1,000 feet.

2.04 RATINGS

A. Furnish and install Automatic Transfer Switches with voltage, amperage, and number of switched poles as shown on project one-line drawing.

B. Load Inrush Rating: Combination load.

C. Continuous Rating: As noted on the Drawings.

D. Interrupting Capacity: 250 percent of continuous rating.

E. Withstand Current Rating: The switch shall be rated to withstand 22,000 RMS Symmetrical Amps. Transfer switch withstand ratings shall be applicable for ANY manufacturer's breakers. Withstand ratings utilizing specific manufacturer's breakers will only be accepted if coordinated in advance by the Contractor to ensure the existing/new breaker upstream of the transfer switch complies with the "specific breaker" listing.

2.05 PRODUCT OPTIONS AND FEATURES

A. ATS Controls: Microprocessor controls with digital display for status information.

B. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.

C. Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s) to allow the control system to be disconnected and service without disconnecting power from the transfer switch mechanism.

D. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

E. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch or the number and size of conductors shown on the drawings, whichever is larger.

F. Operator Panel: Provide with a control panel to allow the operator to view the status and control the operation of the transfer switch. The operator panel shall be a sealed membrane panel rated NEMA 3R that is permanently labeled for switch and control functions. The operator panel shall be provided with the following features and capabilities:
   1. High intensity LED lamps or control panel display to indicate the source that the load is connected to and which sources are available.
   2. High intensity LED lamps or control panel display to indicate that the transfer switch in "Not in Auto" and "Test/Exercise Active" to indicate that the control system is testing or exercising the generator set.
   3. "OVERIDE" from user interface to cause the transfer switch to bypass any active time delays for start, transfer, and retransfer and immediately proceed with its next logical operation.
   4. "TEST" from user interface to initiate a preprogrammed test sequence for the generator set and transfer switch. The transfer switch shall be programmable for test with load or test without load.

5. Security key switch or controller password protection to allow the user to inhibit adjustments, manual operation or testing of the transfer switch unless the key is in place and operated.
6. Analog or digital AC meter display panel to display 3-phase AC Amps, 3-phase AC Volts, Hz, kW/kVA load level, and load power factor. Line to line, line to neutral, average, minimum, and maximum values shall be available via the control panel display and the Modbus registers.
7. Alphanumeric display panel with pushbutton navigation switches. The display shall be clearly visible in both bright (sunlight) and no light conditions. It shall be visible over an angle of at least 120 degrees. The alphanumeric display panel shall be capable of providing the following functions and capabilities:
    a. Display source condition information, including AC voltage for each phase of normal and emergency source, frequency of each source. Voltage for all three phases shall be displayed on a single screen.
    b. Display source status to indicate source is connected or not connected.
    c. Display load data including 3-phase AC voltage, 3-phase AC current, frequency, kW, kVA, and power factor. Voltage and current data for all phases shall be displayed on a single screen.
    d. The display panel shall allow the operator to view and make the following adjustments in the control system after entering an access code:
        1) Set nominal voltage and frequency for the transfer switch.
        2) Adjust voltage and frequency sensor operation set points.
        3) Set up time clock functions.
        4) Set up load sequence functions.
        5) Enable or disable control functions in the transfer switch, including program transition.
        6) Set up exercise and load test operation conditions, normal system time delays for transfer time, time delay for start, stop transfer and retransfer.
    e. Display real time clock data, including date, and time in hours, minutes and seconds. The real time clock shall incorporate provisions for automatic daylight savings time and leap year adjustments. The control shall also log total operating hours for the control system.
    f. Display service history for the transfer switch. Display source connected hours to indicate the total number of hours connected to each source. Display number of times transferred and total number of times each source has failed.

G. Provide RMS voltage sensing and metering that is accurate to within plus or minimum 1% of nominal voltage level. Frequency sensing shall be accurate to within plus or minus 0.2%. Voltage sensing shall be monitored based on the normal voltage at the site.

H. Transfer switch voltage sensors shall be close differential type providing source availability information to the control system based on the following functions:
1. Monitoring all phases of the normal source for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage leave and dropout in a range of 75 to 98% of normal voltage level).
2. Monitoring all phases of the standby source for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage leave and dropout in a range of 75 to 98% of pickup voltage level).
3. Monitoring all phases of the normal and standby sources for voltage imbalance.
4. Monitoring all phases of the normal and standby sources for loss of a single phase.
5. Monitoring all phases of the normal and standby sources for phase rotation.
6. Monitoring all phases of the normal and standby sources for over voltage conditions (adjustable for dropout over a range of 105 to 135% or normal voltage and pickup at 95 – 99% of dropout voltage level).

