

Project Manual For:

**Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
Project No. 19041**



**ALASKA ENERGY
AUTHORITY**

**State of Alaska
Alaska Energy Authority
813 W Northern Lights Blvd, Anchorage, Alaska 99503**

Advertising Date: February 1, 2019

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DIVISION 00 – Bidding and Contract Requirements (yellow)

<u>Section No.</u>	<u>Form</u>	<u>Date</u>
<u>Invitation</u> (yellow)		
00 02 00 INVITATION TO BID	25D-7	(8/01)
<u>Bid Notices</u> (yellow)		
00 10 00 INFORMATION TO BIDDERS	25D-3	(7/88)
00 10 10 SUPPLEMENTARY INFORMATION TO BIDDERS		(12/88)
00 12 00 REQUIRED DOCUMENTS	25D-4	(4/12)
<u>Forms</u> (yellow)		
00 12 90 FEDERAL EEO BID CONDITIONS	25A-301	(12/14)
00 14 40 EEO-1 CERTIFICATION	25A-304	(8/01)
00 31 00 PROPOSAL	25D-9A	(07/03)
00 32 00 BID SCHEDULE		
00 41 00 BID BOND	25D-14	(8/01)
00 42 00 BID MODIFICATION	25D-16	(8/01)
00 43 00 SUBCONTRACTOR LIST	25D-5	(10/12)
00 51 00 CONSTRUCTION CONTRACT	25D-10A	(8/01)
00 61 00 PERFORMANCE BOND	25D-13	(8/01)
00 62 00 PAYMENT BOND	25D-12	(8/01)
00 67 00 CONTRACTOR'S QUESTIONNAIRE	25D-8	(8/01)
<u>Contract Provisions and Specifications</u> (white)		
00 70 00 GENERAL CONDITIONS		
00 80 00 SUPPLEMENTARY CONDITIONS		
00 83 00 STATE LABORERS' AND MECHANICS' MINIMUM RATES OF PAY		
	State wage rates can be obtained at http://www.labor.state.ak.us/lss/pamp600.htm . Use the State wage rates that are in effect 10 days before Bid Opening. The AUTHORITY will include a paper copy of the State wage rates in the signed Contract.	
00 83 50 FEDERAL WAGE RATES		
	Federal wage rates can be obtained at http://www.wdol.gov/dba.aspx#0 for the State of Alaska. Use the federal wage rates that are in effect 10 days before bid opening. The AUTHORITY will include a paper copy of the State wage rates in the signed Contract.	
00 90 00 FEDERAL TERMS AND CONDITIONS		

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ALASKA ENERGY AUTHORITY

INVITATION TO BID

for Construction Contract

Date February 1, 2019

**Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041**

Location of Project: Anchorage, Alaska

Contracting Officer: Jake Tibbe

Issuing Office: ALASKA ENERGY AUTHORITY (AUTHORITY)

State Funded []

Federal Aid [x]

Description of Work: This Denali Commission funded contract is for the assembly of power plant modules, as described in 'Section 01 11 13 Summary of Work'.

The Engineer's Estimate is between **\$1,500,000 - \$2,500,000**

All work shall be substantially completed by: **August 1, 2019**

Interim Completion dates, if applicable, will be shown in the General Requirements.

Bidders are invited to submit sealed bids, in single copy, for furnishing all labor, equipment, and materials and for performing all work for the project described above. Bids will be opened publicly at 2:00 pm local time, in the Willow conference room, 813 West Northern Lights Blvd., Anchorage, Alaska on February 22, 2019.

SUBMISSION OF BIDS

ALL BIDS INCLUDING ANY AMENDMENTS OR WITHDRAWALS MUST BE RECEIVED PRIOR TO BID OPENING. BIDS SHALL BE SUBMITTED ON THE FORMS FURNISHED AND MUST BE IN A SEALED ENVELOPE MARKED AS FOLLOWS:

Bid for Project: Clarks Point and Port Heiden RPSU Projects Modular Power Plant Assembly Project Number: 19041	ATTN: Procurement (Jake Tibbe) Alaska Energy Authority 813 West Northern Lights Blvd. Anchorage, AK 99503
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Bids, amendments or withdrawals transmitted by mail must be received in the above specified post office box no later than 7 hours prior to the scheduled time of bid opening. Hand-delivered bids, amendments or withdrawals must be received by the **Front Desk of the Alaska Energy Authority**, prior to the scheduled time of bid opening. Emailed bid amendments must be addressed to **Jake Tibbe**, Email: jtibbe@aidea.org

A bid guaranty is required with each bid in the amount of 5% of the amount bid. (Alternate bid items as well as supplemental bid items appearing on the bid schedule shall be included as part of the total amount bid when determining the amount of bid guaranty required for the project.)

The Authority hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this Invitation, Disadvantaged Business Enterprises (DBEs) will be afforded full opportunity to submit bids and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

NOTICE TO BIDDERS

Bidders are hereby notified that data to assist in preparing bids is available as follows:

See attached Special Notice to Bidders for this project.

Electronic Plans and Specifications may be ordered, for the price of \$0.00 from:

Alaska Energy Authority
813 West Northern Lights Blvd.
Anchorage, AK 99503

Phone: (907) 771-3990

All questions relating to design features, constructability, quantities, or other technical aspects of the project should be directed to the following. Bidders requesting assistance in viewing the project must make arrangements at least 48 hours in advance with:

Alan Fetters, Project Manager Phone: (907) 771- 3063

Fax: (907) 771-3044

³ All questions concerning bidding procedures should be directed to:

Jake Tibbe
Contracting Officer
813 West Northern Lights Blvd.
Anchorage, AK 99503

Phone: (907) 771-3990 Email: jtibbe@AIDEA.Org

The Bid Calendar, Planholder lists, and Bid Results information are available on the Internet at: www.aidea.org under Procurement Opportunities.

Reminder: 3 AAC 109.220 requires all Bidders to have a valid Alaska Business License and an Alaska Contractor's Certificate of Registration prior to award. To qualify as an Alaska bidder under 3 AAC 109.220, a bidder shall have a valid Alaska business license at time designated in the invitation to bid for bid opening.

ALASKA ENERGY AUTHORITY
INFORMATION TO BIDDERS

The Authority is concerned over the manner in which bids are submitted. Bidders are requested to study and follow the bid assembly instructions as to the method and form for submitting bids so there will be no reason to reject a bid.

EXAMINATION OF CONTRACT REQUIREMENTS

Bidders are expected to examine carefully the plans, specifications and all other documents incorporated in the contract to determine the requirements thereof before preparing bids.

Any explanation desired by bidders regarding the meaning or interpretation of drawings and specifications must be requested in writing and with sufficient time allowed for a reply to reach them before the submission of their bids. Oral explanations or instructions given before the award of the contract will not be binding. Any interpretation made will be in the form of an addendum to the specifications or drawings and will be furnished to all bidders and its receipt by the bidder shall be acknowledged.

CONDITIONS AT SITE OF WORK

Bidders are expected to visit the site to ascertain pertinent local conditions such as the location, accessibility and character of the site, labor conditions, the character and extent of the existing work within or adjacent thereto, and any other work being performed thereon.

PREPARATION OF BIDS

- (a) Bids shall be submitted on the forms furnished, and must be manually signed in ink. The person signing the proposal must initial any erasures or changes made to the bid.
- (b) The bid schedule will provide for quotation of a price or prices for one or more pay items which may include unit price or lump sum items and alternative, optional or supplemental price schedules or a combination thereof which will result in a total bid amount for the proposed construction.

Where required on the bid form, bidders must quote on all items and **THEY ARE WARNED** that failure to do so will disqualify them. When quotations on all items are not required, bidders should insert the words "no bid" in the space provided for any item not requiring a quotation and for which no quotation is made.
- (c) The bidder shall specify the price or prices bid in figures. On unit price contracts the bidder shall also show the products of the respective unit prices and quantities written in figures in the column provided for the purpose and the total amount of the proposal obtained by adding the amounts of the several items. All the figures shall be in ink or typed.
- (d) Neither conditional nor alternative bids will be considered unless called for.
- (e) Unless specifically called for, telegraphic or telefacsimile bids will not be considered.
- (f) Bid Schedule form should be enclosed in a separate sealed envelope and enclosed with all other bidding forms required at the opening.

BID SECURITY

All bids shall be accompanied by a bid security in the form of an acceptable Bid Bond (Form 25D-14), or a certified check, cashier's check or money order made payable to the Alaska Energy Authority. The amount of the bid security is specified on the Invitation To Bid.

Bid Bonds must be accompanied by a legible Power of Attorney.

If the bidder fails to furnish an acceptable bid security with the bid, the bid shall be rejected as non-responsive. Telegraphic notification of execution of Bid Bond does not meet the requirements of bid security accompanying the bid. An individual surety will not be accepted as a bid security.

The Authority will hold the bid securities of the two lowest bidders until the Contract has been executed, after which they will be returned. All other bid securities will be returned as soon as practicable.

BIDDERS QUALIFICATIONS

Before a bid is considered for award, the bidder may be requested by the Authority to submit a statement of facts, in detail, as to his previous experience in performing comparable work, his business and technical organization, financial resources, and plant available to be used in performing the contemplated work.

SUBMISSION OF BIDS

Bids must be submitted as directed on the Invitation To Bid. Do not include in the envelope any bids for other work.

ADDENDA REQUIREMENTS

The bid documents provide for acknowledgement individually of all addenda to the drawings and/or specifications on the signature page of the Proposal. All addenda shall be acknowledged on the Proposal or by telegram prior to the scheduled time of bid opening. If the bidder received no addenda, the word "None" should be shown as specified.

Every effort will be made by the Authority to insure that Contractors receive all addenda when issued. Addenda will be issued to the individual or company to whom bidding documents were issued. Addenda may be issued by any reasonable method such as hand delivery, mail, telefacsimile, telegraph, courier, and in special circumstances by phone. Addenda will be issued to the address, telefacsimile number or phone number as stated on the planholder's list unless picked up in person or included with the bid documents. It is the bidder's responsibility to insure that he has received all addenda affecting the Invitation To Bid. No claim or protest will be allowed based on the bidder's allegation that he did not receive all of the addenda for an Invitation To Bid.

All questions must be received 72 hours before the bid opening. Questions submitted after the deadline may be rejected by the Authority.

WITHDRAWAL OR REVISION OF BIDS

A bidder may withdraw or revise a bid after it has been deposited with the Authority, provided that the request for such withdrawal or revision is received by the designated office, in writing, by telegram, or by telefacsimile, before the time set for opening of bids.

Emailed or telefacsimile modifications shall include both the modification of the unit bid price and the total modification of each item modified, but shall not reveal the amount of the total original or revised bids. Form 25D-16 shall be used to submit such modifications.

RECEIPT AND OPENING OF BIDS

- (a) The Authority must receive all bids, including any amendment or withdrawal prior to the scheduled time of bid opening. Any bid, amendment, or withdrawal that has not actually been received by the Authority prior to the time of the scheduled bid opening will not be considered.
- (b) No responsibility will be attached to any officer or employee of the Authority for the premature opening of, or failure to open, a bid improperly addressed or identified.
- (c) The Authority reserves the right to waive any technicality in bids received when such waiver is in the interest of the State.

BIDDERS PRESENT

At the time fixed for bid opening, bids will be publicly opened and read for the information of bidders and others properly interested, who may be present either in person or by representative. The amount of the bid and the name of the bidder shall be compiled and distributed as soon as possible after bid opening. Bids are not open for public inspection until after the Notice of Intent to Award is issued.

BIDDERS INTERESTED IN MORE THAN ONE BID

If more than one bid is offered by any one party, by or in the name of his or their clerk or partner, all such bids will be rejected. A party who has quoted prices to a bidder is not thereby disqualified from quoting prices to other bidders or from submitting a bid directly for the work.

REJECTION OF BIDS

The Authority reserves the right to reject any and all bids when such rejection is in the best interest of the State; to reject the bid of a bidder who has previously failed to perform properly, or complete on time, contracts of a similar nature; to reject the bid of a bidder who is not, in the opinion of the Contracting Officer, in a position to perform the contract; and to reject a bid as non-responsive where the bidder fails to furnish the required documents, fails to complete required documents in the manner directed, or makes unauthorized alterations to the bid documents.

AWARD OF CONTRACT

- (a) The letter of award, if the contract is to be awarded, will be issued to the lowest responsible and responsive bidder as soon as practical and usually within 40 calendar days after opening of proposals.
- (b) The successful bidder will be notified of the Authority's intent to award the contract and requested to execute certain documents, including the contract form and bonds.
- (c) The contract will be awarded to the successful bidder following receipt by the Authority of all required documents, properly executed, within the time specified in the intent to award. Failure to enter into a contract within the specified time shall be grounds for forfeiture of the bid security and consideration of the second low bidder for award.

ALASKA ENERGY AUTHORITY

SUPPLEMENTARY INFORMATION TO BIDDERS

This document modifies or adds to the provisions of Alaska Energy Authority's form 25D-3, INFORMATION TO BIDDERS.

Following subject area "REJECTION OF BIDS", add the following subject area:

"CONSIDERATION OF PROPOSALS

After the Proposals are opened and read, they will be compared on the basis identified on the bid schedule and the apparent low Bidder announced. The apparent low Bidder shall, within 5 working days following identification as the apparent low Bidder, submit a list of all firms with which the prime CONTRACTOR intends to execute subcontracts for the performance of the Contract. The list shall include the name, business address, Alaska business license number and contractor's registration number of each proposed Subcontractor.

Upon confirmation of the contents of the proposal the low Bidder will be identified by the AUTHORITY in writing. If the low Bidder differs from the apparent low Bidder then the requirements for Subcontractor listing, as noted above, shall become effective upon the low Bidder at the time of identification.

If a Bidder fails to list a Subcontractor or lists more than one Subcontractor for the same portion of Work and the value of that Work is in excess of one-half of one percent of the total bid, the Bidder agrees that it shall be considered to have agreed to perform that portion of Work without the use of a Subcontractor and to have represented that the Bidder is qualified to perform the Work.

A Bidder who attempts to circumvent the requirements of this section by listing as a Subcontractor another contractor who, in turn, sublets the majority of the Work required under the Contract, violates this section.

If a Contract is awarded to a Bidder who violates this section, the Bidder agrees that the Contracting Officer may:

- (1) cancel the Contract without any damages accruing to the State; or
- (2) after notice and a hearing, assess a penalty on the Bidder in an amount that does not exceed 10 percent of the value of the Subcontract at issue.

A Bidder may replace a listed Subcontractor who:

- (1) fails to comply with AS 08.18;
- (2) files for bankruptcy or becomes insolvent;
- (3) fails to execute a contract with the Bidder involving performance of the Work for which the Subcontractor was listed and the Bidder acted in good faith;
- (4) fails to obtain bonding;
- (5) fails to obtain insurance acceptable to the State;
- (6) fails to perform the Contract with the Bidder involving Work for which the Subcontractor was listed;
- (7) must be substituted in order for the prime CONTRACTOR to satisfy required State and Federal affirmative action requirements;
- (8) refuses to agree or abide with the bidder's labor agreement; or
- (9) is determined by the Contracting Officer to be nonresponsive."

Modify subject area "AWARD OF CONTRACT" as follows:

Subparagraph (a) substitute the word "generally" for the phrase "as soon as practical and"

Subparagraph (b) delete and substitute the following:

"All Bidders will be notified of the AUTHORITY's intent to Award the Contract and the successful Bidder will be requested to execute certain documents, including the Contract form and bonds."

Special Notice to Bidders

1. A non-mandatory pre-bid meeting is scheduled for **February 12, 2019, 2:00pm** in the Aspen Conference room at the AIDEA/AEA Building **813 West Northern Lights Blvd, Anchorage, AK 99503**. This is not a mandatory meeting, and there will not be a scheduled site visit prior to the bid opening.

REQUIRED DOCUMENTS

REQUIRED FOR BID. Bids will not be considered if the following documents are not completely filled out and submitted at the time of bidding:

1. **Bid Form (Form 25D-9)**
 2. **Bid Schedule**
 3. **Bid Security**
 4. Any bid revisions must be submitted by the bidder prior to bid opening on the following form:
Bid Modification (Form 25D-16)
-

REQUIRED AFTER NOTICE OF APPARENT LOW BIDDER. The apparent low bidder is required to complete and submit the following document within 5 working days after receipt of written notification:

1. **Subcontractor List (Form 25D-5)**
-

REQUIRED FOR AWARD. In order to be awarded the contract, the successful bidder must completely fill out and submit the following documents within the time specified in the intent to award letter:

1. **Construction Contract (Form 25D-10A)**
2. **Payment Bond (Form 25D-12)**
3. **Performance Bond (Form 25D-13)**
4. **Contractor's Questionnaire (Form 25D-8)**
5. **EEO-1 Certification (25A-304)**
6. **Certificate of Insurance (from carrier)**

FEDERAL EEO BID CONDITIONS

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246). FOR ALL NON-EXEMPT FEDERAL AND FEDERALLY-ASSISTED CONSTRUCTION CONTRACTS TO BE AWARDED IN THE STATE OF ALASKA

1. Definitions. As used in these specifications:
 - a. “**Covered area**” means the geographical area described in the solicitation from which this contract resulted;
 - b. “**Director**” means Director, Office of Federal Contract Compliance Programs (OFCCP), United States Department of Labor (DOL), or any persons to whom the Director delegates authority;
 - c. “**Employer**” identification number” means the Federal Social Security number used on the Employer’s Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. “**Minority**” includes:
 - (1) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (2) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race);
 - (3) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (4) American Indian or Alaska Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the DOL in the covered area, either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades that have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor’s or subcontractor’s failure to make good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7(a) through 7(p) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

Covered construction contractors performing construction work in geographical areas where they do not have a federal or federally-assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any OFCCP office or from federal procurement contracting officers.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period of an approved training program and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligations to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the DOL. The Contractor shall provide notice of these programs to the sources compiled under 7(b) above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendent, general foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and dispositions of the subject matter.
 - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
 - i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
 - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are nonsegregated except that separate or single-used toilet, necessary changing facilities and necessary sleeping facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontractors from minority and female construction contractors and suppliers, including circulations of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations 7(a) through 7(p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any or more of its obligations under 7(a) through 7(p) of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.)
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunities. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic apprentice, trainees, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that the existing records satisfy this requirement, Contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Programs).
16. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
17. The Contractor shall provide written notification to the Department, for all subcontracts documents as follows: the name, address and telephone number of subcontractors and their employer identification number; the estimated dollar amount of the subcontracts; estimated starting and completion dates of the subcontracts; and the geographical area in which the contract is to be performed.

This written notification shall be required for all construction subcontracts in excess of \$10,000 at any tier for construction work under the contract resulting from this project's solicitation.
18. As used in the Bid Notice, and in the contract resulting from this project's solicitation, the "covered area" is the State of Alaska.

STATE OF ALASKA
ALASKA ENERGY AUTHORITY

EEO-1 CERTIFICATION
Federal-Aid Contracts
Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041

This certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor [41 CFR 60-1.7 (b) (1)] and must be completed by the successful Bidder and each proposed Subcontractor participating in this contract.

PLEASE CHECK APPROPRIATE BOXES

The Bidder Proposed Subcontractor hereby CERTIFIES:

PART A. Bidders and proposed Subcontractors with 50 or more year-round employees and a federal contract amounting to \$50,000 or more are required to submit one federal Standard Report Form 100 during each year that the two conditions exist (50 employees and a \$50,000 federal contract).

The company named below (Part C) is exempt from the requirements of submitting the Standard Report Form 100 this year.

NO (go to PART B) YES (go to PART C)

Instructions and blank Standard Report Form 100's may be obtained from a local U.S. Department of Labor office, or by writing to:

The Joint Reporting Committee
P.O. Box 779
Norfolk, Virginia 23501

Telephone number: (757) 461-1213

PART B. The company named below has submitted the Standard Report Form 100 this year.

NO YES

Note: Bidders and proposed Subcontractors who have not filed the required Standard Report Form 100 and are not exempt from filing requirements will not be awarded this contract or subcontract until Form 100 has been filed for the current year ending June 30.

PART C.

Signature of Authorized Company Representative

Title

Company Name

Company Address (Street or PO Box, City, State, Zip)

Date

()

Phone Number

PROPOSAL
of

NAME _____

ADDRESS _____

To the CONTRACTING OFFICER, ALASKA ENERGY AUTHORITY:

In compliance with your Invitation To Bid dated **February 1, 2019**, the Undersigned proposes to furnish and deliver all the materials and do all the work and labor required in the construction of Project:

Project Name

Clarks Point and Port Heiden RPSU Projects

Modular Power Plant Assembly

Project No. 19041

Located at **Anchorage, Alaska**, according to the plans and specifications and for the amount and prices named herein as indicated on the Bid Schedule consisting of **1** sheet(s), which is made a part of this Bid.

The Undersigned declares that he has carefully examined the contract requirements and that he has made a personal examination of the site of the work; that he understands that the quantities, where such are specified in the Bid Schedule or on the plans for this project, are approximate only and subject to increase or decrease, and that he is willing to perform increased or decreased quantities of work at unit prices bid under the conditions set forth in the Contract Documents.

The Undersigned hereby agrees to execute the said contract and bonds within fifteen calendar days, or such further time as may be allowed in writing by the Contracting Officer, after receiving notification of the acceptance of this proposal, and it is hereby mutually understood and agreed that in case the Undersigned does not, the accompanying bid guarantee shall be forfeited to the Alaska Energy Authority, as liquidated damages, and the said Contracting officer may proceed to award the contract to others.

The Undersigned agrees to commence the work within 10 calendar days after the effective date of Notice to Proceed and to substantially complete the work by **August 1, 2019**, unless extended in writing by the Contracting Officer. Final inspection and completion shall be on or before **August 15, 2019** unless extended in writing by the Contracting Officer.

The Undersigned proposes to furnish Payment Bond in the amount of 100% (of the contract) and Performance Bond in the amount of 100% (of the contract), as surety conditioned for the full, complete and faithful performance of this contract.

The Undersigned acknowledges receipt of the following addenda to the drawings and/or specifications (give number and date of each).

Addendum Number	Date Issued

Addendum Number	Date Issued

Addendum Number	Date Issued

NON-COLLUSION AFFIDAVIT

The Undersigned 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 agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this bid.

The Undersigned has read the foregoing proposal and hereby agrees to the conditions stated therein by affixing his signature below:

Signature

Name and Title of Person Signing

Telephone Number

Fax Number

BID SCHEDULE

**Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
Project No. 19041**

Bidders Please Note: Before preparing this bid schedule, read carefully, "Information to Bidders", and the following:

The Bidder shall insert a fixed price in figures opposite each pay item that appears in the bid schedule to furnish all labor, material, equipment, supervision and provide all work for each item listed. No price is to be entered or tendered for any item not appearing in the bid schedule.

Contract award shall be made on the basis of the Total Bid.

Conditioned or qualified bids will be considered non-responsive.

Item	Description	Quantity	Unit	Unit Price	Extended Total Amount
BASE BID:					
1	Port Heiden Module Assembly	1	LS	\$	\$
2	Clarks Point Module Assembly	1	LS	\$	\$
TOTAL BID					\$
Bidder is required to bid on all bid items, including all Additive Alternates. See Specification Section 01 11 13 Summary of Work for detailed descriptions of each bid item.					

Contractor's Name (Printed)

Alaska Contractor's Registration # **Expires**

Alaska Business License # **Expires**

Email

ALASKA ENERGY AUTHORITY

BID BOND

For

**Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041**

DATE BOND EXECUTED: _____

PRINCIPAL (Legal name and business address):

TYPE OF ORGANIZATION:

	<input type="checkbox"/> Individual	<input type="checkbox"/> Partnership
	<input type="checkbox"/> Joint Venture	<input type="checkbox"/> Corporation
STATE OF INCORPORATION:		

SURETY(IES) (Name and business address):

A.	B.	C.

PENAL SUM OF BOND:	DATE OF BID:

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

THE CONDITION OF THE FOREGOING OBLIGATION is that the Principal has submitted the accompanying bid in writing, date as shown above, on the above-referenced Project in accordance with contract documents filed in the office of the Contracting Officer, and under the Invitation To Bid therefore, and is required to furnish a bond in the amount stated above.

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

If the Principal enters into the contract, then the foregoing obligation is null and void.

PRINCIPAL

Signature(s)	1.	2.	3.
Name(s) & Title(s) (Typed)	1.	2.	3.

Corporate Seal

See Instructions on Reverse

CORPORATE SURETY(IES)

Surety A	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety B	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

Surety C	Name of Corporation	State of Incorporation	Liability Limit \$
Signature(s)	1.	2.	Corporate Seal
Name(s) & Titles (Typed)	1.	2.	

INSTRUCTIONS

1. This form shall be used whenever a bid bond is submitted.
2. Insert the full legal name and business address of the Principal in the space designated. If the Principal is a partnership or joint venture, the names of all principal parties must be included (e.g., "Smith Construction, Inc. and Jones Contracting, Inc. DBA Smith/Jones Builders, a joint venture"). If the Principal is a corporation, the name of the state in which incorporated shall be inserted in the space provided.
3. Insert the full legal name and business address of the Surety in the space designated. The Surety on the bond may be any corporation or partnership authorized to do business in Alaska as an insurer under AS 21.09. Individual sureties will not be accepted.
4. The penal amount of the bond may be shown either as an amount (in words and figures) or as a percent of the contract bid price (a not-to-exceed amount may be included).
5. The scheduled bid opening date shall be entered in the space marked Date of Bid.
6. The bond shall be executed by authorized representatives of the Principal and Surety. Corporations executing the bond shall also affix their corporate seal.
7. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
8. The states of incorporation and the limits of liability of each surety shall be indicated in the spaces provided.
9. The date that bond is executed must not be later than the bid opening date.

ALASKA ENERGY AUTHORITY

BID MODIFICATION
Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041

Modification Number: _____

Note: All revisions shall be made to the unadjusted bid amount(s).

Changes to the adjusted bid amounts will be computed by the Authority.

PAY ITEM NO.	PAY ITEM DESCRIPTION	REVISION TO UNIT BID PRICE +/-	REVISION TO BID AMOUNT +/-

TOTAL REVISION: \$ _____

Name of Bidding Firm

Responsible Party Signature

Date

This form may be duplicated if additional pages are needed.

SUBCONTRACTOR LIST

**Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041**

The apparent low bidder shall complete this form and submit it so as to be received by the Contracting Officer prior to the close of business on the fifth working day after receipt of written notice from the Authority.

Failure to submit this form with all required information by the due date will result in the bidder being declared nonresponsive and may result in the forfeiture of the Bid Security.

Scope of work must be clearly defined. If an item of work is to be performed by more than one firm, indicate the portion or percent of work to be done by each.

- Check as applicable:** All Work on the above-referenced project will be accomplished without subcontracts greater than 1/2 of 1% of the contract amount.
- or
- Subcontractor List is as follows:

LIST FIRST TIER SUBCONTRACTORS ONLY

FIRM NAME, ADDRESS, PHONE NO.	AK BUSINESS LICENSE NO., CONTRACTOR'S REGISTRATION NO.	SCOPE OF WORK TO BE PERFORMED

CONTINUE SUBCONTRACTOR INFORMATION ON REVERSE

For projects with federal-aid funding, I hereby certify Alaska Business Licenses and Contractor's Registrations will be valid for all subcontractors prior to award of the subcontract. For projects without federal-aid funding (State funding only), I hereby certify the listed Alaska Business Licenses and Contractor's Registrations were valid at the time bids were opened for this project.

Signature of Authorized Company Representative

Title

Company Name

Company Address (Street or PO Box, City, State, Zip)

Date

() _____
Phone Number

CONSTRUCTION CONTRACT
Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041

This CONTRACT, between the ALASKA ENERGY AUTHORITY, herein called the Authority, acting by and through its Contracting Officer, and

Company Name

Company Address (Street or PO Box, City, State, Zip)

a/an Individual Partnership Joint Venture Sole Proprietorship Corporation incorporated under the laws of the State of _____, its successors and assigns, herein called the Contractor, is effective the date of the signature of the Contracting Officer on this document.

WITNESSETH: That the Contractor, for and in consideration of the payment or payments herein specified and agreed to by the Department, hereby covenants and agrees to furnish and deliver all the materials and to do and perform all the work and labor required in the construction of the above-referenced project at the prices bid by the Contractor for the respective estimated quantities aggregating approximately the sum of

_____ Dollars

(\$ _____), and such other items as are mentioned in the original Bid, which Bid and prices named, together with the Contract Documents are made a part of this Contract and accepted as such.

It is distinctly understood and agreed that no claim for additional work or materials, done or furnished by the Contractor and not specifically herein provided for, will be allowed by the Authority, nor shall the Contractor do any work or furnish any material not covered by this Contract, unless such work is ordered in writing by the Authority. In no event shall the Authority be liable for any materials furnished or used, or for any work or labor done, unless the materials, work, or labor are required by the Contract or on written order furnished by the Authority. Any such work or materials which may be done or furnished by the Contractor without written order first being given shall be at the Contractor's own risk, cost, and expense and the Contractor hereby covenants and agrees to make no claim for compensation for work or materials done or furnished without such written order.

The Contractor further covenants and agrees that all materials shall be furnished and delivered and all labor shall be done and performed, in every respect, to the satisfaction of the Authority, on or before: _____ or within _____ calendar days. It is expressly understood and agreed that in case of the failure on the part of the Contractor, for any reason, except with the written consent of the Authority, to complete the furnishing and delivery of materials and the doing and performance of the work before the aforesaid date, the Authority shall have the right to deduct from any money due or which may become due the Contractor, or if no money shall be due, the Authority shall have the right to recover _____ Dollars (\$ _____) per day for each calendar day elapsing between the time stipulated for the completion and the actual date of completion in accordance with the terms hereof; such deduction to be made, or sum to be recovered, not as a penalty but as liquidated damages.

The bonds given by the Contractor in the sum of \$ _____ Payment Bond, and \$ _____ Performance Bond, to secure the proper compliance with the terms and provisions of this Contract, are submitted herewith and made a part hereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contract and hereby agree to its terms and conditions.

CONTRACTOR

Company Name

Signature of Authorized Company Representative

Typed Name and Title

Date

(Corporate Seal)

ALASKA ENERGY AUTHORITY

Signature of Contracting Officer

Typed Name

Date

ALASKA ENERGY AUTHORITY

PERFORMANCE BOND

Bond No. _____

For
Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041

KNOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the 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 State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____ A.D., 20____, for construction of the above-named project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are such that if the said Principal shall well and truly perform and complete all obligations and work under said contract and if the Principal shall reimburse upon demand of the Alaska Energy Authority any sums paid 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 _____, _____ this _____ day of _____ A.D., 20____.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

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

Alaska Energy Authority Authorized Representative

Date

See Instructions on Reverse

INSTRUCTIONS

1. This form shall be used whenever a performance bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such person is signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.

ALASKA ENERGY AUTHORITY

PAYMENT BOND

Bond No. _____

For
Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041

NOW ALL WHO SHALL SEE THESE PRESENTS:

That _____
of _____ as Principal,
and _____
of _____ as Surety,
firmly bound and held unto the 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 State of Alaska, we bind ourselves, our heirs, successors, executors, administrators, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has entered into a written contract with said State of Alaska, on the _____ of _____ A.D., 20____, for construction of the above-referenced project, said work to be done according to the terms of said contract.

Now, THEREFORE, the conditions of the foregoing obligation are 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, 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 _____, this _____ day of _____ A.D., 20____.

Principal: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

Surety: _____

Address: _____

By: _____

Contact Name: _____

Phone: () _____

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

Alaska Energy Authority Authorized Representative

Date

See Instructions on Reverse

INSTRUCTIONS

1. This form, for the protection of persons supplying labor and material, shall be used whenever a payment bond is required. There shall be no deviation from this form without approval from the Contracting Officer.
2. The full legal name, business address, phone number, and point of contact of the Principal and Surety shall be typed on the face of the form. Where more than a single surety is involved, a separate form shall be executed for each surety.
3. The penal amount of the bond, or in the case of more than one surety the amount of obligation, shall be typed in words and in figures.
4. Where individual sureties are involved, a completed Affidavit of Individual Surety shall accompany the bond. Such forms are available upon request from the Contracting Officer.
5. The bond shall be signed by authorized persons. Where such persons are signing in a representative capacity (e.g., an attorney-in-fact), but is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved, evidence of authority must be furnished.

CONTRACTOR'S QUESTIONNAIRE

**Clarks Point and Port Heiden RPSU Projects
Modular Power Plant Assembly
19041**

A. FINANCIAL

1. Have you ever failed to complete a contract due to insufficient resources?
 No Yes If YES, explain:

2. Describe any arrangements you have made to finance this work: _____

B. EQUIPMENT

1. Describe below the equipment you have available and intend to use for this project.

ITEM	QUAN.	MAKE	MODEL	SIZE/ CAPACITY	PRESENT MARKET VALUE

2. What percent of the total value of this contract do you intend to subcontract? _____ %

3. Do you propose to purchase any equipment for use on this project?
[] No [] Yes If YES, describe type, quantity, and approximate cost:

4. Do you propose to rent any equipment for this work?
[] No [] Yes If YES, describe type and quantity:

5. Is your bid based on firm offers for all materials necessary for this project?
[] Yes [] No If NO, please explain:

C. EXPERIENCE

1. Have you had previous construction contracts or subcontracts with the Authority?
[] Yes [] No

Describe the most recent or current contract, its completion date, and scope of work:

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

Name and Title of Person Signing

Signature

Date

ALASKA ENERGY AUTHORITY
SECTION 00 70 00
GENERAL CONDITIONS

- ARTICLE 1 DEFINITIONS

- ARTICLE 2 AUTHORIZATION AND LIMITATIONS
 - 2.1 Authorities and Limitations
 - 2.2 Evaluations by Contracting Officer
 - 2.3 Means and Methods
 - 2.4 Visits to Site

- ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE
 - 3.1 Incomplete Contract Documents
 - 3.2 Copies of Contract Documents
 - 3.3 Scope of Work
 - 3.4 Intent of Contract Documents
 - 3.5 Discrepancy in Contract Documents
 - 3.6 Clarifications and Interpretations
 - 3.7 Reuse of Documents

- ARTICLE 4 LANDS AND PHYSICAL CONDITIONS
 - 4.1 Availability of Lands
 - 4.2 Visit to Site
 - 4.3 Explorations and Reports
 - 4.4 Utilities
 - 4.5 Damaged Utilities
 - 4.6 Utilities Not Shown or Indicated
 - 4.7 Survey Control

- ARTICLE 5 BONDS AND INSURANCE, AND INDEMNIFICATION
 - 5.1 Delivery of Bonds
 - 5.2 Bonds
 - 5.3 Replacement of Bond and Surety
 - 5.4 Insurance Requirements
 - 5.5 Indemnification

- ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES
 - 6.1 Supervision of Work
 - 6.2 Superintendence by CONTRACTOR
 - 6.3 Character of Workers
 - 6.4 CONTRACTOR to Furnish
 - 6.5 Materials and Equipment
 - 6.6 Anticipated Schedules
 - 6.7 Finalizing Schedules
 - 6.8 Adjusting Schedules
 - 6.9 Substitutes or "Or-Equal" Items
 - 6.10 Substitute Means and Methods
 - 6.11 Evaluation of Substitution
 - 6.12 Dividing the Work
 - 6.13 Subcontractors

- 6.14 Use of Premises
- 6.15 Structural Loading
- 6.16 Record Documents
- 6.17 Safety and Protection
- 6.18 Safety Representative
- 6.19 Emergencies
- 6.20 Shop Drawings and Samples
- 6.21 Shop Drawing and Sample Review
- 6.22 Maintenance during Construction
- 6.23 Continuing the Work
- 6.24 Consent to Assignment
- 6.25 Use of Explosives
- 6.26 CONTRACTOR's Records
- 6.27 Load Restrictions

ARTICLE 7 LAWS AND REGULATIONS

- 7.1 Laws to be observed
- 7.2 Permits, Licenses, and Taxes
- 7.3 Patented Devices, Materials and Processes
- 7.4 Compliance of Specifications and Drawings
- 7.5 Accident Prevention
- 7.6 Sanitary Provisions
- 7.7 Business Registration
- 7.8 Professional Registration and Certification
- 7.9 Local Building Codes
- 7.10 Air Quality Control
- 7.11 Archaeological or Paleontological Discoveries
- 7.12 Applicable Alaska Preferences
- 7.13 Preferential Employment
- 7.14 Wages and Hours of Labor
- 7.15 Overtime Work Hours and Compensation
- 7.16 Covenants against Contingent Fees
- 7.17 Officials Not to Benefit
- 7.18 Personal Liability of Public Officials

ARTICLE 8 OTHER WORK

- 8.1 Related Work at Site
- 8.2 Access, Cutting, and Patching
- 8.3 Defective Work by Others
- 8.4 Coordination

ARTICLE 9 CHANGES

- 9.1 AUTHORITY's Right to Change
- 9.2 Authorization of Changes within the General Scope
- 9.3 Directive
- 9.4 Change Order
- 9.5 Shop Drawing Variations
- 9.6 Changes outside the General Scope; Supplemental Agreement
- 9.7 Unauthorized Work
- 9.8 Notification of Surety
- 9.9 Differing Site Conditions

9.10 Interim Work Authorization

ARTICLE 10 CONTRACT PRICE; COMPUTATION AND CHANGE

- 10.1 Contract Price
- 10.2 Claims for Price Change
- 10.3 Change Order Price Determination
- 10.4 Cost of the Work
- 10.5 Excluded Costs
- 10.6 CONTRACTOR's Fee
- 10.7 Cost Breakdown
- 10.8 Cash Allowances
- 10.9 Unit Price Work
- 10.10 Determinations for Unit Prices

ARTICLE 11 CONTRACT TIME, COMPUTATION AND CHANGE

- 11.1 Commencement of Contract Time; Notice to Proceed
- 11.2 Starting the Work
- 11.3 Computation of Contract Time
- 11.4 Time Change
- 11.5 Extension Due to Delays
- 11.6 Essence of Contract
- 11.7 Reasonable Completion Time
- 11.8 Delay Damages

ARTICLE 12 QUALITY ASSURANCE

- 12.1 Warranty and Guaranty
- 12.2 Access to Work
- 12.3 Tests and Inspections
- 12.4 Uncovering Work
- 12.5 AUTHORITY May Stop the Work
- 12.6 Correction or Removal of Defective Work
- 12.7 One Year Correction Period
- 12.8 Acceptance of Defective Work
- 12.9 AUTHORITY may Correct Defective Work

ARTICLE 13 PAYMENTS TO CONTRACTOR AND COMPLETION

- 13.1 Schedule of Values
- 13.2 Preliminary Payments
- 13.3 Application for Progress Payment
- 13.4 Review of Applications for Progress Payments
- 13.5 Stored Materials and Equipment
- 13.6 CONTRACTOR's Warranty of Title
- 13.7 Withholding of Payments
- 13.8 Retainage
- 13.9 Request for Release of funds
- 13.10 Substantial Completion
- 13.11 Access Following Substantial Completion
- 13.12 Final Inspection
- 13.13 Final Completion and Application for Payment
- 13.14 Final Payment

- 13.15 Final Acceptance
- 13.16 CONTRACTOR's Continuing Obligation
- 13.17 Waiver of Claims by CONTRACTOR
- 13.18 No Waiver of Legal Rights

ARTICLE 14 SUSPENSION OF WORK AND TERMINATION

- 14.1 AUTHORITY May Suspend Work
- 14.2 Default of Contract
- 14.3 Rights or Remedies
- 14.4 Convenience Termination

ARTICLE 15 CLAIMS AND DISPUTES

- 15.1 Notification
- 15.2 Presenting Claim
- 15.3 Claim Validity, Additional Information & Authority's Action
- 15.4 Contracting Officer's Decision
- 15.5 Appeals on a Contract Claim
- 15.6 Construction Contract Claim Appeal
- 15.7 Fraud and Misrepresentation in Making a Claim

ARTICLE 1 - DEFINITIONS

Wherever used 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 articles, sections, and subsections herein are intended for convenience of reference.

Terms not defined below shall have their ordinary accepted meanings within the context which they are used. Words which 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 to be interpreted as defined.

Addenda - All clarifications, corrections, or changes issued graphically or in writing by the AUTHORITY 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.

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

Approved or Approval - Means written approval by the Contracting Officer or his authorized representative as defined in Article 2.1. 'Approved' or 'Approval' as used in this contract document shall mean that the Authority has received a document, form or submittal from the Contractor and that the Authority has taken "No exceptions" to the item submitted. Unless the context clearly indicates otherwise, approved or approval shall not mean that the Authority approves of the methods or means, or that the item or form submitted meets the requirements of the contract or constitutes acceptance of the Contractor's work. Where approved or approval means acceptance, then such approval must be set forth in writing and signed by the contracting officer or his designee.

A.S - Initials which stand for Alaska Statute.

Authority - The Alaska Energy Authority (AEA). References to "Contracting Agency" means the AUTHORITY. The AUTHORITY is acting as an agent for Owner.

Award - The acceptance, by the AUTHORITY, 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 AUTHORITY directing changes to the Contract Documents, within their general scope.

Consultant - The person, firm, or corporation retained directly by the AUTHORITY to prepare Contract Documents, perform construction administration services, or other Project related services. References to Authority's Consultants shall include Engineer.

Contingent Sum Work Item - When the bid schedule contains a Contingent Sum Work Item, the Work covered shall be performed only upon the written Directive of the Project Manager. Payment shall be made as provided in the Directive.

Contract - The written agreement between the AUTHORITY 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 AUTHORITY 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 Executive Director to enter into and administer the Contract on behalf of the AUTHORITY; who 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 construction Contract.

Contractor - The individual, firm, corporation or any acceptable combination thereof, contracts with the AUTHORITY for performance of the Work.

Contract Price - The total moneys payable by the AUTHORITY to the CONTRACTOR under the terms of the Contract Documents.

CONTRACTOR's Release – CONTRACTOR's written notification to the AUTHORITY specifying final payment due and releasing the AUTHORITY of any and all claims.

Contract Time - The number of Calendar Days following issuance of Notice-to-Proceed in which the project shall be rendered Substantially Complete, or if specified as a calendar date, the Substantial Completion date specified in the Contract Documents.

Controlling Item - Any feature of the Work on the critical path of a network schedule.

Defective - Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents.

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 which show the character and scope of the Work to be performed and which have been furnished by the AUTHORITY and are by reference made a part of the Contract Documents.

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

Equipment - All machinery together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of the work.

Final Completion - The Project has progressed to the point that all required Work is complete..

Furnish - To procure, transport, and deliver to the project site materials, labor, or equipment, for installation or use on the project.

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

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

1. New Years Day - January 1
2. Martin Luther King'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 States 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.

Interim Work Authorization - A written order by the Project Manager initiating changes to the Contract within its general scope, until a subsequent Change Order is executed.

Invitation for Bids - A portion of the bidding documents soliciting bids for the Work to be performed.

Materials - Any substances specified for use in the construction of the project.

Notice of Intent to Award - The written notice by the AUTHORITY to all Bidders identifying the apparent successful Bidder and establishing the AUTHORITY's intent to execute the Contract when all conditions required for execution of the Contract are met.

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

Onsite Project Representative - The Engineer's authorized representative assigned to make detailed observations relating to contract performance.

Owner – Means Grantee for whom the ALASKA ENERGY AUTHORITY is acting as an agent of.

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

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

Pre-construction Conference - A meeting between the CONTRACTOR, Project Manager and the Engineer, and other parties affected by the construction, to discuss the project before the CONTRACTOR begins work.

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

Procurement Manager/Officer - The person authorized by the Contracting Officer to administer the Contract on behalf of the AUTHORITY; who has authority to make findings, determinations and decisions with respect to the Contract and, when necessary present such to the Contracting Officer, to modify or terminate 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.

Proposal - The offer of a Bidder, on the prescribed forms, 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 his Proposal is accepted by the AUTHORITY.

Quality Assurance (QA) - Where referred to in the technical specifications (Divisions 2 through 16), Quality Assurance refers to measures to be provided by the CONTRACTOR as specified.

Quality Control (QC) - Tests and inspections by the CONTRACTOR to insure the acceptability of materials incorporated into the work. QC test reports are used as a basis upon which to determine whether the Work conforms to the requirements of the Contract Documents and to determine its acceptability for payment.

Regulatory Requirements - Laws, rules, regulations, ordinances, codes and/or orders.

Schedule of Values - 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 which comprise the Contract Price.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which 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. Where used in the Contract Documents, "Shop Drawings" shall also mean "Submittals".