7. Monitoring of all phases of the normal and standby sources for over or under frequency conditions.

I. Communications Module: Provide remote interface module to support monitoring of vendor's transfer switch, controller and optional power meter. Module shall provide status, analog parameters, event logs, equipment settings & configurations over embedded webpage and open protocol. Module shall allow for the initiating of transfers, retransfers, bypassing of active timers and the activating/deactivating of engine start signal shall be available over the embedded webpage and to the transfer switch vendor's monitoring equipment. The transfer switch shall incorporate adjustable time delays for generator set start (adjustable in a range from 0 – 6 seconds, set at 5 seconds); transfer (adjustable in a range from 0 – 120 seconds, set at 2 seconds); retransfer (adjustable in a range from 0 – 30 minutes, set at 5 minutes); and generator stop (cool down) (adjustable in a range of 0 – 30 minutes, set at 5 minutes).

J. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs to provide optimum protection form line voltage surges, RFI and EMI.

K. The transfer switch shall provide an isolated relay contact for starting of the generator set. The relay shall be normally held open, and close to start the generator set. Output contacts shall be form C.

L. Provide one set of Form C auxiliary contacts on both sides operated by transfer switch position, rated 10 Amps, 250 VAC.

M. Generator set exercise (test) with load mode: The control system shall be configurable to test the generator set under load. In this mode the transfer switch shall control the generator set in the following sequence:
1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program or when manually initiated by the operator.
2. When the control system senses the generator set at rated voltage and frequency it shall operate to connect the load to the generator set.
3. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period the transfer switch shall automatically reconnect the load to the normal source.
4. At the completion of the exercise period the transfer switch shall operate to connect the load to the normal source.
5. The transfer switch shall operate the generator set unloaded for the programmed cool down period and then remove the start signal from the generator set. If the normal source fails at any time when the generator set is running the transfer switch shall immediately connect the load to the generator set.

N. Elevator Pre-Transfer Delay Relay: Provide relay and NO/NC contact outputs to delay transfer or retransfer for a specified time to give warning to an elevator controller that a transfer or retransfer is about to occur. This time delay shall be adjustable over a range of 0 to 60 seconds, set to 20 seconds or as recommended by elevator manufacturer.

2.06 ENCLOSURE

A. Enclosure shall be ICS 10 and UL listed NEMA 1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA 70. The cabinet door shall include permanently mounted key type latches.

B. Enclosure shall be configured to require front access only for maintenance.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surface is suitable for transfer switch installation.

3.02 INSTALLATION

A. Install transfer switches in accordance with manufacturer's instructions.

B. Provide engraved plastic nameplates under the provisions of Section 26 05 53.

C. Provide start-up control signal wiring between transfer switch and standby diesel generator system to start generator upon local loss of power.

D. All transfer switches shall have signage for arc hazard installed. The marking shall be located to be clearly visible to qualified personnel before examination, adjustment, servicing or maintenance of the equipment. At a minimum the signage shall state the following:

Warning

Arc Flash and Shock Hazard

Appropriate PPE Required

3.03 MANUFACTURER'S SERVICES

A. The transfer switch manufacturer shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be included in the packing list with the transfer switch. The test process shall include calibration of voltage sensors.

3.04 DEMONSTRATION

A. Visual and Mechanical Inspection:
   1. Compare equipment nameplate data with drawings and specifications.
   2. Inspect physical and mechanical condition.
   3. Verify manual transfer warnings are attached and visible.
   4. Verify tightness of control connections.
   5. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data.
   6. Perform manual transfer operation.
   7. Verify positive mechanical interlocking between normal and alternative sources.
   8. Inspect anchorage, alignment, grounding and required clearances.

B. Electrical Tests:
   1. Measure contact-resistance.

2. Verify settings and operation of control devices.
3. Calibrate and set relays and timers in accordance with manufacturer's published data.
4. Verify phase rotation, phasing and synchronized operation as required by the application.
5. Perform automatic transfer tests:
   a. Simulate loss of normal power.
   b. Return to normal power.
   c. Simulate loss of emergency power.
   d. Simulate all forms of single-phase conditions.
6. Verify correct operation and timing of following functions:
   a. Normal source voltage-sensing relays.
   b. Engine start sequence.
   c. Time delay upon transfer.
   d. Alternate source voltage-sensing relays.
   e. Automatic transfer operation.
   f. Interlocks and limit switch function.
   g. Time delay and retransfer upon normal power restoration.
   h. Engine cool down and shutdown feature.

END OF SECTION