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 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 AUTHORITY covering work that is not within the general scope of the Contract.

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

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

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

Unit Price Work - Work to be paid for on the basis of unit prices.

Utility - The privately, publicly or cooperatively owned lines, facilities and systems for producing, transmitting or distributing communications, power, electricity, light, heat, gas, oil, crude products, water, steam, waste, storm water not connected with highway or street drainage, and other similar commodities, including publicly owned fire and police signal systems, street lighting systems, and railroads which directly or indirectly serve the public or any part thereof. The term "utility" shall also mean the utility company, inclusive of any wholly owned or controlled subsidiary."

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.

ARTICLE 2 – AUTHORIZATION AND LIMITATIONS

2.1 Authorities and Limitations

- 2.1.1 The Contracting Officer alone shall have the power to bind the AUTHORITY and to exercise the rights, responsibilities, authorities and functions vested in the Contracting Officer by the Contract Documents. 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 interest of the AUTHORITY 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.
- 2.1.2 The CONTRACTOR shall perform the Work in accordance with any 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 The performance or nonperformance of the Contracting Officer or his authorized representative, shall not give rise to any contractual obligation or duty to the CONTRACTOR, any Subcontractor, any Supplier, or any other organization performing any of the Work or any Surety representing them.

2.2 Evaluations by Contracting Officer:

- 2.2.1 The Contracting Officer or his authorized representative will decide all questions which 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 "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 AUTHORITY any duty of 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 & 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 his 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 by the Bidder is considered a representation that the Bidder examined the Contract Documents to make certain that all sheets and pages were provided and that the Bidder is satisfied as to the conditions to be encountered in performing the Work. The AUTHORITY 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 AUTHORITY shall furnish to the CONTRACTOR up to six 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 AUTHORITY 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 the terms or provisions 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, code or 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 AUTHORITY 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 AUTHORITY or any of the AUTHORITY'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.

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. 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 which 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 his own risk and expense. However, the CONTRACTOR shall not be liable to the AUTHORITY 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:

- Contents of Addenda
- Supplementary Conditions
- General Conditions
- General Requirements
- Technical Specifications
- Drawings
- Recorded dimensions will govern over scaled dimensions
- Large scale details over small scale details
- Schedules over plans
- Architectural drawings over structural drawings 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 AUTHORITY shall have or acquire any title to or ownership rights in any of the Contract Documents (or copies thereof) prepared by or for the AUTHORITY 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 AUTHORITY.

ARTICLE 4 - LANDS AND PHYSICAL CONDITIONS

4.1 Availability of Lands:

The AUTHORITY shall furnish as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for use of the CONTRACTOR in connection with the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the AUTHORITY, unless otherwise provided in the Contract Documents. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. The CONTRACTOR shall provide all waste and disposal areas, including disposal areas for hazardous or contaminated materials, at no additional cost to the AUTHORITY.

4.2 Visit to Site:

The submission of a bid by the CONTRACTOR is considered a representation that the CONTRACTOR has visited and carefully examined the site and is satisfied as to the conditions to be encountered in performing the Work and as to the requirements of the Contract Documents.

4.3 Explorations and Reports:

Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by the AUTHORITY in preparation of the Contract Documents. The CONTRACTOR may for his purposes rely upon the accuracy of the factual data contained in such reports, but not upon interpretations or opinions drawn from such factual data contained therein or for the completeness or sufficiency thereof. Except as indicated in the immediately preceding sentence and in paragraphs 4.4 and 9.9, CONTRACTOR shall have full responsibility with respect to surface and subsurface conditions at the site.

4.4 Utilities:

- 4.4.1 The horizontal and vertical locations of known underground utilities as shown or indicated by the Contract Documents are approximate and are based on information and data furnished to the AUTHORITY by the owners of such underground utilities.
- 4.4.2 The CONTRACTOR shall have full responsibility for:
- a. Reviewing and checking all information and data concerning utilities.
 - b. Locating all underground utilities shown or indicated in the Contract Documents which are affected by the Work.
 - c. Coordination of the Work with the owners of all utilities during construction.
 - d. Safety and protection of all utilities as provided in paragraph 6.17.
 - e. Repair of any damage to utilities resulting from the Work in accordance with 4.4.4 and 4.5.
- 4.4.3 If Work is to be performed by any utility owner, the CONTRACTOR shall cooperate with such owners to facilitate the Work.
- 4.4.4 In the event of interruption to any utility service as a result of accidental breakage or as result of being exposed or unsupported, the CONTRACTOR shall promptly notify the utility owner and the Project Manager. If service is interrupted, repair work shall be continuous until the service is restored. No Work shall be undertaken around fire hydrants until provisions for continued service has been approved by the local fire authority.

4.5 Damaged Utilities:

When utilities are damaged by the CONTRACTOR, the utility owner shall have the choice of repairing the utility or having the CONTRACTOR repair the utility. In the following circumstances, the CONTRACTOR shall reimburse the utility owner for repair costs or provide at no cost to the utility owner or the AUTHORITY, all materials, equipment and labor necessary to complete repair of the damage:

- a. When the utility is shown or indicated in the Contract Documents.
- b. When the utility has been located by the utility owner.
- c. When no locate was requested by the CONTRACTOR for utilities shown or indicated in the Contract Documents.
- d. All visible utilities.
- e. When the CONTRACTOR could have, otherwise, reasonably been expected to be aware of such utility.

4.6 Utilities Not Shown or Indicated:

If, while directly performing the Work, an underground utility is uncovered or revealed at the site which was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall, promptly after

becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.19) identify the owner of such underground utility and give written notice thereof to that owner and to the Project Manager. The Project Manager will promptly review the underground utility to determine the extent to which the Contract Documents and the Work should be modified to reflect the impacts of the discovered utility. The Contract Documents will be amended or supplemented in accordance with paragraph 9.2 and to the extent necessary through the issuance of a change document by the Contracting Officer. During such time, the CONTRACTOR shall be responsible for the safety and protection of such underground utility as provided in paragraph 6.17. The CONTRACTOR may be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are directly attributable to the existence of any underground utility that was not shown or indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of.

4.7 Survey Control:

The AUTHORITY will identify sufficient horizontal and vertical control data to enable the CONTRACTOR to survey and layout the Work. All survey work shall be performed under the direct supervision of a registered land surveyor when required by paragraph 7.8. Copies of all survey notes shall be provided to the AUTHORITY at an interval determined by the Project Manager. The Project Manager may request submission on a weekly or longer period at his discretion. Any variations between the Contract Documents and actual field conditions shall be identified in the survey notes. Survey notes are to be in a format acceptable to the AUTHORITY.

ARTICLE 5 - BONDS, INSURANCE, AND INDEMNIFICATION

5.1 Delivery of Bonds:

When the CONTRACTOR delivers the executed Contract to the Contracting Officer, the CONTRACTOR shall also deliver to the Contracting Officer such bonds as the CONTRACTOR may be required to furnish in accordance with paragraph 5.2.

5.2 Bonds:

5.2.1 The CONTRACTOR shall furnish Performance and Payment Bonds, each in an amount as shown on the Contract as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These bonds shall remain in effect for one year after the date of Final Acceptance and until all obligations under this Contract, except special guarantees as per 12.7, have been met. All bonds shall be furnished on forms provided by the AUTHORITY (or copies thereof) and shall be executed by such Sureties as are authorized to do business in the State of Alaska. The Contracting Officer may at his option copy the Surety with notice of any potential default or liability.

5.3 Replacement of Bond and Surety:

If the Surety on any bond furnished in connection with this Contract is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.2, or otherwise becomes unacceptable to the AUTHORITY, or if any such Surety fails to furnish reports as to his financial condition as requested by the AUTHORITY, the CONTRACTOR shall within five days thereafter substitute another bond and Surety, both of which must be acceptable to AUTHORITY.

An individual Surety may be replaced by a corporate Surety during the course of the Contract period. If the Surety desires to dispose of the collateral posted, the AUTHORITY may, at its option, accept substitute collateral.

5.4 Insurance Requirements:

5.4.1 The CONTRACTOR shall provide evidence of insurance with a carrier or carriers satisfactory to the AUTHORITY covering injury to persons and/or property suffered by the Alaska Energy Authority 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.

5.4.2 The CONTRACTOR shall maintain in force at all times during the performance of Work under this agreement the following policies and minimum limits of liability. 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 5.5. 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. Waiver of subrogation against the Authority and Employer's Liability Protection in the amount of \$500,000 each accident/\$500,000 each disease.
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.
3. Whenever the work involves activity on or about navigable waters, the Workers' Compensation policy shall contain a United States Longshoreman's and Harbor Worker's Act endorsement, and when appropriate, a Maritime Employer's Liability (Jones Act) endorsement with a minimum limit of \$1,000,000.

b. Commercial General Liability Insurance: on an occurrence policy form covering all operations by or on behalf of the CONTRACTOR with combined single limits not less than:

1. If the CONTRACTOR carries a *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:
\$1,000,000 each occurrence
\$2,000,000 aggregate
2. If the CONTRACTOR carries a *Commercial General Liability* policy, the limits of liability shall not be less than:
\$1,000,000 each occurrence (Combined Single Limit for bodily injury and property damage)

\$1,000,000 for Personal Injury Liability

\$2,000,000 aggregate for Products-Completed Operations

\$2,000,000 general aggregate

The Authority and the Owner shall be named as "Additional Insured" under all liability coverages listed above.

- c. Automobile Liability Insurance: covering all vehicles used by the Contractor in the performance of services under this agreement with combined single limits not less than:

\$1,000,000 each occurrence

- 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 AUTHORITY, the CONTRACTOR and Subcontractors at all tiers. 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, in transit from port of arrival to job site, or while temporarily located away from the Project site.

In addition to providing the above coverages the CONTRACTOR shall require that all indemnities obtained from any SUBCONTRACTORS be extended to include the Authority and Owner as an additional named indemnitees. CONTRACTOR shall further require that the Authority and the Owner be named as additional insured on all liability insurance policies maintained by all SUBCONTRACTORS under their contracts with CONTRACTOR, and that an appropriate waiver of subrogation in favor of the Authority be obtained with respect to all other insurance policies.

- e. Other Coverages: As specified in the Supplementary Conditions, if required.

- 5.4.3 a. In addition to providing the above coverages the Contractor shall, in any contract or agreement with subcontractors performing work, require that all indemnities and waivers of subrogation it obtains, and that any stipulation to be named as an additional insured it obtains, also be extended to waive rights of subrogation against the AUTHORITY and the Owner and to add the ALASKA ENERGY AUTHORITY and the Owner as additional named indemnitees and as additional insured.
- b. Evidence of insurance shall be furnished to the AUTHORITY prior to the award of the contract. Such evidence, executed by the carrier's representative and issued to the AUTHORITY, shall consist of a certificate of insurance or the policy declaration page with required endorsements attached thereto which denote the type, amount, class of operations covered, effective (and retroactive) dates, and dates of expiration. Acceptance by the AUTHORITY of deficient evidence does not constitute a waiver of contract requirements.
- c. When a certificate of insurance is furnished, it shall contain the following statement: "This is to certify that the policies described herein comply with all aspects of the insurance requirements of (Project Name and Number)."

5.5 Indemnification:

The CONTRACTOR shall indemnify, save harmless, and defend the AUTHORITY, the

OWNER its agents and its employees from any and all claims, actions, or liabilities for injuries or damages sustained by any person or property arising directly or indirectly from the CONTRACTOR or SUBCONTRACTOR's performance of WORK under this Contract; however, this provision has no effect if, but only if, the sole proximate cause of the injury or damage is the AUTHORITY's negligence.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.1 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. All Work under this Contract shall be performed in a skillful and workmanlike manner. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction.

6.2 Superintendence by CONTRACTOR:

The CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent. The Project Manager 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 AUTHORITY. 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 Project Manager in every way possible.

6.3 Character of Workers:

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

6.4 CONTRACTOR to Furnish:

Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish 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.

6.5 Materials and Equipment:

All materials and equipment shall be of specified quality and new, except as otherwise provided in the Contract Documents. If required by the Project Manager, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. 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 AUTHORITY or any of the AUTHORITY'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 paragraph 2.3.

6.6 Anticipated Schedules:

- 6.6.1 Prior to submitting the CONTRACTOR's first Application for Payment the CONTRACTOR shall submit to the Project Manager for review an anticipated progress schedule indicating the starting and completion dates of the various stages of the Work.
- 6.6.2 Prior to submitting the CONTRACTOR's first Application for Payment, the CONTRACTOR shall submit to the Project Manager for review:

Anticipated schedule of Shop Drawing submissions; and

Anticipated Schedule of Values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by the CONTRACTOR at the time of submission.

6.7 Finalizing Schedules:

Prior to processing the first Application for Payment the Project Manager and the CONTRACTOR will finalize schedules required by paragraph 6.6. The finalized progress schedule will be acceptable to the AUTHORITY as providing information related to the orderly progression of the Work to completion within the Contract Time; but such acceptance will neither impose on the AUTHORITY nor relieve the CONTRACTOR from full responsibility for the progress or scheduling of the Work. If accepted, the finalized schedule of Shop Drawing and other required submissions will be acknowledgment by the AUTHORITY as providing a workable arrangement for processing the submissions. If accepted, the finalized Schedule of Values will be acknowledgment by the AUTHORITY as an approximation of anticipated value of Work accomplished over the anticipated Contract Time. Receipt and acceptance of a schedule submitted by the CONTRACTOR shall not be construed to assign responsibility for performance or contingencies to the AUTHORITY or relieve the CONTRACTOR of his responsibility to adjust his forces, equipment, and work schedules as may be necessary to insure completion of the Work within prescribed Contract Time. Should the prosecution of the Work be discontinued for any reason, the CONTRACTOR shall notify the Project Manager at least 24 hours in advance of resuming operations.

6.8 Adjusting Schedules:

Upon substantial changes to the schedule or upon request the CONTRACTOR shall submit to the Project Manager for acceptance (to the extent indicated in paragraph 6.7 and the General Requirements) adjustments in the schedules to reflect the actual present and anticipated progress of the Work.

6.9 Substitutes or "Or-Equal" Items:

- 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 substitution is limited or not permitted, materials or equipment of other Suppliers may be accepted by the Project Manager only if sufficient information is submitted by the CONTRACTOR which clearly demonstrates to the Project Manager that the material or equipment proposed is equivalent or equal in all aspects to that named. The procedure for review by the Project Manager will include the following as supplemented in the General Requirements.
- 6.9.2 Requests for review of substitute items of material and equipment will not be accepted by the Project Manager from anyone other than the CONTRACTOR.
- 6.9.3 If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the Project Manager for Approval 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 the specified. The application will state that the evaluation and Approval of the proposed substitute will not delay the CONTRACTOR's timely achievement of Substantial or Final Completion, 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 AUTHORITY 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.
- 6.9.4 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 AUTHORITY in evaluating the proposed substitute. The AUTHORITY may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed substitute. The Project Manager may reject any substitution request which the Project Manager determines is not in the best interest of the OWNER.
- 6.9.5 Substitutions shall be permitted during or after the bid period as allowed and in accordance with Document 00 02 00 - Invitation for Bids, Document 00 70 00 – General Conditions, and Document 01 60 00 – Materials and Equipment.

6.10 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 Project Manager, if the CONTRACTOR submits sufficient information to allow the Project Manager to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the Project Manager will be similar to that provided in paragraph 6.9 as applied by the Project Manager and as may be supplemented in the General Requirements.

6.11 Evaluation of Substitution:

The Project Manager will be allowed a reasonable time within which to evaluate each proposed substitute. The Project Manager will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Contracting Officer's prior written Approval which will be evidenced by either a Change Order or a Shop Drawing Approved in accordance with Sections 6.20 and 6.21. 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.

6.12 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.

6.13 Subcontractors:

The CONTRACTOR may utilize the services of appropriately licensed Subcontractors on those parts of the Work which, under normal contracting practices, are performed by Subcontractors, in accordance with the following conditions:

- 6.13.1 The CONTRACTOR shall not award any Work to any Subcontractor without prior written Approval of the Contracting Officer. This Approval will not be given until the CONTRACTOR submits to the Contracting Officer a written statement concerning the proposed award to the Subcontractor which shall contain required Equal Employment Opportunity documents, evidence of insurance whose limits are acceptable to the CONTRACTOR, and an executed copy of the subcontract. All subcontracts shall contain provisions for prompt payment, release of retainage, and interest on late payment amounts and retainage as specified in AS 36.90.210. Contracts between subcontractors, regardless of tier, must also contain these provisions.
- 6.13.2 The CONTRACTOR shall be fully responsible to the AUTHORITY 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.
- 6.13.3 All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate written agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the AUTHORITY and contains waiver provisions as required by paragraph 13.17 and termination provisions as required by Article 14.
- 6.13.4 Nothing in the Contract Documents shall create any contractual relationship between the AUTHORITY and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of the AUTHORITY 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 AUTHORITY will not undertake to settle any differences between or among the CONTRACTOR, Subcontractors, or Suppliers.
- 6.13.5 The CONTRACTOR and Subcontractors shall coordinate their work and cooperate with other trades so to facilitate general progress of Work. Each trade shall afford other trades every reasonable opportunity for installation of their work and storage of materials. If cooperative work of one trade must be altered due to lack of proper supervision or failure to make proper provisions in time by another trade, such conditions shall be remedied by the CONTRACTOR with no change in Contract Price or Contract Time.

6.13.6 The CONTRACTOR shall include on his 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.

6.14 Use of Premises:

The CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project limits and approved remote storage sites and lands and areas identified in and permitted by Regulatory Requirements, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against the AUTHORITY by any such owner or occupant because of the performance of the Work, the CONTRACTOR shall hold the AUTHORITY harmless.

6.15 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.

6.16 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. These record documents together with all Approved samples and a counterpart of all Approved Shop Drawings will be available to the Project Manager for reference and copying. Upon completion of the Work, the annotated record documents, samples and Shop Drawings will be delivered to the Project Manager. Record documents shall accurately record variations in the Work which vary from requirements shown or indicated in the Contract Documents.

6.17 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:

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

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

6.17.3 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 as stated in 4.6, 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 acts of God, of 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).

6.18 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 Project Manager.

6.19 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 AUTHORITY, is obligated to act to prevent threatened damage, injury or loss. The CONTRACTOR shall give the Project Manager 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 AUTHORITY 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 Project Manager.

6.20 Shop Drawings and Samples:

- 6.20.1 After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the Project Manager for review and Approval in accordance with the accepted schedule of Shop Drawing submissions the required number of all Shop Drawings, which will bear a stamp or specific written indication that the CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as the Project Manager may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable the Project Manager to review the information as required.
- 6.20.2 The CONTRACTOR shall also submit to the Project Manager for review and Approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that the CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.
- 6.20.3 Before submission of each Shop Drawing or sample the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation

requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.20.4 At the time of each submission the CONTRACTOR shall give the Project Manager specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to the Project Manager for review and Approval of each such variation. All variations of the proposed Shop Drawing from that specified will be identified in the submission and available maintenance, repair and replacement service will be indicated. The submittal will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such variation, including costs of redesign and claims of other Contractors affected by the resulting change, all of which shall be considered by the AUTHORITY in evaluating the proposed variation. If the variation may result in a change of Contract Time or Price, or Contract responsibility, and is not minor in nature; the CONTRACTOR must submit a written request for Change Order with the variation to notify the AUTHORITY of his intent. The AUTHORITY may require the CONTRACTOR to furnish at the CONTRACTOR's expense additional data about the proposed variation. The Project Manager may reject any variation request which the Project Manager determines is not in the best interest of the AUTHORITY.

6.21 Shop Drawing and Sample Review:

- 6.21.1 The Project Manager will review with reasonable promptness Shop Drawings and samples, but the Project Manager's review will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate acceptance of the assembly in which the item functions. The CONTRACTOR shall make corrections required by the Project Manager and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review. The CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by the Project Manager on previous submittals.
- 6.21.2 The Project Manager's review of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless the CONTRACTOR has in writing advised the Project Manager of each such variation at the time of submission as required by paragraph 6.20.4. The Contracting Officer if he so determines, may give written Approval of each such variation by Change Order, except that, if the variation is minor and no Change Order has been requested a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample review comments shall suffice as a modification. Approval by the Contracting Officer will not relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.20.3.
- 6.21.3 The AUTHORITY shall be responsible for all AUTHORITY review costs resulting from the initial submission and the resubmittal. The CONTRACTOR shall, at the discretion of the AUTHORITY, pay all review costs incurred by the AUTHORITY as a result of any additional re-submittals.

6.21.4 Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to the Project Manager's review and Approval of the pertinent submission will be the sole expense and responsibility of the CONTRACTOR.

6.22 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 13.10.

6.23 Continuing the Work:

The CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with the AUTHORITY. 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.

6.24 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 his Sureties of any of his or its 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.

6.25 Use of Explosives:

6.25.1 When the use of explosives is necessary for the prosecution of the Work, the CONTRACTOR shall exercise the utmost care not to endanger life or property, including new Work and shall follow all Regulatory Requirements applicable to the use of explosives. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

6.25.2 All explosives shall be stored in a secure manner in compliance with all Regulatory Requirements, and all such storage places shall be clearly marked. Where no Regulatory Requirements apply, safe storage shall be provided not closer than 1,000 feet from any building, camping area, or place of human occupancy.

6.25.3 The CONTRACTOR shall notify each public utility owner having structures in proximity to the site of his intention to use explosives. Such notice shall be given sufficiently in advance to enable utility owners to take such steps as they may deem necessary to protect their property from injury. However, the CONTRACTOR shall be responsible for all damage resulting from the use of the explosives, whether or not, utility owners act to protect their property.

6.26 CONTRACTOR's Records:

6.26.1 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.

- 6.26.2 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.
- 6.26.3 Records of all communications between the AUTHORITY 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 AUTHORITY or its assigned representative may perform an audit of these records during normal work hours after written notice to the CONTRACTOR.

6.27 Load Restrictions

The CONTRACTOR shall comply with all load restrictions as set forth in the "Administrative Permit Manual", and Title 17, Chapter 25, of the Alaska Administrative Code in the hauling of materials on public roads, beyond the limits of the project, and on all public roads within the project limits that are scheduled to remain in use upon completion of the project.

Overload permits may, at the discretion of the State, be issued for travel beyond the project limits for purposes of mobilization and/or demobilization. Issuance of such a permit will not relieve the CONTRACTOR of liability for damage which may result from the moving of equipment.

The operation of equipment of such weight or so loaded as to cause damage to any type of construction will not be permitted. No overloads will be permitted on the base course or surface course under construction. No loads will be permitted on a concrete pavement, base or structure before the expiration of the curing period. The CONTRACTOR shall be responsible for all damage done by his equipment.

ARTICLE 7 - LAWS AND REGULATIONS

7.1 Laws to be Observed

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 AUTHORITY and its representatives against claim or liability arising from or based on the 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 AUTHORITY 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 is a condition precedent to final payment by the AUTHORITY under this Contract.

- 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 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 AUTHORITY, 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 AUTHORITY for any costs, expenses, and damages which 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 AUTHORITY are at variance with any Regulatory Requirements, CONTRACTOR shall give the Project Manager prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 9.2. as determined appropriate by the Project Manager. 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 Project Manager, the CONTRACTOR shall bear all costs arising there from; however, it shall not be the CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings supplied by the AUTHORITY 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 provide and maintain in a neat and sanitary condition such accommodations for the use of his employees and AUTHORITY representatives as may be necessary to comply with the 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: "it is unlawful for a person to submit a bid or work as a contractor until he has been issued a certificate of registration by the Department of Commerce. A

partnership or joint venture shall be considered registered if one of the general partners or ventures whose name appears in the name under which the partnership or venture does business is registered."

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. 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 to include 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 Archaeological or Paleontological Discoveries:

When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, or paleontological remains, such as shell heaps, land or sea mammal bones or tusks, the CONTRACTOR shall cease operations immediately and notify the Project Manager. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the Contracting Officer order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra Work, such shall be covered by an appropriate Contract change document.

7.12 Applicable Alaska Preferences: Not Applicable.

7.13 Preferential Employment: Not Applicable.

7.14 Wages and Hours of Labor:

7.14.1 One certified copy of all payrolls shall be submitted weekly to the State Department of Labor and, upon request, to the Contracting Officer to assure to assure compliance with AS 36.05.040, *Filing Schedule of Employees Wages Paid and Other Information*. 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 to the Work performed. The CONTRACTOR and his 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. Regardless of project funding source, copies of all certified payrolls supplied to the State Department of Labor by the CONTRACTOR shall be supplied also to the Project Manager upon request, including submittals made by, or on behalf of, subcontractors.

7.14.2 The following labor provisions shall also apply to this Contract:

- a. The CONTRACTOR and his Subcontractors shall pay all employees unconditionally and not less than once a week;
- b. wages may not be less than those stated under AS 36.05.010, 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 AUTHORITY 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.

7.14.3 Within three calendar days of award of a construction contract, the CONTRACTOR shall file a "Notice of Work" with the Department of Labor and shall pay all related fees. The Contracting Officer will not issue Notice to Proceed to the CONTRACTOR until such notice and fees have been paid to the Department of Labor. Failure of the CONTRACTOR to file the Notice of Work and pay fees within this timeframe shall not constitute grounds for an extension of contract time or adjustment of contract price.

7.15 Overtime Work Hours and Compensation:

Pursuant to 40 *U.S.C.* 327-330 and AS 23.10.060 -.110, 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 any affected employee for any amounts due and penalties and to the AUTHORITY 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.

7.16 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 DEPARTMENT 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.

7.17 Officials Not to Benefit:

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

7.18 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 AUTHORITY employees authorized as his representatives, either personally or as officials of the AUTHORITY, it being always understood that in such matters they act as agents and representatives of the AUTHORITY.

ARTICLE 8 - OTHER WORK

8.1 Related Work at Site:

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

8.1.2 When separate contracts are let within the limits of the Project, the CONTRACTOR shall conduct his 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 his Work with that of the others in an acceptable manner and shall perform it in proper sequence to that of others.

8.1.3 If the fact that other such work 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 AUTHORITY 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.

8.1.4 If the fact that such other work is to be performed was 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 Project Manager of such required increase within fifteen (15) calendar days following receipt of the Contracting Officer's notice. Should the Project Manager find such increase(s) to be justified, a Change Order will be executed.

8.2 Access, Cutting, and Patching:

The CONTRACTOR shall afford each utility owner and any other contractor who is a party to such a direct contract with the AUTHORITY (or the AUTHORITY, if the AUTHORITY is performing the additional work with the AUTHORITY'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 Project Manager. The duties and responsibilities of the CONTRACTOR under this paragraph are for the benefit of other contractors to the extent that there are comparable provisions for the benefit of the CONTRACTOR in said direct contracts between the AUTHORITY and other contractors.

8.3 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 AUTHORITY, the CONTRACTOR shall inspect and promptly report to the Project Manager 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 to so report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

8.4 Coordination:

If the AUTHORITY contracts with others for the performance of other work at the site, Project Manager will have authority and responsibility for coordination of the activities among the various prime contractors.

ARTICLE 9 - CHANGES

9.1 AUTHORITY's Right to Change

Without invalidating the Contract and without notice to any Surety, the AUTHORITY may, at any time or from time to time, order additions, deletions or revisions in the Work within the general scope of the Contract, including but not limited to changes:

- 9.1.1 In the Contract Documents;
- 9.1.2 In the method or manner of performance of the Work;
- 9.1.3 In Authority-furnished facilities, equipment, materials, services, or site;
- 9.1.4 Directing acceleration in the performance of the Work.

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 by one or more of following ways:

- 9.2.1 Directive (pursuant to paragraph 9.3)
- 9.2.2 A Change Order (pursuant to paragraph 9.4)
- 9.2.3 AUTHORITY's acceptance of Shop Drawing variations from the Contract Documents as specifically identified by the CONTRACTOR as required by paragraph 6.20.4.

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 Project Manager may authorize minor variations in the Work from the requirements of the Contract Documents which 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 Project Manager may order the Contractor to correct Defective Work or methods which are not in conformance with the Contract Documents.
- 9.3.4 The Project Manager may direct the commencement or 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 Project Manager, 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 immediately provide written notice to the Project Manager depicting such increases before proceeding with the Directive, except in the case of an emergency. If the Project Manager finds the increase in Contract Price or the extension of Contract Time justified, a Change Order will be issued. If however, the Project Manager does not find that a Change Order is justified, the Project Manager may direct the CONTRACTOR to proceed with the Work. The CONTRACTOR shall cooperate with the Project Manager 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" as provided in 10.4

9.4 Change Order

A change in Contract Time, Contract Price, or responsibility may be made for changes within the scope of the Work 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 Documents except as otherwise specifically provided. Changes in Contract Price and Contract Time shall be made in accordance with Articles 10 and 11. A Change Order shall be considered executed when it is signed by the AUTHORITY.

9.5 Shop Drawing Variations

Variations by shop drawings shall only be eligible for consideration under 9.4 when the conditions affecting the price, time, or responsibility are identified by the CONTRACTOR in writing and a request for a Change Order is submitted as per 6.20.4.

9.6 Changes Outside the General Scope; Supplemental Agreement

Any change which is outside the general scope of the Contract, as determined by the Project Manager, must be authorized by a Supplemental Agreement signed by the appropriate representatives of the AUTHORITY and the CONTRACTOR.

9.7 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 6.19 and except in the case of uncovering Work as provided in paragraph 12.4.2.

9.8 Notification of Surety:

If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any bond to be given to a Surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable bond will be adjusted accordingly.

9.9 Differing Site Conditions:

9.9.1 The CONTRACTOR shall promptly, and before such conditions are disturbed (except in an emergency as permitted by paragraph 6.19), notify the Project Manager 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 Project Manager shall promptly investigate the conditions, and if the Project Manager 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.

9.9.2 Any claim for additional compensation by the CONTRACTOR under this clause shall be made in accordance with Article 15. In the event that the Contracting Officer and the CONTRACTOR are unable to reach an agreement concerning an alleged differing site condition, the CONTRACTOR will be required to keep an accurate and detailed record which 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 Project Manager shall be given the opportunity to supervise and check the keeping of such records.

9.10 Interim Work Authorization

An Interim Work Authorization may be used to establish a change within the scope of the Work; however, only a Change Order shall establish associated changes in Contract Time and Price. Work authorized by Interim Work Authorization shall be converted to a Change Order. The basis of payment shall be as stated in the Interim Work Authorization, unless it states that the basis of payment has not been established and is to be negotiated, in which case the Cost of the Work shall be documented pursuant to Article 10.4, to establish a basis for negotiating a lump sum price for the Change Order.

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 his expense without change in the Contract Price. The Contract Price may only be changed by a Change Order or Supplemental Agreement.

10.2 Claim for Price Change:

Any claim for an increase or decrease in the Contract Price shall be submitted in accordance with the terms of Article 15, and shall not be allowed unless notice requirements of this Contract have been met.

10.3 Change Order Price Determination:

The value of any Work covered by a Change Order for an increase or decrease in the Contract Price shall be determined in one of the following ways:

10.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of subparagraphs 10.9.1 through 10.9.3, inclusive).

10.3.2 By mutual acceptance of a lump sum price that includes overhead and profit. The following maximum rates of cost markup (to cover both overhead and profit of the CONTRACTOR) shall be used in the negotiation of a Lump Sum Change Order:

- a. 17% - where a cost is borne directly by prime contractor (first tier contractor).
- b. 10% - where a cost is borne by a subcontractor (lower tier contractor).

Where the cost is borne by a subcontractor acting as a first tier contractor, the allowable overhead and profit markup for lump sum change orders shall not exceed 17%. Any lower tier subcontractors, including the CONTRACTOR in this case, for whom the first tier subcontractor performs the work, shall be allowed an overhead and profit markup that does not exceed 10%.

10.3.3 When 10.3.1 and 10.3.2 are inapplicable, on the basis of the "cost of the work" (determined as provided in paragraphs 10.4 and 10.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 10.6).

10.3.4 Before a Change Order or Supplemental Agreement is approved, the CONTRACTOR shall submit cost or pricing data regarding the changed or extra Work. The CONTRACTOR shall certify that the data submitted is, to his best knowledge and belief, accurate, complete and current as of a mutually determined specified date and that such data will continue to be accurate and complete during the performance of the changed or extra Work.

10.4 Cost of the Work:

The term "cost of the work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by the AUTHORITY, such costs shall be in amount no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in subparagraph 10.5:

- 10.4.1 Payroll costs for employees in the direct employ of the CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by the AUTHORITY and the CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include manual workers up through the level of foreman but shall not include general foremen, superintendents, and non-manual employees. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays shall be included in the above to the extent authorized by the AUTHORITY.
- 10.4.2 Cost of all materials and equipment furnished and incorporated or consumed in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to the CONTRACTOR unless the AUTHORITY deposits funds with the CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to the AUTHORITY. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the AUTHORITY, and the CONTRACTOR shall make provisions so that they may be obtained.
- 10.4.3 Payments made by the CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by the AUTHORITY, CONTRACTOR shall obtain competitive quotes from Subcontractors or Suppliers acceptable to the CONTRACTOR and shall deliver such quotes to the AUTHORITY who will then determine which quotes will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of "cost of the work" plus a fee, the Subcontractor' "cost of the work" shall be determined in the same manner as the CONTRACTOR's "cost of work" as described in paragraphs 10.4 through 10.5; and the Subcontractor's fee shall be established as provided for under subparagraph 10.6.2 clause b. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.
- 10.4.4 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, and surveyors) employed for services necessary for the completion of the Work.
- 10.4.5 Supplemental costs including the following:
- a. The proportion of necessary transportation, travel and subsistence expenses of the CONTRACTOR's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of the CONTRACTOR.
 - c. Rentals of all construction equipment and machinery and the parts thereof whether rented from the CONTRACTOR or others in accordance with rental agreements Approved by the AUTHORITY and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

For any machinery or special equipment (other than small tools) which has been authorized by

the Project Manager, the CONTRACTOR shall receive the rental rates in the current edition and appropriate volume of the "Rental Rate Blue Book for Construction Equipment", published by Dataquest, Inc., 1290 Ridder Park Drive, San Jose, CA 95131. Hourly rental rates shall be determined as follows:

The established hourly rental rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 176, and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

The adjusted monthly rate is that resulting from application of the rate adjustment formula in order to eliminate replacement cost allowances in machine depreciation and contingency cost allowances.

Attachments shall not be included unless required for the time and materials work.

For equipment not listed in The Blue Book, the CONTRACTOR shall receive a rental rate as agreed upon before such work is begun. If agreement cannot be reached, the AUTHORITY reserves the right to establish a rate based on similar equipment in the Blue Book or prevailing commercial rates in the area.

These rates shall apply for equipment used during the CONTRACTOR's regular shift of 10 hours per day. Where the equipment is used more than 10 hours per day, either on the CONTRACTOR's normal work or on time and materials, and either on single or multiple shifts, an overtime rate, computed as follows, shall apply:

The hourly overtime rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

Equipment which must be rented or leased specifically for work required under this section shall be authorized in writing by the Project Manager. The CONTRACTOR shall be paid invoice price plus 15%.

When it is necessary to obtain equipment from sources beyond the project limits exclusively for time and materials, work, the actual cost of transferring the equipment to the site of the work and return will be allowed as an additional item of expense. Where the move is made by common carrier, the move-in allowance will be limited to the amount of the freight bill or invoice. If the CONTRACTOR hauls the equipment with his own forces, the allowance will be limited to the rental rate for the hauling unit plus operator wages. In the event that the equipment is transferred under its own power, the moving allowance will be limited to one-half of the normal hourly rental rate plus operator's wages. In the event that the move-out is to a different location, payment will in no instance exceed the amount of the move-in. Move-in allowance shall not be made for equipment brought to the project for time and materials work which is subsequently retained on the project and utilized for completion of contract items, camp maintenance, or related work.

Equipment ordered to be on a stand-by basis shall be paid for at the stand-by rental rate for the number of hours in the CONTRACTOR'S normal work shift, but not to exceed 8 hours per day. The stand-by rental rate shall be computed as follows:

The hourly stand-by rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, all multiplied by the area adjustment factor.

Time will be recorded to the nearest one-quarter hour for purposes of computing compensation to the CONTRACTOR for equipment utilized under these rates.

The equipment rates as determined above shall be full compensation, including overhead and profit, for providing the required equipment and no additional compensation will be made for other costs such as, but not limited to, fuels, lubricants, replacement parts or maintenance costs. Cost of repairs, both major and minor, as well as charges for mechanic's time utilized in servicing equipment to ready it for use prior to moving to the project and similar charges will not be allowed.

- d. Sales, consumer, use or similar taxes related to the Work, and for which the CONTRACTOR is liable, imposed by Regulatory Requirements.
- e. Deposits lost for causes other than negligence of the CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by the CONTRACTOR in connection with the performance and furnishing of the Work provided they have resulted from causes other than the negligence of the CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and Approval of the AUTHORITY. No such losses, damages and expenses shall be included in the "cost of the work" for the purpose of determining the CONTRACTOR's fee. If, however, any such loss or damage requires reconstruction and the CONTRACTOR is placed in charge thereof, the CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraphs 10.6.2.a and 10.6.2.b.
- g. The cost of utilities, fuel and sanitary facilities at the site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.
- I. Cost of premiums for additional bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by the AUTHORITY in accordance with Article 5.

10.5 Excluded Costs:

The term "cost of the work" shall not include any of the following:

- 10.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing agency, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 10.4.1 or specifically covered by paragraph 10.4.4 all of which are to be considered administrative costs covered by the CONTRACTOR's fee.
- 10.5.2 Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

- 10.5.3 Any part of CONTRACTOR's capital expenses including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.
- 10.5.4 Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 10.4.5.i above).
- 10.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.
- 10.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 10.4.

10.6 CONTRACTOR's Fee:

The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows.

- 10.6.1 A mutually acceptable fixed fee; or if none can be agreed upon.
- 10.6.2 A fee based on the following percentages of the various portions of the "cost of the work":
 - a. For costs incurred under paragraphs 10.4.1 and 10.4.2, the CONTRACTOR's fee shall be twenty percent;
 - b. For costs incurred under paragraph 10.4.3, the CONTRACTOR's fee shall be ten percent; and if a subcontract is on the basis of "cost of the work" plus a fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors and multiple tiers thereof shall be fifteen percent;
 - c. No fee shall be payable on the basis of costs itemized under paragraphs 10.4.4, 10.4.5 and 10.5;
 - d. The amount of credit to be allowed by the CONTRACTOR to the AUTHORITY for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's fee by an amount equal to ten percent of the net decrease; and
 - e. When both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 10.6.2.a through 10.6.2.d, inclusive.

10.7 Cost Breakdown:

Whenever the cost of any Work is to be determined pursuant to paragraphs 10.4 and 10.5, the CONTRACTOR will submit in a form acceptable to the AUTHORITY an itemized cost breakdown together with supporting data.

10.8 Cash Allowances:

It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors

or Suppliers and for such sums within the limit of the allowances as may be acceptable to the Contracting Officer. CONTRACTOR agrees that:

- 10.8.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and
- 10.8.2 CONTRACTOR's cost for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued to reflect actual amounts due the CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

10.9 Unit Price Work:

- 10.9.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Contract. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by the CONTRACTOR will be made by the AUTHORITY in accordance with paragraph 10.10.
- 10.9.2 Each unit price will be deemed to include an amount considered by the CONTRACTOR to be adequate to cover the CONTRACTOR's overhead and profit for each separately identified item. If the "Basis of Payment" clause in the Contract Documents relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the Contract Documents.
- 10.9.3 Payment to the CONTRACTOR shall be made only for the actual quantities of Work performed and accepted or materials furnished, in conformance with the Contract Documents. When the accepted quantities of Work or materials vary from the quantities stated in the bid schedule, or change documents, the CONTRACTOR shall accept as payment in full, payment at the stated unit prices for the accepted quantities of Work and materials furnished, completed and accepted; except as provided below:
 - a. When the quantity of Work to be done or material to be furnished under any item, for which the total cost of the item exceeds 10% of the total Contract Price, is increased by more than 25 percent of the quantity stated in the bid schedule, or change documents, either party to the Contract, upon demand, shall be entitled to an equitable unit price adjustment on that portion of the Work above 125 percent of the quantity stated in the bid schedule.
 - b. When the quantity of Work to be done or material to be furnished under any major item, for which the total cost of the item exceeds 10% of the total Contract Price, is decreased by more than 25 percent of the quantity stated in the bid schedule, or change documents either party to the Contract, upon demand, shall be entitled to an equitable price adjustment for the quantity

of Work performed or material furnished, limited to a total payment of not more than 75 percent of the amount originally bid for the item.

10.10 Determinations for Unit Prices:

The Project Manager will determine the actual quantities and classifications of Unit Price Work performed by the CONTRACTOR. The Project Manager will review with the CONTRACTOR preliminary determinations on such matters before finalizing the costs and quantities on the Schedule of Values. The Project Manager's acknowledgment thereof will be final and binding on the CONTRACTOR, unless, within 10 days after the date of any such decisions, the CONTRACTOR delivers to the Project Manager written notice of intention to appeal from such a decision.

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.

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 Project Manager at least 24 hours 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 him to order long lead materials which could cause delays in Project completion. However, granting 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 time, or alteration of price.

11.3 Computation of Contract Time:

11.3.1 When the Contract Time is specified on a Calendar Day 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 Final Completion.

11.3.3 The Contract Time shall be as stated is 00800, Supplementary Conditions.

11.4 Time Change:

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

11.5 Extension Due to Delays:

The right of the CONTRACTOR to proceed shall not be terminated nor the CONTRACTOR charged with liquidated or actual damages because of delays to the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the

CONTRACTOR, including, but not restricted to the following: acts of God or of the public enemy, acts of the AUTHORITY in its contractual capacity, acts of another contractor in the performance of a contract with the AUTHORITY, floods, fires, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather and delays of Subcontractors or Suppliers due to such causes. Any delay in receipt of materials on the site, caused by other than one of the specifically mentioned occurrences above, does not of itself justify a time extension, provided that the CONTRACTOR shall within twenty four (24) hours from the beginning of any such delay (unless the Contracting Officer shall grant a further period of the time prior to the date of final settlement of the Contract), notify the Project Manager in writing of the cause of delay. The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when the findings of fact justify such an extension.

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 CONTRACTOR and the AUTHORITY 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, he and his Sureties shall be liable for damages resulting from his refusal or failure to complete the Work within the specified time.

Liquidated and actual damages for delay shall be paid by the CONTRACTOR or his Surety to the AUTHORITY in the amount as specified in the Supplementary Conditions 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. If a listing of incidents resulting from a delay and expected to give rise to actual or liquidated damages is not established by the Contract Documents, then the CONTRACTOR and his Surety shall be liable to the AUTHORITY for any actual damages occasioned by such delay. The CONTRACTOR acknowledges that the liquidated damages established herein are not a penalty but rather constitute an estimate of damages that the AUTHORITY will sustain by reason of delayed completion. These liquidated and actual damages are intended as compensation for losses anticipated arising, and including those items enumerated in the Supplementary Conditions.

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 AUTHORITY costs, fees, and charges related to reprocurement. If a default termination occurs, the CONTRACTOR or his Surety shall pay in addition to these damages, all excess costs and expenses related to completion as provided by Article 14.2.5.

For each calendar day that the work remains incomplete after the expiration of the Contract Time, liquidated damages in the amount as stated in 00800, Supplemental Conditions shall be assessed to the CONTRACTOR. If no money is due the CONTRACTOR, the AUTHORITY shall have the right to recover said sum from the CONTRACTOR, the surety or both. The amount of these deductions is to reimburse the AUTHORITY for estimated liquidated damages incurred as a result of the CONTRACTOR's failure to complete the work within the time specified. As liquidated

damages, such deductions are not to be considered as penalties.

Permitting the CONTRACTOR to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the AUTHORITY of any of its rights under the Contract.

ARTICLE 12 - QUALITY ASSURANCE

12.1 Warranty and Guaranty:

The CONTRACTOR warrants and guarantees to the AUTHORITY 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.

12.2 Access to Work:

The AUTHORITY and the AUTHORITY's consultants, 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 Project Manager 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 Project Manager 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 AUTHORITY'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 AUTHORITY may perform additional tests and inspections which it deems necessary to insure quality control. All such failed tests or inspections shall be at the CONTRACTOR's expense.
- 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 Project Manager, it must, if requested by the Project Manager, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the Project Manager timely notice of CONTRACTOR's intention to cover the same and the Project Manager has not acted with reasonable promptness in response to such notice.
- 12.3.5 Neither observations nor inspections, tests or Approvals by the AUTHORITY or others shall relieve the CONTRACTOR from the CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

12.4 Uncovering Work:

12.4.1 If any Work is covered contrary to the written request of the Project Manager, it must, if requested by the Project Manager, be uncovered for the Project Manager's observation and replaced at the CONTRACTOR's expense.

12.4.2 If the Project Manager considers it necessary or advisable that covered Work be observed inspected or tested, the CONTRACTOR, at the Project Manager's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the Project Manager may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is Defective, the CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) and the AUTHORITY shall be entitled to an appropriate decrease in the Contract Price. If, however, such Work is not found to be Defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

12.5 AUTHORITY 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.

12.6 Correction or Removal of Defective Work:

If required by the Project Manager, 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 Project Manager, remove it from the site and replace it with Work which conforms to the requirements of the Contract Documents. The CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

12.7 One Year Correction Period:

If within one year after the date of Substantial Completion of the relevant portion of the Work or such longer period of time as may be prescribed by Regulatory Requirements or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be Defective, the CONTRACTOR shall promptly, without cost to the AUTHORITY and in accordance with the Project Manager's written instructions, either correct such Defective Work, or, if it has been rejected by the Project Manager, remove it from the site and replace it with conforming Work. If the CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, the AUTHORITY may have the Defective Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by the CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service for the benefit of the

AUTHORITY before Substantial Completion of all the Work, the correction period for that item may begin on an earlier date if so provided in the Specifications or by Change Order. Provisions of this paragraph are not intended to shorten the statute of limitations for bringing an action.

12.8 Acceptance of Defective Work:

Instead of requiring correction or removal and replacement of Defective Work, the Project Manager may accept Defective Work, the CONTRACTOR shall bear all direct, indirect and consequential costs attributable to the Project Manager'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 AUTHORITY shall be entitled to an appropriate decrease in the Contract Price. If the AUTHORITY has already made final payment to the CONTRACTOR, an appropriate amount shall be paid by the CONTRACTOR or his Surety to the AUTHORITY.

12.9 AUTHORITY May Correct Defective Work:

If the CONTRACTOR fails within a reasonable time after written notice from the Project Manager to proceed to correct Defective Work or to remove and replace rejected Work as required by the Project Manager in accordance with paragraph 12.6, 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 AUTHORITY may, after 7 days' written notice to the CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph the AUTHORITY shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, the Project Manager 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 AUTHORITY has paid the CONTRACTOR but which are stored elsewhere. The CONTRACTOR shall allow the Project Manager and his authorized representatives such access to the site as may be necessary to enable the Project Manager to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of the AUTHORITY 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 AUTHORITY 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 time because of any delay in performance of the work attributable to the exercise, by the Project Manager, of the AUTHORITY's rights and remedies hereunder.

ARTICLE 13 - PAYMENTS TO CONTRACTOR AND COMPLETION

13.1 Schedule of Values:

The Schedule of Values established as provided in paragraph 6.6 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Project Manager. Progress payments on account of Unit Price Work will be based on the number of units completed.

13.2 Preliminary Payments:

Upon approval of the Schedule of Values the CONTRACTOR may be paid for direct costs substantiated by paid invoices and other prerequisite documents required by the General Requirements. Direct costs shall include the cost of bonds, insurance, approved materials stored on the site or at approved remote storage sites, deposits required by a Supplier prior to fabricating materials, and other approved direct mobilization costs substantiated as indicated above. These payments shall be included as a part of the total Contract Price as stated in the Contract.

13.3 Application for Progress Payment:

The CONTRACTOR shall submit to the Project Manager for review an Application for Payment filled out and signed by the CONTRACTOR covering the Work completed as of the date of the Application 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.

13.4 Review of Applications for Progress Payment:

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

13.5 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 Application for Payment shall also be accompanied by a bill of sale, paid invoice or other documentation warranting that the AUTHORITY 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 AUTHORITY's interest therein, all of which will be satisfactory to the Project Manager. 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.

13.6 CONTRACTOR's Warranty of Title:

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

13.7 Withholding of Payments:

The AUTHORITY 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:

13.7.1 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.

13.7.2 The Contract Price has been reduced by Change Order,

- 13.7.3 The AUTHORITY has been required to correct Defective Work or complete Work in accordance with paragraph 12.9.
- 13.7.4 The AUTHORITY's actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.2.1.a through 14.2.1.k inclusive.
- 13.7.5 Claims have been made against the AUTHORITY or against the funds held by the AUTHORITY on account of the CONTRACTOR's actions or inactions in performing this Contract, or there are other items entitling the AUTHORITY to a set off.
- 13.7.6 Subsequently discovered evidence or the results of subsequent inspections or test, nullify any previous payments for reasons stated in subparagraphs 13.7.1 through 13.7.5.
- 13.7.7 The CONTRACTOR has failed to fulfill or is in violation of any of his obligations under any provision of this Contract.

13.8 Retainage:

At any time the AUTHORITY finds that satisfactory progress is not being made it may in addition to the amounts withheld under 13.7 retain a maximum amount equal to 10% of the total amount earned on all subsequent progress payments. This retainage may be released at such time as the Project Manager finds that satisfactory progress is being made.

13.9 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 AUTHORITY, together with a request for release of funds and adequate documentary evidence proving that the problem has been cured. In the case of withholding which 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 AUTHORITY shall have a reasonable time to investigate and verify the facts and seek additional assurances before determining whether release of withheld payments is justified.

13.10 Substantial Completion:

When the CONTRACTOR considers the Work ready for its intended use the CONTRACTOR shall notify the Project Manager in writing that the Work or a portion of Work which 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 AUTHORITY issue a certificate of Substantial Completion. Within a reasonable time thereafter, the Project Manager, the CONTRACTOR and Engineer(s) shall make an inspection of the Work to determine the status of completion. If the Project Manager does not consider the Work substantially complete, the Project Manager will notify the CONTRACTOR in writing giving the reasons therefore. If the Project Manager considers the Work substantially complete, the Project Manager 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 Project Manager 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 AUTHORITY shall be responsible for all AUTHORITY costs resulting from the initial inspection and the first re-inspection, the CONTRACTOR shall pay all costs incurred by the AUTHORITY resulting from re-inspections, thereafter.

13.11 Access Following Substantial Completion:

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

13.12 Final Inspection:

Upon written notice from the CONTRACTOR that the entire Work or an agreed portion thereof is complete, the Project Manager will make a final inspection with the CONTRACTOR and Engineer(s) 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 AUTHORITY resulting from re-inspections.

13.13 Final Completion and Application for Payment:

After the CONTRACTOR has completed all such corrections to the satisfaction of the Project Manager and delivered schedules, guarantees, bonds, certificates of payment to all laborers, Subcontractors and Suppliers, and other documents - all as required by the Contract Documents; and after the Project Manager has indicated in writing that the Work has met the requirements for Final Completion, and subject to the provisions of paragraph 13.18, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all remaining certificates, warranties, guarantees, releases, affidavits, and other documentation required by the Contract Documents.

13.14 Final Payment:

13.14.1 If on the basis of the Project Manager's observation of the Work during construction and final inspection, and the Project Manager's review of the final Application for Payment and accompanying documentation - all as required by the Contract Documents; and the Project Manager is satisfied that the Work has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the AUTHORITY will process final Application for Payment. Otherwise, the Project Manager will return the Application 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 Application for Payment.

13.14.2 If, through no fault of the CONTRACTOR, Final Completion of the Work is significantly delayed, the Project Manager shall, upon receipt of the CONTRACTOR's final Application for Payment, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by the AUTHORITY for Work not fully completed or corrected is less than the retainage provided for in paragraph 13.9, and if bonds have been furnished as required in paragraph 5.1, the written consent of the Surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the CONTRACTOR to the AUTHORITY with the application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

13.15 Final Acceptance:

Following certification of payment of payroll and revenue taxes, and final payment to the CONTRACTOR, the AUTHORITY will issue a letter of Final Acceptance, releasing the CONTRACTOR from further obligations under the Contract, except as provided in paragraph 13.17.

When it is anticipated that restarting, testing, adjusting, or balancing of systems will be required following Final Acceptance and said requirements are noted in Section(s) 01 77 00, such Work shall constitute a continuing obligation under the Contract.

13.16 CONTRACTOR's Continuing Obligation:

The CONTRACTOR's obligation to perform and complete the Work and pay all laborers, Subcontractors, and material men in accordance with the Contract Documents shall be absolute. Neither any progress or final payment by the AUTHORITY, nor the issuance of a certificate of Substantial Completion, nor any use or occupancy of the Work or any part thereof by the AUTHORITY or Owner, nor any act of acceptance by the AUTHORITY nor any failure to do so, nor any review and Approval of a Shop Drawing or sample submission, nor any correction of Defective Work by the AUTHORITY 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.

13.17 Waiver of Claims by CONTRACTOR:

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

13.18 No Waiver of Legal Rights:

The AUTHORITY 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 therefore, 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 AUTHORITY shall not be precluded or estopped, notwithstanding any such measurement, estimate, or certificate and payment in accordance therewith, from recovering from the CONTRACTOR or his Sureties, or both, such damages as it may sustain by reason of his failure to comply with requirements of the Contract Documents. Neither the acceptance by the AUTHORITY, or any representative of the AUTHORITY, 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 AUTHORITY, 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 AUTHORITY 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 AUTHORITY May Suspend Work:

14.1.1 The AUTHORITY 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 The Contracting Officer may give the contractor and his surety a written Notice to Cure Default if the contractor:

- a. fails to begin work in the time specified,
- b. fails to use sufficient resources to assure prompt completion of the work,
- c. performs the work unsuitably or neglect or refuse to remove and replace rejected materials or work,
- d. stops work,
- e. fails to resume stopped work after receiving notice to do so,
- f. becomes insolvent (except that if you declare bankruptcy, termination will be under Title 11 US Code 362 and/or 365. Your bankruptcy does not relieve the surety of any obligations to assume the Contract and complete the work in a timely manner.
- 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. fails to comply with Contract minimum wage payments or civil rights requirements, or
- l. are party to fraud, deception, misrepresentation , or
- m. for any cause whatsoever, fails to carry on the Work in an acceptable manner.

14.2.2 The Notice to Cure Default will detail the conditions determined to be in default, the time within which to cure the default and may, in the Contracting Officer's discretion, specify the actions necessary to cure the default. Failure to cure the delay, neglect or default within the time specified in the Contracting Officer's written notice to cure authorizes the Authority to terminate the contract. The Contracting Officer may allow more time to cure than originally stated in the Notice to Cure Default if he deems it to be in the best interests of the Authority. The Authority will provide you and your surety with a written Notice of Default Termination that details the default and the failure to cure it.

- 14.2.3 If the CONTRACTOR or Surety, within the time specified in the above notice of default, shall not proceed in accordance therewith, then the AUTHORITY 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 AUTHORITY 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 AUTHORITY has paid the CONTRACTOR but which are stored elsewhere, and finish the Work as the AUTHORITY may deem expedient. The AUTHORITY 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.
- 14.2.4 The Contracting Officer may, by written notice to the CONTRACTOR and his Surety or his representative, transfer the employment of the Work from the CONTRACTOR to the Surety, or if the CONTRACTOR abandons the Work undertaken under the Contract, the Contracting Officer may, at his option with written notice to the Surety and without any written notice to the CONTRACTOR, transfer the employment for said Work directly to the Surety. The Surety shall submit its plan for completion of the Work, including any contracts or agreements with third parties for such completion, to the AUTHORITY for Approval prior to beginning completion of the Work. Approval of such contracts shall be in accordance with all applicable requirements and procedures for Approval of subcontracts as stated in the Contract Documents.
- 14.2.5 After the notice of termination is issued, the Authority may take over the work and complete it by contract or otherwise and may take possession of and use materials, appliances, equipment or plant on the work site necessary for completing the work.
- 14.2.6 Rather than taking over the work itself, the Authority may transfer the obligation to perform the work from the contractor to your surety. The surety must submit its plan for completion of the work, including any contracts or agreements with third parties for completion, to the Authority for approval prior to beginning work. The surety must follow the Contract requirements for approval of subcontracts, except that the limitation on percent of work subcontracted will not apply.
- 14.2.7 On receipt of the transfer notice, the surety must take possession of all materials, tools, and appliances at the work site, employ an appropriate work force, and complete the Contract work, as specified. The Contract specifications and requirements shall remain in effect. However the Authority will make subsequent Contract payments directly to the Surety for work performed under the terms of the Contract. CONTRACTOR forfeits any right to claim for the same work or any part thereof. CONTRACTOR is not entitled to receive any further balance of the amount to be paid under the Contract.
- 14.2.8 Upon receipt of the notice terminating the services of the CONTRACTOR, the Surety shall enter upon the premises and take possession of all materials, tools, and appliances thereon for the purpose of completing the Work included under the Contract and employ by contract or otherwise any person or persons to finish the Work and provide the materials therefore, without termination of the continuing full force and effect of this Contract. In case of such transfer of employment to the Surety, the Surety shall be paid in its own name on estimates covering Work subsequently performed under the terms of the Contract and according to the terms thereof without any right of the CONTRACTOR to make any claim for the same or any part thereof.

14.2.9 If the Contract is terminated for default, the CONTRACTOR and the Surety shall be jointly and severally liable for damages for delay as provided by paragraph 11.8, and for the excess cost of completion, and all costs and expenses incurred by the AUTHORITY in completing the Work or arranging for completion of 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 procurement 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 AUTHORITY and any amounts due to persons for whose benefit the AUTHORITY has withheld funds, such excess shall be paid by the AUTHORITY to the CONTRACTOR. If the damages, costs, and expenses due the AUTHORITY exceed the unpaid balance, the CONTRACTOR and his Surety shall pay the difference.

14.2.10 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 AUTHORITY, the termination will not affect any rights or remedies of the AUTHORITY against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due the CONTRACTOR by the AUTHORITY will not release the CONTRACTOR from liability.

14.4 Convenience Termination:

14.4.1 The performance of the Work may be terminated by the AUTHORITY 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 AUTHORITY the extent to which performance of Work is terminated, and the date upon which such termination becomes effective.

14.4.2 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 which, if the Contract had been completed, would be required to be furnished to the AUTHORITY;
- 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 which is in the possession of the CONTRACTOR and in which the AUTHORITY has or may acquire any interest.

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

14.4.3 When the AUTHORITY 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 AUTHORITY - 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 AUTHORITY shall pay reasonable factory cancellation charges 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 which 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 AUTHORITY. Charges for loss of profit or consequential damages shall not be recoverable except as provided above.

- a. The following costs are not payable under a termination settlement agreement or Contracting Officer's determination of the termination claim:
 - 1. Loss of anticipated profits or consequential or compensatory damages
 - 2. Unabsorbed home office overhead (also termed "General & Administrative Expense") related to ongoing business operations
 - 3. Bidding and project investigative costs
 - 4. Direct costs of repairing equipment to render it operable for use on the terminated work

14.4.4 The termination claim shall be submitted promptly, but in no event later than 90 days from the effective date of termination, unless extensions in writing are granted by the Contracting Officer upon written request of the CONTRACTOR made within the 90 day period. Upon failure of the CONTRACTOR to submit his 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 the amount so determined.

14.4.5 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.

14.4.6 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 which are properly chargeable to the terminated portions of the Contract;
- c. So far as practicable, claims by the contractor for idled or stand-by equipment shall be made as follows: Equipment claims will be reimbursed as follows:
 1. Contractor-owned equipment usage, based on the contractor's ownership and operating costs for each piece of equipment as determined from the contractor's accounting records. Under no circumstance, may the contractor base equipment claims on published rental rates.
 2. Idle or stand-by time for Contractor-owned equipment, based on your internal ownership and depreciation costs. Idle or stand-by equipment time is limited to the actual period of time equipment is idle or on stand-by as a direct result of the termination, not to exceed 30 days. Operating expenses will not be included for payment of idle or stand-by equipment time.
 3. Rented equipment, based on reasonable, actual rental costs. Equipment leased under "capital leases" as defined in Financial Accounting Standard No. 13 will be considered Contractor-owned equipment. Equipment leased from an affiliate, division, subsidiary or other organization under common control with you will be considered Contractor-owned equipment, unless the lessor has an established record of leasing to unaffiliated lessees at competitive rates consistent with the rates you have agreed to pay and no more than forty percent of the lessor's leasing business, measured in dollars, is with organizations affiliated with the lessor.

14.4.7 The CONTRACTOR shall have the right of appeal under the AUTHORITY's claim procedures, as defined in Article 15, for any determination made by the Contracting Officer, except if the CONTRACTOR has failed to submit his 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 AUTHORITY 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 AUTHORITY; and,
- d. All progress payments made to the CONTRACTOR under the provisions of this section.

- 14.4.8 Where the Work has been terminated by the AUTHORITY said termination shall not affect or terminate any of the rights of the AUTHORITY against the CONTRACTOR or his Surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the AUTHORITY due to the CONTRACTOR under the terms of the Contract shall not release the CONTRACTOR or his Surety from liability.
- 14.4.9 The contractor's termination claim may not include claims that pre dated the notice for termination for convenience. Those claims shall be prosecuted by the contractor under Article 15.
- 14.4.10 The contractor's termination claim may not exceed the total dollar value of the contract as awarded plus agreed upon change orders less the amounts that have been paid for work completed.
- a. Unless otherwise provided for in the Contract Documents, or by applicable statute, the CONTRACTOR, from the effective date of termination and for a period of three years after final settlement under this Contract, shall preserve and make available to the AUTHORITY 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 his Contract and relating to the Work terminated hereunder.
 - b. Cost Principles. The Authority may use the federal cost principles at 48 CFR §§ 31.201-1 to 31.205-52 (or succeeding cost principles for fixed price contracts) as guidelines in determining allowable costs under this Subsection to the extent they are applicable to construction contracts and consistent with the specifications of this Contract. The provisions of this contract control where they are more restrictive than, or inconsistent with, these federal cost principles."

ARTICLE 15 - CLAIMS AND DISPUTES

15.1 Notification

- 15.1.1 The CONTRACTOR shall notify the AUTHORITY in writing as soon as the CONTRACTOR becomes aware of any act or occurrence which may form the basis of a claim for additional compensation or an extension of Contract Time or of any dispute regarding a question of fact or interpretation of the Contract. The AUTHORITY has no obligation to investigate any fact or occurrence that might form the basis of a claim or to provide any additional compensation or extension of Contract Time unless the CONTRACTOR has notified the AUTHORITY in writing in a timely manner of all facts the CONTRACTOR believes form the basis for the claim.
- 15.1.2 If the CONTRACTOR believes that he is entitled to an extension of Contract Time, then the CONTRACTOR must state the contract section on which he basis his extension request, provide the AUTHORITY with sufficient information to demonstrate that the CONTRACTOR has suffered excusable delay, and show the specific amount of time to which the CONTRACTOR is entitled. The AUTHORITY will not grant an extension of Contract Time if the CONTRACTOR does not timely submit revised schedules under **Section 01 32 00**.
- 15.1.3 If the matter is not resolved by agreement within 7 days, the CONTRACTOR shall submit an Intent to Claim, in writing, to the AUTHORITY within the next 14 days.
- 15.1.4 If the CONTRACTOR believes additional compensation or time is warranted, then he must immediately begin keeping complete, accurate, and specific daily records concerning every detail of the potential claim including actual costs incurred. The

CONTRACTOR shall provide the AUTHORITY access to any such records and furnish the AUTHORITY copies, if requested. Equipment costs must be based on the CONTRACTOR's internal rates for ownership, depreciation, and operating expenses and not on published rental rates. In computing damages, or costs claimed for a change order, or for any other claim against the Authority for additional time, compensation or both, the contractor must prove actual damages based on internal costs for equipment, labor or efficiencies. Total cost, modified total cost or jury verdict forms of presentation of damage claims are not permissible to show damages. Labor inefficiencies must be shown to actually have occurred and can be proven solely based on job records. Theoretical studies are not a permissible means of showing labor inefficiencies. Home office overhead will not be allowed as a component of any claim against the Authority.

- 15.1.5 If the claim or dispute is not resolved by the Project Manager, then the CONTRACTOR shall submit a written Claim to the Contracting Officer within 90 days after the CONTRACTOR becomes aware of the basis of the claim or should have known the basis of the claim, whichever is earlier. The Contracting Officer will issue written acknowledge of the receipt of the Claim.
- 15.1.6 The CONTRACTOR waives any right to claim if the AUTHORITY was not notified properly or afforded the opportunity to inspect conditions or monitor actual costs or if the Claim is not filed on the date required.

15.2 Presenting the Claim

- 15.2.1 The Claim must include all of the following:
- a. The act, event, or condition the claim is based on
 - b. The Contract provisions which apply to the claim and provide relief
 - c. The item or items of Contract work affected and how they are affected
 - d. The specific relief requested, including Contract Time if applicable, and the basis upon which it was calculated
 - e. A statement certifying that the claim is made in good faith, that the supporting cost and pricing data are accurate and complete to the best of your knowledge and belief, and that the amount requested accurately reflects the Contract adjustment which the CONTRACTOR believes is due.

15.3 Claim Validity, Additional Information, and AUTHORITY's Action

- 15.3.1 The Claim, in order to be valid, must not only show that the CONTRACTOR suffered damages or delay but that it was caused by the act, event, or condition complained of and that the Contract provides entitlement to relief for such act, event, or condition.
- 15.3.2 The AUTHORITY can make written request to the CONTRACTOR at any time for additional information relative to the Claim. The CONTRACTOR shall provide the AUTHORITY the additional information within 30 days of receipt of such a request. Failure to furnish the additional information may be regarded as a waiver of the Claim.

15.4 Contracting Officer's Decision

- 15.4.1 The CONTRACTOR will be furnished the Contracting Officer's Decision within 90 days, unless the Contracting Officer requests additional information or gives the CONTRACTOR notice that the time for issuing a decision is being extended for a specified period. The Contracting Officer's decision is final and conclusive unless,

within 14 days of receipt of the decision, the CONTRACTOR delivers a Notice of Appeal to the Executive Director of the Authority.

15.5 Appeals on a Contract Claim.

15.5.1 An appeal from a decision of the Contracting Officer on a contract claim may be filed by the CONTRACTOR with the Executive Director of the Authority. The appeal shall be filed within 14 days after the decision is received by the CONTRACTOR. An appeal by the CONTRACTOR may not raise any new factual issues or theories of recovery that were not presented to and decided by the Contracting Officer in the decision under Section 15.4, except that a CONTRACTOR may increase the contractor's calculation of damages if the increase arises out of the same operative facts on which the original claim was based. The CONTRACTOR shall file a copy of the appeal with the Contracting Officer.

- a. An appeal must contain a copy of the decision being appealed and identification of the factual or legal errors in the decision that form the basis for the appeal.
- b. The Executive Director shall handle the appeal of a claim under this section expeditiously.

15.6 Construction Contract Claim Appeals.

15.6.1 The appeal from a decision of the Contracting Officer of a claim involving a construction contract shall be resolved by:

- a. binding and final arbitration under AS 09.43.010 - 09.43.180 (Uniform Arbitration Act) if the claim is:
 1. less than \$250,000 and the CONTRACTOR requests arbitration of the claim; or
 2. \$250,000 or more and both the agency and the CONTRACTOR agree to arbitration of the claim; or
- b. a hearing under the Authority's established policy and procedures if the claim is not handled by arbitration under 15.6.1 of this subsection.

15.7 Fraud and Misrepresentation in Making Claims

Criminal and Civil penalties authorized under State or federal law (including, but not limited to, forfeiture of all claimed amounts) may be imposed on the CONTRACTOR if the CONTRACTOR makes or uses a misrepresentation in support of a claim or defraud or attempt to defraud the AUTHORITY at any stage of prosecuting a claim under this Contract.”

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SECTION 00 80 00
SUPPLEMENTARY CONDITIONS
MODIFICATIONS TO THE GENERAL CONDITIONS

The following supplements modify, change, delete from, or add to Section 00 70 00 "General Conditions of the Construction Contract for Buildings", revised December, 2011. Where any article of the General Conditions is modified, or a Paragraph, Subparagraph, or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

SC-1-DEFINITIONS

A. Add the following definitions:

1. **QUALITY ASSURANCE ACCEPTANCE TESTING** – This is all sampling and testing performed by the CONTRACTOR to determine at what level the product or service will be accepted for payment. Qualified personnel and laboratories will perform sampling and testing. The AUTHORITY pays for this testing.
2. **QUALITY CONTROL PROGRAM (QC PROGRAM)** – The CONTRACTOR'S, Subcontractor's or Supplier's operational techniques and activities that maintain control of the manufacturing process to fulfill the Contract requirements. This may include materials handling, construction procedures, calibration and maintenance of equipment, production process control, material sampling, testing and inspection, and data analysis.
3. **RESIDENT ENGINEER** - The Engineer's authorized representative assigned to make detailed observations relating to contract performance.

SC-2.4-VISITS TO SITE/PLACE OF BUSINESS

At General Conditions Article 2.4, delete the first four words of the first sentence ("The Contracting Officer will ...") and replace with the following words "The Contracting Officer has the right to, but is not obligated to..."

SC-4.2-VISIT TO SITE

At General Conditions Article 4.2, delete this article in its entirety and replace with the following article:

- "A. A formal visit to the site will occur as noted on the Invitation to Bid".

SC-4.3-EXPLORATIONS AND REPORTS

At General Conditions Article 4.3, add the following paragraph:

“All reports and other records (if available) are provided for informational purposes only to all plan holders listed with the AUTHORITY as General Contractors, and are available to other planholders upon request. They are made available so Bidders have access to the same information available to the AUTHORITY. The reports and other records are not intended as a substitute for independent investigation, interpretation, or judgment of the Bidder. The AUTHORITY is not responsible for any interpretation or conclusion drawn from its records by the Bidder. While referenced by or provided with the Contract Documents; the recommendations, engineering details, and other information contained in these reports of explorations shall not be construed to supersede or constitute conditions of the Contract Documents.”

SC-5.4.1 – INSURANCE REQUIREMENTS

At General Condition Article 5.4.1, delete the second to the last sentence and replace with the following: “The delivery to the AUTHORITY of a written notice in accordance with the policy provisions is required before cancellation of any coverage or reduction in any limits of liability.”

SC-5.4.2a – WORKERS COMPENSATION INSURANCE

At General Condition Article 5.4.2a, delete paragraph “a” in its entirety and replace with the following:

- "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. Coverage shall include:
1. Waiver of subrogation against the Authority.
 2. Employer's Liability Protection in the amount of \$500,000 each accident / \$500,000 each disease.
 3. 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.
 4. Whenever the work involves activity on or about navigable waters, the Workers' Compensation policy shall contain a United States Longshoreman's and Harbor Worker's Act endorsement, and when appropriate, a Maritime Employer's Liability (Jones Act) endorsement with a minimum limit of \$1,000,000.”

SC-5.4.2d- BUILDER'S RISK INSURANCE

At General Conditions Article 5.4.2.d, delete the subsection in its entirety.

SC-9.4-CHANGE ORDER

A. At General Conditions Article 9.4, add the following sentence:

"The AUTHORITY will issue Change Orders for the CONTRACTOR to sign. A Change Order shall be considered executed when the AUTHORITY signs it. The CONTRACTOR'S signature indicates that they accept the Change Order or acknowledge it. Acknowledgement of a Change Order does not surrender the CONTRACTOR'S right to claim."

SC-11.8-DELAY DAMAGES

At General Condition Article 11.8, add the following paragraphs:

11.8.1 For each calendar day that the Work is not Substantially Complete after the expiration of the Contract Time or the completion date has passed, the AUTHORITY shall deduct \$500 from progress payments.

11.8.2 If no money is due the CONTRACTOR, the AUTHORITY shall have the right to recover these sums from the CONTRACTOR, from the Surety, or from both. These are liquidated damages and not penalties. These charges shall reimburse the AUTHORITY for its additional administrative expenses incurred due to CONTRACTOR'S failure to complete the work within the time specified.

11.8.3 Permitting the CONTRACTOR to continue and finish the work or any part of it after the Contract time has elapsed or the completion date has passed does not waive the AUTHORITY'S rights to collect liquidated damages under this section.

SC-12.1-WARRANTY AND GUARANTEE

At General Condition Article 12.1, add the following sentence:

"The failure of the AUTHORITY to strictly enforce the Contract in one or more instances does not waive its right to do so in other or future instances."

SC-12.6-CORRECTION OR REMOVAL OF DEFECTIVE WORK

At General Condition Article 12.6, add the following paragraphs:

"The CONTRACTOR shall establish necessary lines and grades before performing the Work. Work done before necessary lines and grades are established, Work contrary to the AUTHORITY'S instructions, Work done beyond the limits of the Contract, or any extra Work done without authority, will be considered as unauthorized and shall not be paid for by the AUTHORITY, and may be ordered removed or replaced at no additional cost to the AUTHORITY."

SC-15.6- Construction Contract Claim Appeals.

Delete 15.6 in its entirety.

PROJECT NO. 19041

END OF SECTION 00 80 00

REQUIRED CONTRACT PROVISIONS
For
FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Non-discrimination
- III. Non-segregated Facilities³
- IV. Payment of Predetermined Minimum Wages
- V. Statements and Payrolls
- VI. Record of Materials, Supplies, and Labor
- VII. Subletting or Assigning the Contract
- VIII. Safety: Accident Prevention
- IX. False Statements
- X. Implementation of Clean Air Act and Federal Water Pollution Control Act
- XI. Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion
- XII. Certification Regarding Use of Contract Funds for Lobbying

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the Contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of these Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. Selection of Labor: During the performance of this contract, the contractor shall not:

- a. discriminate against labor from any other State, possession, or territory of the United States, or
- b. Employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION (Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the Alaska Energy Authority (AEA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the AEA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the AEA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the AEA.

8. Selection of Subcontractors, Procurement of Materials, and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 26 shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from AEA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years

following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the AEA and the U.S. DOT.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the AEA each July for the duration of the project, indicating the number of minority, women, and non minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on the job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES (Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO Provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

2. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, or national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

3. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to the award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGES (Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on

any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The AEA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) The work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) The additional classification is utilized in the area by the construction industry;

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) With respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the U.S. Department of Labor, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days

of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U. S. DOL) and Helpers:

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate that is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers: Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, which is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT): Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and

trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding: The AEA shall, upon its own action or upon written request of an authorized representative of the DOL, withhold or cause to be withheld from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the AEA Procurement Officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements: No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such work week unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation: Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible therefor shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages: The AEA shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS (Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3): The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b) (2) (B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish each week in which any contract work is performed a payroll of wages paid each of its employees (including apprentices, trainees, and helpers described in Section IV, paragraphs 4 and 5 and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402 or the Government Bookstore, 915 Second Avenue, Seattle, WA 98174. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance", signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid in full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions set forth in the Regulations, 29 CFR 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this section V available for inspection, copying, or transcription by authorized representatives of the AEA, the U.S. DOT, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the AEA, the U.S. DOT, DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any

further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORDS OF MATERIALS, SUPPLIES, AND LABOR (Applicable to highway contracts)

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR Part 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on the Form FHWA-47.

c. Furnish, upon the completion of the contract, to the AEA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items so performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR Part 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of this Section VII is computed includes the cost of materials and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the AEA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the AEA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the AEA is assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract, the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the AEA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract entered into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. Title 18, United States Code, Section 1001, states:

“Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious or fraudulent statements or representations, or makes or uses any false writing or document knowing the same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than five years, or both.” (June 25, 1948, ch. 645, 62 Stat. 749.)

To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all personnel concerned with the project:

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid, or the execution of this contract or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, et seq., as amended by Pub. L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR Part 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.
2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.
3. That the firm shall promptly notify the AEA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.
4. That the firm agrees to include or cause to be included the requirements of paragraphs 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions: (Applicable to all Federal-aid contracts - 49 CFR 29)
 - a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
 - b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
 - c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
 - d. The prospective primary participant shall provide immediate written notice to the department or agency to which this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
 - e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.
 - f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from

participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded from Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion—Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Covered Transactions: (Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms “covered transaction,” “debarred,” “suspended,” “ineligible,” “primary covered transaction,” “participant,” “person,” “principal,” “proposal,” and “voluntarily excluded,” as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction,” without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participation in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment,

Suspension, Ineligibility and Voluntary Exclusion—Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING (Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

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SECTION 01 11 13
SUMMARY OF WORK

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Related Requirements.
- B. Work covered by Contract Documents.
- C. Description of Work.
- D. Contract Method.
- E. Work by Others.
- F. Coordination.
- G. Access for Testing and Inspection.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions.
- B. Section 00 80 00 – Supplementary Conditions.
- C. Section 01 29 73 - Schedule of Values.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work under this Contract consists of the assembly, testing, and commissioning of two each power generation modules; one for the community of Clark's Point and one for the community of Port Heiden as described in 1.4 Description of Work below, and within the Contract Documents.
- B. The intent of the Contract is to provide for the construction and completion of every detail of work described in the Contract Documents. The Contractor shall furnish all labor, materials, supervision, equipment, tools, transportation, quality control, and supplies required to complete the work in accordance with the Contract Documents.

1.4 DESCRIPTION OF WORK

- A. Receive Owner Furnished materials including three (3) each diesel engines and two (2) each module structures. See Section 01 64 00 – Receipt of Owner Furnished Materials.
- B. Provide a secured construction shop and yard for power plant module assembly. Provide temporary power, lighting, and heat as required. Note that after installation of the switchgear, heat shall be provided to maintain the control room above freezing.
- C. Place the module on cribbing as required make floor level within 1/4" throughout. Shim and re-level as required throughout the duration of construction. Cover the module and openings as required to prevent the entry of water.
- D. Furnish and install generation equipment, controls, mechanical equipment, piping, electrical equipment, wiring, raceways, instrumentation, and all other materials as required to provide a complete, fully functional power plant in accordance with the Contract Documents.
- E. Furnish doors, windows, and hardware in accordance with the Contract Documents. Finish coat all doors and metal frames in accordance with the Contract Documents. Upon completion of major mechanical and electrical equipment installation, install doors, windows, and hardware in accordance with the Contract Documents.
- F. Provide lube oil, glycol coolant, and other materials required to make the modules functional. Flush the hydronic piping systems system with potable water and charge with glycol as specified. Provide diesel fuel as required for testing the system including filling the interior day tank and running the generators. Provide a minimum 300 kW electric load bank with temporary cables to allow full functional load testing.
- G. Provide yard space, restroom facilities, electrical service, and internet service for testing and commissioning. Provide access to the Authority and the Engineer to observe operational testing of the modules minimum 10-hours per day, 8 am to 6 pm, throughout the testing period.
- H. Functionally test and commission the completed modules. Note that a minimum of two weeks prior to beginning testing, the Authority will provide the Contractor a detailed checklist to be used in testing. Tasks shall include but not be limited to:
 - 1. Prior to beginning functional testing, complete all required tests of mechanical and electrical systems as required by the Contract Documents.

2. Functionally test all mechanical and electrical equipment and all associated controls to demonstrate proper operation.
 3. Test and calibrate all mechanical and electrical instrumentation devices.
 4. Run through a complete functional test of the generation system including automatic and manual start/stop, paralleling, load sharing, and safety shut downs.
 5. Test all data and communication systems including PLC, server, operator interface screens, cameras, and other devices. Demonstrate proper operation of SCADA system on all devices within the plant and also on a remote computer via internet access.
- I. Upon completion of testing, thoroughly clean all interior ceiling, wall, and floor surfaces. De-grease and scuff the entire module floor and finish paint with one coat of self-priming epoxy, Sherwin Williams Macropoxy 646 or approved equal, color Structural Gray 4031.

1.5 CONTRACT METHOD

- A. This Contract is lump sum and is composed of multiple lump sum items as shown on the Section 00 32 00 – Bid Schedule. This work shall be measured and paid for in accordance with Section 00 70 00 – General Conditions, Article 13 – Payment to Contractors and Completion and Section 01 29 73 - Schedule of Values.

1.6 WORK BY OTHERS

- A. The module structures will be fabricated by others and be provided to the Contractor as Owner Furnished materials. See Specification Section 01 64 00 – Receipt of Owner Furnished Materials. Assume full responsibility for protection and safekeeping of materials and products provided under this Contract.
- B. The intent of this Contract is for the modules to be shop-assembled, not field constructed in the communities of Clark's Point and Port Heiden. The work under this Contract is considered off-site fabrication. Transportation to the final destination and all on-site installation will be performed under a separate contract.
- C. The Drawings have notes delineating Shop/On-Site work. All work described as being part of the On-Site scope is not part of this Contract and will be performed under a separate contract.

1.7 COORDINATION

- A. Coordinate Work to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

- B. Sequence Work to maximize worker efficiency and minimize construction time.
- C. Prior to procurement, verify that characteristics of interrelated equipment are compatible.
- D. Coordinate space requirements and installation of components. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and repairs.

1.8 ACCESS FOR TESTING AND INSPECTION

- A. Provide access for the Authority and the Engineer to the site. Provide on-site transportation, ladders, lifts, eye and ear protection, hard hats, appropriate and clean respiratory protection, etc. for inspections and testing of the work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PROJECT SCHEDULE CRITICAL DATES

February 20, 2019	Port Heiden Owner Furnished Engines Available for Pickup.
March 18, 2019	Port Heiden Owner Furnished Module Delivery.
April 8, 2019	Clark's Point Owner Furnished Module Delivery.
July 1, 2019	Substantial Completion for both modules. Begin Testing.
July 15, 2019	Final Completion for both modules.

END OF SECTION

SECTION 01 12 19
CONTRACTOR'S CERTIFICATION OF SUBCONTRACTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparing, submitting and accepting subcontracts.

1.2 RELATED REQUIREMENTS

- A. Section 00 10 00 – Information to Bidders.
- B. Section 00 43 00 – Subcontractor List.
- C. Section 00 70 00 – General Conditions: Subcontractor Certification and Approval.
- D. Section 00 80 00 – Supplementary Conditions: Subcontract Provisions.
- E. Section 01 33 00 – Submittal Procedures.

1.3 PREPARATION OF CERTIFICATION

- A. Certification Forms: Use forms provided by the Authority.
- B. Contractor shall prepare certification form and submit to the Authority prior to the start of work. Where required, attach additional information to the certification form.
- C. Substitute certification forms will not be considered.

1.4 SUBMITTAL OF CERTIFICATION

- A. The CONTRACTOR shall submit certification forms for all subcontractors for review and approval by the Authority.

1.5 CONSIDERATION OF CERTIFICATION

- A. Following receipt of submitted subcontractor certification forms, the Authority will review for the following, at minimum:
 - 1. Completeness of forms and attachments
 - 2. Proper execution (signatures) of forms and attachments
- B. Incomplete or improperly executed subcontractor certification forms will be returned to the Contractor for revision and resubmittal.
- C. Contractor shall remove its subcontractor from the project site until its subcontractor certification form is submitted, reviewed, and approved.
- D. The Authority will not process payments for work performed by a non-certified subcontractor.

1.6 ACKNOWLEDGMENT OF CERTIFICATION

- A. Submittals which have been examined by the Authority and are determined to be complete and properly executed shall be acknowledged as such by the Project Manager's signature.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

Note: The Contractor shall provide this form for ALL subcontractors working on this project. This form is applicable to all projects, including Small Procurement Contracts, and must be completed in full.

PROJECT: Clark's Point and Port Heiden RPSU Projects, ITB #19041 PROJ. #: TBD

PRIME CONTRACTOR: _____

Pursuant to the Contract Documents, we hereby stipulate the following concerning the award of Work to the last Subcontractor on the following list:

1. First Tier Subcontractor: _____ DBE? **Yes** **No**
Second Tier: _____ DBE? **Yes** **No**
Third Tier: _____ DBE? **Yes** **No**
Fourth Tier: _____ DBE? **Yes** **No**

2. Date of Subcontract: _____

3. Amount of Subcontract: \$ _____

4. Scope of Work: _____

5. Are the following documents kept on file by both the Contractor and the Subcontractor (check the appropriate answer)?
Contract Minimum Wage Schedule **Yes** **No**

6. Does the Subcontract contain provisions for prompt payment, release of retainage, and interest on late payment and retainage conforming to AS 36.90.210?
Yes **No**

7. Does the Subcontract specifically bind the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the Department and does it contain waiver provisions and termination provisions as required by the Contract Documents?
Yes **No**

8. a. Does the Subcontractor have adequate insurance coverages as specified in the Contract Documents?
Yes **No**

If not, does the Contractor stipulate that the insurance limits of the Subcontractor are acceptable to the Contractor and that he has notified his insurance carrier of the reduced insurance limits?
Yes **No**

b. Does the evidence of insurance certify that the policies described thereon comply with all aspects of the insurance requirements for this project?
Yes **No**

PROJECT: Clark's Point and Port Heiden RPSU Projects, ITB #19041

PROJ. #: TBD

Subcontractor Name: _____

c. Does the evidence of insurance list the Department as an "Additional Insured" or "Certificate Holder"?

Yes No

d. Does the evidence of insurance commit to providing 30 day written notice of cancellation or reduction of any coverage?

Yes No

e. Insurance Expiration dates:

Comprehensive or Commercial General Liability: _____

Automobile: _____ Workers' Compensation: _____

(Other): _____

9. Copies of the following professional certifications, licenses, and registrations are attached (circle all that apply):

Business License (mandatory)

Contractor License (mandatory)

Land Surveyor's License

Electrical Administrator's License (mandatory for electrical subs)

Mechanical Administrator's License (mandatory for mechanical subs)

Engineer/Architect

Other: _____

10. Exceptions to any of the above are explained as follows: _____

CERTIFICATION (to be completed and signed by PRIME CONTRACTOR): I certify all the above to be true and correct.

Signature: _____

Printed Name: _____

Company: _____

Date: _____

AUTHORITY'S APPROVAL/DISAPPROVAL

The subject subcontract is **APPROVED**. Nothing in this approval should be construed as relieving the Prime Contractor of the responsibility for complete performance of the work or as a waiver of any right of the Approval to reject defective work.

Signature: _____ Date: _____

Project Manager

The subject subcontract is **NOT APPROVED** for the following reasons:

Signature: _____ Date: _____

Project Manager

SECTION 01 26 63
CHANGE PROCEDURES

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

- A. Section 00 32 00 – Bid Schedule.
- B. Section 00 51 00 – Construction Contract.
- C. Section 00 70 00 – General Conditions.
- D. Section 00 80 00 – Supplementary Conditions.
- E. Section 01 29 73 – Schedule of Values.
- F. Section 01 29 76 – Application for Payment.
- G. Section 01 32 16 – Construction Progress Schedule.
- H. Section 01 73 00 – Execution Requirements.

1.2 SUBMITTALS

- A. Submit the name of the individual authorized to accept changes, and to be responsible for informing others in the Contractor's employ of changes in the Work.
- B. Submit with each price proposal a complete, detailed, itemized cost breakdown defining all impacts on Contract Price and Contract Time, in sufficient detail to fully explain the basis for the proposal.
- C. All change forms shall be provided by the Authority.

1.3 CHANGE AUTHORIZATION

- A. In accordance with Section 00 70 00 – General Conditions, Article 9 Changes, the Authority may authorize changes to the Work. The Authority may authorize changes in one of the following ways:
 - 1. Directive (Section 00 70 00, Article 9.3).

2. Change Order (CO) (Section 00 70 00, Article 9.4).
3. Acceptance of Shop Drawing variations, which have been identified by the Contractor. (Section 00 70 00, Article 9.5).
4. Interim Work Authorization (IWA) (Section 00 70 00, Article 9.10).

1.4 CHANGE PROCEDURES

- A. The Authority may initiate change to the contract by issuing to the Contractor a Request for Proposal (RFP) document. The RFP may include:
 1. Change narrative.
 2. Supplementary revised drawings, specifications, additional details, or sketches.
 3. Other information as deemed appropriate.
- B. The Contractor shall request a change to the contract by submitting to the Authority a written Change Notice on a form provided by the Authority. The Authority may respond by rejecting it, or with an RFP to initiate contract change. The Contractor's Change Notice shall include, at minimum:
 1. A description of the proposed change with a statement of the justification of the change.
 2. Statement of the effect of the change on Contract Price and Contract Time.
 3. The information required in Section 00 70 00 – General Conditions, Article 15 Claims and Disputes.
- C. Upon receipt of a Request for Proposal (RFP) from the Authority, the Contractor shall respond with a price proposal. The Contractor shall make every effort to return its price proposal in response to the RFP within the time frame requested by the Authority, but in no event later than 14 calendar days from date the RFP is issued. For work to be performed after the execution of a Change Order or Contingency Authorization, the basis of pricing shall be estimated. For work performed prior to the execution of a Change Order or Contingency Authorization, the pricing shall be based upon documentation of actual incurred costs. The price proposal shall include:
 1. A complete, detailed, itemized price breakdown.

2. For the prime contractor and subcontractors, detailed documentation of costs for direct costs, labor, equipment, consultants, sub-contractor markups, overhead and profit, and other items set forth in General Conditions Section 00 70 00, Article 10.
 3. Other information as required by the Authority.
- D. Upon receipt of pricing response to an RFP, the Authority may execute a change to the contract. The issuance of an RFP or the receipt of pricing response to an RFP shall not obligate the Authority to execute a change to the contract.

1.5 DIRECTIVES

- A. The Authority may issue Directives as per Section 00 70 00 – General Conditions, Article 9.3.

1.6 INTERIM WORK AUTHORIZATIONS (IWA)

- A. The Authority may issue Interim Work Authorizations in accordance with Section 00 70 00 – General Conditions, Article 9.10.
- B. IWAs may be issued to authorize the commencement of additional work in advance of the execution of a Change Order or Contingency Authorization.
- C. Work authorized by IWA shall be converted to a negotiated Change Order.
- D. The price on the IWA form shall be an estimated limit not to be exceeded by the Contractor without prior amendment of the IWA by the Authority. The Authority shall not be obligated to compensate the Contractor for costs in excess of the amount on the IWA.
- E. Upon the execution of an IWA, the Contractor is authorized to begin the specified work. The Contractor shall track its costs using Cost of Work procedures. The Contractor shall use the Authority's Cost of the Work form and shall submit the data to the Authority at the close of each work day. A separate Cost of Work form is required for each IWA.

1.7 CHANGE ORDER

- A. Any change in Contract Time, Contract Price, or associated responsibility within the general scope of the Contract, shall be made by Change Order.

- B. The Contractor shall use forms furnished by the Authority for Change Orders.

1.8 CHANGE PRICING AND TIME ANALYSIS

- A. Unless specified elsewhere, Section 00 70 00 – General Conditions, Article 10 shall be applied to the negotiation of all changes to the scope of the contract.
1. Unit Price, when unit prices are contained in the Contract.
 2. Mutually acceptable Lump Sum Price, including overhead and profit.
 3. Cost of the Work.
- B. **UNIT PRICE CHANGE** – For unit price **CHANGE PROCEDURES**, prices shall be determined by multiplying the contractual unit price(s) by the estimated quantities of Work associated with changed scope. Payment will be based on the actual installed quantities. Document actual installed quantities and submit information requested by the Authority on a daily basis for its approval and certification. Refer to Section 00 70 00 – General Conditions, Article 10 for additional requirements.
- C. **LUMP SUM PRICE CHANGE** – The Contractor and the Authority shall negotiate an equitable price (and time adjustment if appropriate) in good faith. If negotiations do not result in a mutually acceptable lump sum price, the Authority may, at its discretion, direct the Contractor to perform the work under Cost of the Work Change Order.
- D. **COST OF THE WORK CHANGE** – The Contractor shall document Cost of the Work on forms acceptable to the Authority, and shall submit documented costs to the Authority daily for verification and certification. Cost of the Work pricing proposals shall be supported by invoices for substantiation of purchase and rental costs and with additional data as may be requested by Authority.
- E. Time Analysis: NOT USED.
- F. The Authority shall have the right to audit all records in possession of the Contractor relating to activities covered by the Contractor's pricing of Contract **CHANGE ORDER PROCEDURES**, including Cost of the Work pricing, as set forth in Section 00 70 00 – General Conditions. If the Contractor is a joint venture, the right of Authority shall apply collaterally to the same extent to the records of joint venture sponsor, and of each individual joint venture member.

1.9 FORM EXECUTION

- A. Contract forms issued under this section shall be effective the date the Authority's authorized person signs the form.
- B. For Change Orders, Contractor signature will indicate acceptance of the terms or acknowledgment of order, depending on box checked. Acknowledgment of Change Order does not substitute for notification requirements of Section 00 70 00 – General Conditions, Article 15.1.

1.10 PAYMENT

- A. The Contractor shall promptly revise its Schedule of Values and Application for Payment forms to record each authorized Change Order and each authorized Contingency Authorization as a separate line item. For Change Orders, adjust the Contract Price as shown on the Change Order.
- B. The Contractor shall promptly revise and resubmit its progress schedules to reflect any change in Contract Time, including adjustments for other items of Work affected by the change.
- C. Payment for contract changes shall be made only following the execution of Change Orders or Contingency Authorizations and the inclusion of these change documents by reference on the Application for Payment form.
- D. Payment shall not be made for Work authorized via Interim Work Authorization.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 29 73
SCHEDULE OF VALUES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements for preparing and submitting the schedule of values.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions.
- B. Section 01 11 13 – Summary of Work.
- C. Section 01 26 63 – Change Procedures.
- D. Section 01 29 76 – Application for Payment.
- E. Section 01 32 16 – Construction Progress Schedule.
- F. Section 01 33 00 – Submittal Procedures.
- G. Section 01 77 00 – Contract Closeout Procedures.

1.3 FORMAT

- A. Form and content must be acceptable to the Authority.
- B. Form shall have a signature block for submission by Contractor and a signature block for approval by the Authority.
- C. Content shall include the following column headings.
 - 1. CPM Activity Number.
 - 2. CPM Activity Description.
 - 3. CPM Dollar Value.
 - 4. Current Percent Complete.
 - 5. Current Dollar Complete.

6. Previous Percent Complete.
7. Previous Dollar Complete.
8. Percent Complete this Period.
9. Dollar Complete this Period.

1.4 CONTENT

- A. List installed value of each activity shown on the submitted and approved CPM Schedule.
- B. For items on which payments will be requested for stored products, list sub values for cost of stored products with taxes paid.
- C. Limits for specific line item values shall be as specified below and shall be included on all approved Schedules of Values and Applications for Payment.

1. Mobilization and Demobilization: NOT APPLICABLE
2. Contract Closeout Procedures: Unless specified elsewhere, the assigned values for tasks specified under Contract Closeout Procedures shall be based upon the estimated value of each task. The breakdown shall include separate amounts for the requirements of Final Completion and Final Acceptance, as set forth below:

<u>Contract Price</u>	<u>Value for Final Completion</u>	<u>Value for Final Acceptance</u>
Less than \$200,000	\$2,000	\$2,000
\$200,000 - \$500,000	\$5,000	\$5,000
\$500,001 - \$1,000,000	\$10,000	\$10,000
\$1,000,001 - \$5,000,000	\$20,000	\$20,000
Greater than \$5,000,000	\$30,000	\$30,000

- D. The sum of values listed on the Schedule of Values shall equal total Contract Price.

- 1.5** A Schedule of Values containing costs for early activities in excess of actual value ("front end loading") will be rejected by the Authority until the Contractor corrects the deficiency. The Authority shall not be obligated to pay the Contractor until front end loading is eliminated and the Schedule of Values is approved.

1.6 SUBMITTAL

- A. Submit proposed Schedule of Values with updated CPM Schedule per specification sections for Summary of Work, Construction Progress Schedule, and Submittals.
- B. Submit Schedule of Values with updated completion percentages sufficiently in advance of each Application for Payment to enable the Authority to resolve differences.

1.7 SUBSTANTIATING DATA

- A. When the Authority requires substantiating information, submit data justifying line item amounts in question.
- B. Provide one copy of data with cover letter for each copy of the Application for Payment. Show application number and date, and line item by number and description.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 29 76
APPLICATION FOR PAYMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of Application for Payment.

1.2 RELATED REQUIREMENTS

- A. Section 00 32 00 – Bid Schedule.
- B. Section 00 70 00 – General Conditions.
- C. Section 00 80 00 – Supplementary Conditions.
- D. Section 01 11 13 – Summary of Work.
- E. Section 01 26 63 – Change Procedures.
- F. Section 01 29 73 – Schedule of Values.
- G. Section 01 32 16 - Construction Progress Schedule
- H. Section 01 33 00 – Submittal Procedures.
- I. Section 01 45 00 – Quality Control.
- J. Section 01 51 00 – Construction Facilities.
- K. Section 01 77 00 – Contract Closeout Procedures.
- L. Section 01 78 39 – Project Record Documents.

1.3 FORMAT

- A. Submit Application for Payment on form approved by the Authority.

1.4 PREPARATION OF APPLICATIONS

- A. Type required information on Application for Payment form acceptable to the Authority.
- B. Execute certification by original signature of authorized officer upon each copy of the Application for Payment.
- C. Show breakdown of costs for each item of the Work on accepted Schedule of Values as specified in Section 01 29 73 – Schedule of Values.
- D. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.
- E. Submit Stored Materials Worksheet with every Application for Payment requesting payment for stored materials. Show only direct costs of materials and freight. Submit documentation in accordance with Section 00 70 00 – General Conditions, Article 13.5 Stored Materials and Equipment, for materials shown in column titled “New Material This Pay Request Period.”

1.5 SUBMITTAL PROCEDURES

- A. Submit two originals of each Application for Payment at one-month intervals. Each document shall bear original signature of authorized executive.
- B. Submit with Authority-approved transmittal letter bearing Authority's project number.

1.6 SUBSTANTIATING DATA

- A. When Authority requires substantiating information, submit all requested data justifying line item amounts in question.
- B. Provide one copy of data with cover letter for each copy of Application for Payment. Show Application for Payment number and date, and line item by number and description.

1.7 SUBMITTALS WITH APPLICATION FOR PAYMENT

- A. Submit the following for review sufficiently in advance of Application for Payment to allow detailed review by Authority and resolution of differences.
 - 1. Schedule of Values with updated percentages of completion as required by Section 01 29 73 – Schedule of Values.

- B. Submit the following with each Application for Payment.
 - 1. Updated construction schedule as required by Section 01 32 16 - Construction Progress Schedule.
 - 2. Updated Project Record Documents as required by Section 01 78 39 – Project Record Documents.
 - 3. Letter certifying that all Project Record Documents, including as-built drawings and submittals are current.

1.8 ADDITIONAL REQUIREMENTS FOR FIRST APPLICATION FOR PAYMENT

- A. The first Application for Payment will be processed after the Project Manager has received all of the following:
 - 1. Superintendent Data (Section 00 70 00 – General Conditions, Article 6.2).
 - 2. Progress Schedule (Section 00 70 00 – General Conditions, Paragraph 6.6.1, and Section 01 32 16 - Construction Progress Schedule).
 - 3. Schedule of Values (Section 00 70 00 – General Conditions, Paragraph 6.6.2, and Section 01 29 73 – Schedule of Values).
 - 4. Submittal Schedule (Section 00 70 00 – General Conditions, Paragraph 6.6.2).
 - 5. Safety Representative Designation (Section 00 70 00 – General Conditions, Article 6.18).
 - 6. Building Permits (Section 00 70 00 – General Conditions, Article 7.2).
 - 7. Name of Individual Authorized to Accept Changes (Section 01 26 63 – Change Procedures).
 - 8. Contractor Quality Control Plan (Section 01 45 00 – Quality Control).
 - 9. Freeze Protection Plan (Section 01 51 00 – Construction Facilities).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements for various meetings during the construction project.

1.2 RELATED REQUIREMENTS

- A. Section 01 11 13 – Summary of Work.
- B. Section 01 32 16 - Construction Progress Schedule.
- C. Section 01 33 23 – Shop Drawings, Product Data, and Samples.
- D. Section 01 45 00 – Quality Control.
- E. Section 01 73 00 – Execution Requirements.

1.3 PRECONSTRUCTION CONFERENCES

- A. The Authority will administer preconstruction conference for execution of Contract and exchange of preliminary submittals. Attendance by all key Contractor and Subcontractor project personnel is required.
- B. The Authority will document the meeting and distribute minutes within 48-hours of adjournment. Minutes will be typed, reflecting date, list of attendees and in a format to facilitate correction of previous meeting minutes. Distribution will be to all attendees and those affected by discussions or decisions made at meeting.

1.4 PREINSTALLATION CONFERENCES

- A. When required in an individual Specification section, and as shown in the Contractor's quality control plan, or as directed by the Authority, convene a pre-installation conference prior to commencing Work for a specific item.
- B. Require attendance of entities directly affecting, or affected by, Work of the section.

- C. Review conditions of installation, preparation and installation procedures, and coordination with related Work.
- D. Record significant discussions and agreements and disagreements of each conference, and approved schedule. Distribute record of conference to all attendees within 24-hours of adjournment.

1.5 PROGRESS MEETINGS

- A. The Contractor shall attend Progress Meetings when scheduled by the Project Manager or requested by the Contractor. Progress Meetings will be held on a day and time which is mutually convenient to both the Authority and the Contractor. These meetings shall be documented by the Contractor as well as the Project Manager.
- B. Progress Meeting shall be attended by all key Contractor personnel and, as appropriate, Subcontractor project personnel.
- C. The Contractor shall furnish copies of its updated schedule, per Section 01 32 16 - Construction Progress Schedule, to all attendees of the meeting. This schedule will be reviewed in detail during the meeting and will be used for the coordination of activities by others.
- D. Progress Meetings will also be used to review other key aspects of the Work, such as safety, quality, critical items, etc.
- E. Meeting Minutes: The Contractor shall document the meetings and distribute minutes within 48-hours of adjournment. Minutes shall be typed, reflecting date, attendees followed by company or organization, who stated each item, and in format to facilitate correction of previous meeting minutes. Distribution shall be to all attendees and those affected by discussions or decisions made at meeting.

1.6 SAFETY MEETING

- A. The Contractor shall conduct Safety Meetings as required by its project Safety Program.
- B. The Contractor shall invite the Authority to attend Safety Meetings.

1.7 OTHER MEETINGS

- A. At various times throughout the duration of the Contract, the Contractor will be required to attend meetings as requested by the Authority. It is anticipated that such meetings will involve coordination with others, project schedule review, problem resolution, change order negotiations, and other topics of mutual importance.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions.
- B. Section 00 80 00 – Supplementary Conditions.
- C. Section 01 11 13 – Summary of Work.
- D. Section 01 26 63 – Change Procedures.
- E. Section 01 29 73 – Schedule of Values.
- F. Section 01 29 76 – Application for Payment.
- G. Section 01 31 19 – Project Meetings.
- H. Section 01 33 00 – Submittal Procedures.

1.3 SUBMITTALS

- A. Within fifteen (15) days after date established in Notice to Proceed, submit preliminary schedule.
- B. Within ten (10) days after joint review, submit complete schedule.
- C. Submit updated schedule with each Application for Payment.

1.4 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

- B. Diagram Sheet Size: Maximum 22 x 17 inches.
- C. Scale and Spacing: To allow for notations and revisions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by Specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Project Manager at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Indicate changes required to maintain Date of Substantial Completion.

3.6 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Engineer, Authority, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

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SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Procedures for the preparation, tracking, and review of submittals for the project.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Requirements.
- B. Section 00 80 00 – Supplementary Conditions.
- C. Section 01 11 13 – Summary of Work.
- D. Section 01 12 19 – Contractor's Certification of Subcontracts.
- E. Section 01 29 73 – Schedule of Values.
- F. Section 01 29 76 – Application for Payment.
- G. Section 01 32 16 - Construction Progress Schedule.
- H. Section 01 33 23 – Shop Drawings, Product Data, and Samples.
- I. Section 01 45 00 – Quality Control.
- J. Section 01 60 00 – Material and Equipment.
- K. Section 01 73 00 – Execution Requirements.
- L. Section 01 77 00 – Contract Closeout Procedures.
- M. Technical Product Specifications.
- N. Operations and Maintenance Manuals.
- O. Equipment Installation Data.

1.3 SUBMITTAL REGISTER

- A. Submit preliminary Submittal Register as required by Section 00 70 00 – General Conditions in the first 7 calendar days of the contract. In addition to manufacturer's data and shop drawing submissions, include all submittals required by the Contract Documents in the Submittal Register.
- B. Submittal Register shall portray an orderly sequence of submittals, early submittals for long lead-time items, and submittals which require extensive review.
- C. Submittal Register shall be reviewed by the Authority and shall be revised and resubmitted until accepted by the Authority.

1.4 CONTRACTOR REVIEW

- A. The Contractor shall prepare and review submittals as required by the provisions of Section 00 70 00 – General Conditions and Section 00 80 00 – Supplementary Conditions.

1.5 SUBMITTAL REQUIREMENTS

- A. Unless otherwise directed in these documents or by Authority, provide each submittal as an electronic portable document format (PDF) file, transmitted via email. If file is too large to be received by Authority via email, provide and deliver in portable USB drive, or as otherwise instructed by Authority.
- B. Submit each submittal with a Submittal Summary form as its face document. Use a Submittal Summary form provided by the Authority, or a substitute approved by the Authority.
- C. Label submittals with a numbering system approved by the Authority. Identify the project by title and Authority's project number; identify Work and product by Specification section and Article number.
- D. Submit items required by individual Specification sections together. Do not mix items specified in different sections in the same submittal. Sequence the submission of submittals to correspond with the approved Submittal Register.
- E. Before the submission of each submittal, the Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and

reviewed or coordinated each submittal with other submittals and with the requirements of the Work and the Contract Documents, upon which the Contractor shall certify in writing on each submittal that it has made this determination. The failure to review and certify a submittal shall be cause for the Authority to return the submittal without review.

- F. On the submittal, notify the Authority in writing of any deviations from requirements of the Contract Documents.
- G. Organize the submittals into logical groupings to facilitate the processing of related submittals, such as:
 - 1. By Specification Section number. Sequentially number each submittal. Resubmittals shall be identified with the original submittal number followed by a sequential alphabetic suffix.
 - 2. Finishes which involve Authority selection of colors, textures, or patterns.
 - 3. Items required by the individual Technical Product Specification Sections.
 - 4. Associated items, which require correlation for efficient function or for installation.
- H. Submit all required color and finish samples in order to receive approval for colors and finishes.

1.6 RESUBMITTALS

- A. Provide complete copies of re-submittals. Do not re-submit partial copies of submittals for incorporation into the Authority's retained submittals from the prior submission.
- B. If drawings, product submittals, samples, mockups, or other required submittals are incomplete or not properly submitted, the Authority will not review the submittal and will return it to the Contractor. The Authority will review a submittal no more than 2 times without additional charge to the Contractor (incomplete or improperly submitted submittals count as one of these submittals). The Contractor shall pay all review costs associated with more than 2 reviews.

1.7 AUTHORITY REVIEW

- A. The Authority will review submittals and re-submittals, and return submittal comments within 7 calendar days of receipt.

- B. The Authority or authorized agent will receive, review and return submittals to the Contractor with one of the following dispositions noted:

“No Exceptions Taken” – denotes that the submittal is generally consistent with the requirements of the Contract Documents. A resubmittal is not required.

“Approved as Noted” – denotes that the submittal is generally consistent with the requirements of the Contract Documents but only as conditioned by notes and corrections made on the submittal. A resubmittal is not required provided the Contractor understands the review comments and desires no further clarification.

“Revise and Resubmit” – denotes that revisions are required in the submittal in order for the submittal to be generally consistent with the requirements of the Contract Documents. The Authority will indicate on the returned submittal what revisions are necessary. A resubmittal is required.

“Rejected” – denotes that the submittal does not meet the requirements of the Contract Documents and shall not be used in the Work. The Authority will indicate on the returned submittal the reasons for its rejection. A resubmittal is required.

- C. Review by the Authority of submittals shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is consistent with the requirements of the Contract Documents. Review of submittals shall not relieve the Contractor of the responsibility for compliance with the requirements of the Contract Documents or for errors, dimensions, and quantities unless specific exception is requested and approved on the submittal.
- D. The Authority's review shall not extend to the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

1.8 DISTRIBUTION

- A. The Contractor shall be responsible for making and distributing any reproductions of approved submittals that it may require for its use.
- B. The Contractor shall perform work in accordance with approved submittals.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions.
- B. Section 01 11 13 – Summary of Work.
- C. Section 01 31 19 – Project Meetings.
- D. Section 01 33 00 – Submittal Procedures.
- E. Section 01 45 00 – Quality Control.
- F. Section 01 60 00 – Material and Equipment.
- G. Section 01 73 00 – Execution Requirements.
- H. Section 01 78 39 – Project Record Documents.
- I. Technical Specifications: Identification of submittal requirements.

1.2 SHOP DRAWINGS

- A. Present in a clear and thorough manner. Label each Shop Drawing with Authority's Project name, Project number and date of submittal. Identify each element of the Shop Drawings by reference to specification section, sheet number and detail, schedule, or Area of Work.
- B. The data shown on the Shop Drawings shall be complete with respect to specified performance and design criteria, materials and similar data to show the Authority materials and equipment the Contractor proposes to provide.
- C. Identify dimensions; show relation to adjacent or critical features or Work or products.

- D. Designation of work "by others", if shown in submittals, shall mean that work will be responsibility of Contractor rather than subcontractor or supplier who has prepared submittals.
- E. Minimum Sheet Size: 11"x17".

1.3 PRODUCT DATA

- A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification section and Article number. Show reference standards, performance characteristics and capacities; wiring, piping and control diagrams; component parts; finishes; dimensions; and required clearances.
- B. 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.
- C. Submit manufacturer's instructions for storage, preparation, assembly, installation, start-up, adjusting, commissioning, and finishing.

1.4 SAMPLES

- A. Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures and patterns for Authority selection as specified in technical product sections.
- B. Submit samples to illustrate functional characteristics of products, including parts and attachments.
- C. Approved samples which may be used in the Work are indicated in the Specification section.
- D. Samples shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which they are intended, and otherwise as the Authority may require, to enable the Authority to review the submittal.
- E. Label each sample with identification required for transmittal letter.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 42 19
REFERENCE STANDARDS

PART 1 – GENERAL

1.1 RELATED SECTION

- A. Section 00 70 00 – General Conditions.

1.2 QUALITY ASSURANCE

- A. For Products or workmanship specified by association, trade, or other technical standards: comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of bid advertisement, unless otherwise stated in the Contract Documents.
- C. Provide copies of standards through the submittal process when required by the Contract Documents. Maintain a copy of each reference standard on site during construction.
- D. Should specified reference standards conflict with Contract Documents, request clarification from the Authority before proceeding. Local code requirements, where more stringent than referenced standards, shall govern.
- E. Neither the contractual relationship, duties, and responsibilities of the parties to the Contract, nor those of the Engineer, shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

1.3 CODES, STANDARDS, AND REGULATORY REQUIREMENTS

- A. All work shall be in accordance with the latest edition of governing Codes, Standards and regulatory requirements, including but are not limited to:
 - 1. International Fire Code (IFC).
 - 2. National Fire Protection Association (NFPA) NFPA 30.
 - 3. International Building Code (IBC).
 - 4. National Electrical Code (NEC).

5. American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME).
6. American Petroleum Institute (API).
7. American Society of Testing and Materials (ASTM).
8. American Society of Mechanical Engineers (ASME).
9. American Welding Society (AWS).
10. American Institute of Steel Construction (AISC).
11. Manufacturers Standardization Society of the Valve and Fitting Industry (MSS).
12. Alaska Department of Environmental Conservation (ADEC) 18 AAC 75.
13. Steel Structures Painting Council (SSPC).
14. Occupational Safety and Health Administration (OSHA) 29 CFR 1910.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Contractor's quality assurance program and control procedures for executing the Work.
- B. Contractor's technical qualifications to be able to execute the Work in accordance with the Contract Documents.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions.
- B. Section 01 33 00 – Submittal Procedures.
- C. Section 01 33 23 – Shop Drawings, Product Data, and Samples.
- D. Section 01 42 19 – Reference Standards.
- E. Section 01 60 00 – Material and Equipment.
- F. Technical Specifications (Division 21, 23, and 26): Contractor and Fabricator Qualifications, Quality Control, and Testing.

1.3 SUBMITTALS

- A. Submit a Quality Control Plan for review and approval.
- B. Submit required progress reports in accordance with the Contract Documents.

1.4 GENERAL

- A. The Contractor shall provide and maintain an effective Quality Control Program related to testing and inspection. The Contractor shall perform Quality Control Testing as specified and shall provide copies of all results to the Authority for use in observing contract compliance.

- B. The Contractor's Quality Control Program shall include, but is not limited to: administration, management, supervision, reports, record-keeping, submittals, services of independent testing agencies and labs, and other related services.
- C. Quality Control is the sole responsibility of the Contractor.
- D. Quality Control services are required to verify compliance with requirements specified or indicated and do not relieve the Contractor of responsibility for compliance with the Contract Documents.
- E. Specific Quality Control requirements are included in the Technical Specifications. General Quality Control requirements entail ensuring that all aspects of the Work conform to the technical requirements of the Contract Documents.
- F. The Contractor's Quality Control Program described herein is not intended to limit the Contractor's Quality Control activities, which may be necessary to achieve compliance with the Contract Documents.

1.5 JOB CONDITIONS

- A. Where Specifications require work to be field-tested or approved, it shall be tested in the presence of the Authority after timely notice of its readiness for inspection and testing, and the work after testing shall be concealed only upon approval of Authority.
- B. The Authority shall have the right to witness all tests. The Contractor shall notify the Authority at least seven (7) calendar days prior to testing.
- C. The results of tests are for use by the Authority to evaluate the acceptability of Work with respect to specified testing requirements. Regardless of the test results, Contractor is solely responsible for quality of workmanship and materials and for compliance with requirements of Contract Documents.
- D. Maintain quality control over sub-contractors, suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality. Verify applicability and follow all manufacturers' recommendations and instructions for assembly, installation and testing of materials and equipment. In any case where the Contractor believes that such recommendations or instructions are not applicable, the Contractor shall so notify the Authority and state the reasons for the Contractor's

determination. The Contractor shall then follow the Authority's written direction on whether to follow manufacturer's recommendations and instructions.

- E. Upon failure of Work which has been tested or inspected, previous acceptance may be withdrawn and Work be subject to removal and replacement with Work in accordance with the Contract Documents, at no cost to the Authority.

1.6 MANUFACTURER'S FIELD SERVICES

- A. Required when technical specifications require the manufacturer or fabricator to provide qualified personnel to observe field conditions, installation, quality of workmanship, and to start, test, and adjust equipment as applicable.
- B. Submit to the Authority the manufacturer or fabricator representative's written reports containing observations and recommendations within five (5) calendar days of manufacturer's field services. Provide three (3) copies and a digital version.

PART 2 – PRODUCTS

2.1 CONTRACTOR QUALIFICATION TECHNICAL REQUIREMENTS

- A. The Contractor shall meet all technical requirements of the Contract Documents. The Contractor may use sub-contractors as required to meet the requirements. The Authority may request documentation of all required qualifications after the bid opening and prior to award in order to verify Contractor qualifications.
- B. In accordance with Alaska statues and regulations, all Electrical work shall be performed under the supervision of an Electrical Administrator with a current license in the State of Alaska.
- C. In accordance with Alaska statues and regulations, all Mechanical work governed by Alaska law shall be performed under the supervision of a Mechanical Administrator with a current license in the State of Alaska.
- D. All Fire Suppression work shall be performed by a contractor that meets the qualifications listed under Division 21 Specifications.
- E. Fabricators for specialty equipment such as engine-generators or switchgear shall meet the minimum requirements of the technical specifications.

PART 3 – EXECUTION

3.1 GENERAL

- A. The Contractor shall provide full and complete documentation of Quality Control procedures and activities in a Quality Control Program and Quality Control Testing Plan.

3.2 QUALITY CONTROL

- A. The Contractor shall establish the methodology to perform the Contractor's inspection and tests of all items including that of its subcontractors. The Contractor shall ensure conformance to applicable technical specifications and drawings with respect to the materials, Codes, workmanship, storage, installation, construction, finishes, functional performance, and identification. The Contractor shall ensure quality for all construction work performed under this Contract, including assigned subcontract work. The Contractor shall specifically include surveillance and tests required in the technical specifications.
- B. The Contractor shall coordinate all work requiring Special Inspection to ensure full access by Special Inspectors and Quality Assurance testing personnel to work, work performance, and testing preparation, operations and results.
- C. The Contractor shall provide, as a minimum, the following components for all definable features of work:
 - 1. Preparatory Inspection Meeting: Contractor shall schedule and attend a preparatory meeting to review testing procedures a minimum of a week prior to beginning work on any element of Work which has been identified in the Contract Documents to require testing and inspection by the Contractor and Code-required Special Inspection. Subsequent meetings shall be conducted as necessary to ensure continued accuracy of testing and inspection procedures.
 - 2. Document Control: Contractor shall have and follow a procedure for ensuring that all Work is performed in accordance with the following:
 - a. Conformed sets of Contract Drawings and Specifications.
 - b. Contract Change Order documents.
 - c. Approved Submittals.
 - d. Applicable Requests for Information (RFI's) or Design Clarification Verifications (DCVR's).
 - e. Manufacturer's Instruction.

3. In Progress Inspection: Contractor shall perform in-progress inspections as work progresses on the Work which shall include, but not be limited to:
 - a. Examination of the quality of workmanship with respect to Contract Drawings, Technical Specifications and Approved Submittals.
 - b. Review of control testing for compliance with Contract requirements.
 - c. Inspection for use of defective or damaged materials, omissions and dimensional requirements.
 - d. Review of timeliness and scheduling requirements for all tests, retests and eventual approvals.
 - e. Contractor Deficiency Reports and punch lists as appropriate to the level of completion of the Work.
4. Non-Conformance Procedure: Contractor shall have and follow a procedure for identifying, documenting, tracking, and resolving items in the Work which do not comply with Contract Documents, Specifications, Approved Submittals, or Manufacturer's Instructions. If a quality control test indicates that the tested material does not conform to the requirements of the Contract Documents, the Contractor shall take supplemental tests at the same location from which the non-conforming result was obtained, after correction of the work, to document conformance with the Contract Documents. Otherwise, the Authority reserves the right to reject materials for which final Quality Control tests indicate non-conformance with the Contract Documents.
5. Code Required Inspection: Contractor shall coordinate and make timely requests for inspections, tests and other activities required by Codes and Regulations as specified.

3.3 RECORD KEEPING

- A. The Contractor shall maintain current Quality Control records, on forms acceptable to the Authority, of all inspections and tests performed. The records shall include factual evidence that the required inspections or tests have been performed, including, but not limited to, the following information for each such test and inspection: Specification reference, date, type and number of inspections or test involved; results of the inspections, tests or retests; the nature of defect, causes for rejection, proposed remedial action, corrective action(s) taken, and similar information related to any re-inspection.

- B. The Contractor shall maintain and submit to the Authority the following Quality Control records and reports:
1. Daily Reports: The Contractor shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. The Daily Log shall include compliance with shop drawings submittals, identification by Specification section and schedule activity of inspections, tests, and retests conducted, results of inspections and tests, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed. One copy of each Daily Report shall be submitted to the Authority on a weekly basis.
 2. Immediate Notification of Deficiencies: Contractor shall provide immediate notification to the Authority whenever a failed or nonconforming test or inspection occurs. This immediate notification shall be followed up with the required written reports.
 3. Non-Conformance Report: Contractor shall submit a weekly Non-Conformance Report to the Authority identifying all substandard inspections and tests taken during the week, including identification by Specification section and schedule activity of the inspection or test, location and nature of defects, causes for rejection and remedial actions taken or proposed. The Non-Conformance Report shall also identify corrective actions taken or proposed for any open items on prior Non-Conformance Reports including a scheduled date for resolution of each item. The Non-Conformance Report shall be submitted and discussed in Progress Meetings.
 4. Inspection Control Log: Contractor shall maintain an inspection control log chronologically recording each inspection and test performed by the Contractor, including the nature of the inspection, test or retest, the date performed, the results, causes for rejection, remedial action or corrective action taken and dates of subsequent inspections and retests, and final acceptance. The Contractor shall submit the updated Inspection Control Log weekly to the Authority; the Log will be discussed in Progress Meetings.

3.4 ORGANIZATION

- A. Staffing Levels: Provide sufficient qualified personnel to monitor the work quality at all times. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity.
1. In cases where multiple trades, disciplines or subcontractors are on site at the same time, each activity shall be inspected and tested by personnel skilled in that portion of the work.
 2. In cases where multiple shifts are employed, the Quality Control staff shall be increased as required to monitor the work on each shift.

3.5 QUALITY SURVEILLANCE BY THE AUTHORITY

- A. All items of materials and equipment shall be subject to surveillance testing and inspection by the Authority at the point of production, manufacture or shipment to determine if the producer, manufacturer or shipper maintains an adequate inspection system which insures conformance to the applicable specifications and drawings with respect to materials, workmanship, construction, finish, functional performance and identification. In addition, all items or materials, equipment and work in place shall be subject to surveillance testing and inspection by the Authority at the site for the same purposes. Surveillance by the Authority does not relieve the Contractor of performing Quality Control inspections and testing of either onsite or offsite Contractor's or subcontractor's workplace or manufacturing assembly plant.

END OF SECTION

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SECTION 01 51 00
CONSTRUCTION FACILITIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements for furnishing and maintaining construction facilities during the project.

1.2 RELATED REQUIREMENTS

- A. Section 01 11 13 – Summary of Work.
- B. Section 01 29 76 – Application for Payment.
- C. Section 01 73 00 – Execution Requirements.

1.3 TEMPORARY ELECTRICITY

- A. Unless specified elsewhere, the Contractor shall make their own provisions for temporary electrical service.
- B. Provide lighting for construction operations.

1.4 TEMPORARY HEAT

- A. Provide and pay for heat devices, insulated enclosure, tenting, and heat as required to maintain specified conditions for construction operations, to protect materials and finishes from damage due to temperature or humidity.

1.5 TEMPORARY VENTILATION

- A. Provide and pay for ventilation of enclosed areas to cure materials, to disperse humidity, to prevent accumulations of dust, fumes, vapors, or gases, and to maintain a safe work environment.

1.6 TEMPORARY WATER SERVICE

- A. Unless specified elsewhere, the Contractor shall make its own provisions for temporary water service.

1.7 TEMPORARY SANITARY FACILITIES

- A. Unless specified elsewhere, provide and maintain required facilities and enclosures.

1.8 TEMPORARY TELEPHONE SERVICE

- A. Unless specified elsewhere, provide, maintain and pay for telephone service to the Contractor field offices.

1.9 FREEZE PROTECTION

- A. Provide freeze protection for the Power Plant Module in accordance with Section 01 11 13 – Summary of Work.
- B. Provide freeze protection for temporary water service piping, valves, and other components.

1.10 CONSTRUCTION FENCES

- A. Include all supplementary parts necessary or required for a complete and satisfactory installation of temporary fences. All runs of the fence shall present the same general appearance.
- B. Material requirements, unless shown otherwise on the Drawings:
 - 1. Fabric: No. 9 ASW gage zinc coated or approved equal.
 - 2. Barbed Wire (Zinc-coated): 3-strand twisted No. 12 ½ ASW gage galvanized steel wire with 4-point barbs of No. 14 ASW gage galvanized steel wire, or approved equal. The barbs shall be spaced approximately 4 inches apart.
 - 3. Wire ties and tension wire: No. 7 ASW gage marcelled steel wire with same coating as fabric and conforming to ASTM A824.
 - 4. Plywood, if used shall be painted.

C. Other requirements:

1. Used materials may be installed provided the used materials are good, sound, and are suitable for the purpose intended.
2. Posts and braces shall be galvanized steel pipe conforming to the requirements of ASTM F1038 and sized in accordance with Tables 1 through VI of Federal Specifications RR-F-191/3. Posts shall be spaced more than 10 feet apart.
3. Galvanizing of steel items will be required.
4. Temporary fences that are damaged from any cause during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.
5. If no longer required for the Work as determined by the Authority, temporary fences shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work.
6. In secure areas away from traffic, fence shall be 8 feet high. Fence construction shall include top and bottom tension wires. All fabric tension wire and barbed wire shall be installed taut with no more than 2-inch open gaps between bottom of fence and underlying surface.

1.11 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where required and where Work is installed in unsecure areas.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to prevent damage.

1.12 SECURITY

- A. Provide security and facilities to protect Work from unauthorized entry, vandalism, or theft.

1.13 REMOVAL OF UTILITIES AND FACILITIES

- A. Remove CONSTRUCTION FACILITIES, Services, Utilities and other related materials, prior to Substantial Completion inspection.

- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore permanent facilities used during construction to a 'like new' condition if it was provided by Contract, or the condition the facility was found prior to construction of this project for existing facilities.

1.14 SHORING AND BRACING

- A. The Contractor is responsible for providing shoring and bracing required to accomplish the work. This includes shoring of adjacent facilities, shoring for installed work, and shoring and bracing for installation of structural steel.
- B. The Contractor's shoring and bracing shall be designed by an Alaska registered structural engineer.
- C. Provide a sealed and signed copy of shoring and bracing calculations to the Authority for informational purposes only. The submission of calculations to the Authority shall not transfer responsibility for the design of shoring and bracing to the Authority. Rather, the Authority will receive the calculations to verify they have been done by a registered engineer.

1.15 COST RESPONSIBILITY

- A. Except as otherwise noted, the cost of construction facilities and utilities shall be the responsibility of Contractor.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 60 00
MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements for transportation and handling, storage and protection, substitutions, and product options.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions.
- B. Section 01 11 13 – Summary of Work.
- C. Section 01 33 00 – Submittal Procedures.
- D. Section 01 33 23 – Shop Drawings, Product Data, and Samples.
- E. Section 01 42 19 – Reference Standards.
- F. Section 01 45 00 – Quality Control.
- G. Section 01 51 00 – Construction Facilities.
- H. Section 01 60 00 – Material and Equipment.
- I. Section 01 73 00 – Execution Requirements.

1.3 TRANSPORTATION AND HANDLING

- A. Transport products by methods to avoid product damage; deliver in dry, undamaged condition, in manufacturer's unopened containers or packaging.
- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Immediately on delivery, inspect shipment to assure:

1. Product complies with requirements of Contract Documents and reviewed submittals.
2. Quantities are correct.
3. Accessories and installation hardware are correct.
4. Containers and packages are intact and labels legible.
5. Products are protected and undamaged.

1.4 STORAGE AND PROTECTION

- A. Handle and store materials for construction, products of demolition, and other items to avoid damage to existing buildings, and infrastructure.
- B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.
- C. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- D. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter. Cover such material to prevent material from being blown or transported away from the stockpile.
- E. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

1.5 SUBSTITUTIONS

- A. Prior to the bid opening, the Bidder shall make his own determination in selecting which specified or substitute equipment to base his proposal upon. Substituted items shall be equal to or better than that specified or indicated in regards to quality, workmanship, finish, space requirements, electrical requirements, performance, and warranties.
- B. After the bid opening, the Contractor shall submit sufficient data in accordance with this Section to establish equality. The Authority shall be the sole judge of equality and acceptability.

- C. Acceptance of substitute materials will not relieve the Contractor of the responsibility for any changes in his own Work or in the Work of other crafts caused by the substitution. Any additional costs resulting from substitutions are the responsibility of the Contractor.
- D. Only one request for substitution will be considered for each product. When substitution is not accepted, provide specified product.
- E. The Authority will consider requests for Substitutions only within 90 days after date established by the Notice to Proceed.
- F. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
- G. Document each request with complete data substantiating compatibility of proposed Substitution with Contract Documents.
- H. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.6 SUBSTITUTION SUBMITTAL PROCEDURE:

- A. Submit Request for Substitution for consideration on Substitution Request Form provided by the Authority (Section 01 60 00-A). Limit each request to one proposed Substitution.
- B. Submit certification signed by the Contractor, that the Contractor:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product. List similar projects using proposed product, dates of installation and user telephone number.
 - 2. Will provide an equivalent warranty for the Substitution as for the specified Product.
 - 3. Will coordinate installation and make changes to other Work, which may be required for the Work to be complete with no additional cost to the Authority.
 - 4. Waives claims for additional costs or time extension, which may subsequently become apparent from indirect costs.

5. Will reimburse the Authority for review or redesign services associated with re-approval by Authorities.
- C. Submit shop drawings, manufacturers' product data, and certified test results attesting to the proposed Product equivalence and variations between substitute and specified product. The burden of proof is on proposer.
- D. The Authority will notify the Contractor in writing of decision to accept or reject request.

PART 2 – PRODUCTS

2.1 PRODUCTS

- A. Products include material, equipment, and systems.
- B. Comply with Specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- D. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.

2.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers followed by the term "No Substitutions": use only specified manufacturers, no substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named that meets the description specifications of the named manufacturers, equal in substance, function, dimension, appearance, and quality.

PART 3 – EXECUTION (NOT USED)

END OF SECTION



Project: Clark's Point and Port Heiden RPSU Projects, ITB #19041

Project No.: TBD

Contractor: _____

Specified item for which substitution is requested: _____
(reference specification section and paragraph)

The following product is submitted for substitution: _____
(describe proposed substitution and differences from specified item; attach complete technical, performance, and test data; state whether substitution affects dimensions and functional clearances shown on drawings or affects other trades, and include complete information for changes to drawings and/or specifications which proposed substitution will require for its proper installation.)

I certify the following:

- | Yes | No | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | The substitute will perform adequately and achieve the results called for by the general design. |
| <input type="checkbox"/> | <input type="checkbox"/> | The substitute is similar, of equal substance, suited to the same use, and will provide the same warranty as the product specified. |
| <input type="checkbox"/> | <input type="checkbox"/> | An equivalent source of replacement parts is available. |
| <input type="checkbox"/> | <input type="checkbox"/> | The evaluation and approval of the proposed substitute will not delay the Substantial or Final Completion of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | Any change in the design necessitated by the proposed substitution will not delay the Substantial or Final Completion of the project. |
| <input type="checkbox"/> | <input type="checkbox"/> | The cost of any change in the design necessitated by the proposed substitution, including engineering and detailing costs, and construction costs caused by the substitution will be paid by the Contractor at no cost to the Authority. |
| <input type="checkbox"/> | <input type="checkbox"/> | The cost of any license fee or royalty necessitated by the proposed substitution will be paid by the Contractor at no cost to the Authority. |

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Signed: _____ Date: _____
Authorized Contractor Signature

Architect/Engineer Recommendation:

- Accepted
 Accepted as Noted
 Not Accepted
 Received Too Late

Remarks:

Signed: _____ Date: _____
Architect/Engineer

Accepted
 Rejected
 _____ Date: _____
 Project Manager

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SECTION 01 64 00
RECEIPT OF OWNER FURNISHED MATERIALS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. This section describes receipt, unloading, transportation, storage, and handling of materials furnished by the Owner (Authority) for this project as described herein.
- B. See Section 01 11 13 - Summary of Work for delivery dates for Owner Furnished materials.

1.2 RELATED REQUIREMENTS

- A. Section 01 11 13 – Summary of Work
- B. Section 26 32 13.50 – Owner Furnished Diesel Engines.

1.3 DESCRIPTION OF OWNER FURNISHED MATERIAL

- A. Port Heiden Engines: Three (3) each diesel engines. Detailed description of the engines, including photos, is included in Section 26 32 13.50 – Owner Furnished Diesel Engines. The engines are in storage at the Authority Warehouse at 2601 Commercial Drive, Anchorage, AK 99501. The Contractor will make arrangements with the Authority to pick up the engines from this location and take possession.
- B. Port Heiden Module: One (1) each steel module structure. The module construction is detailed on the approved shop drawings which are included in separately bound Drawings. The overall module dimensions are 45' long by 15' wide by 13' high and the total weight is 40,000#. The module will be delivered to the Authority Warehouse at 2601 Commercial Drive, Anchorage, AK 99501. The Contractor will make arrangements with the Authority to receive the module at this location and take possession.
- C. Clark's Point Module: One (1) each steel module structure. The module construction is detailed on the approved shop drawings which are included in separately bound Drawings. The overall module dimensions are 45' long by 15' wide by 13' high and the total weight is 40,000#. The module will be delivered to the Authority Warehouse at 2601 Commercial Drive, Anchorage, AK 99501. The Contractor will

make arrangements with the Authority to receive the module at this location and take possession.

1.4 ACCEPTANCE OF OWNER FURNISHED MATERIAL

- A. The Contractor shall (1) receive and accept the materials at the delivery point specified; (2) inspect all materials to confirm that the materials delivered are in good condition and the quantities are correct; and (3) execute a receipt for all materials accepted from the Authority. Delinquency in signing material receipts may result in delayed progress payments.
- B. All material furnished by the Authority shall comply with the plans and specifications. All materials which do not meet specifications or are received broken or damaged shall be culled by the Contractor and a report made to the Authority within 5 days of receipt of material as to the number culled and reason for culling.
- C. If the Authority fails to deliver the materials according to the dates set forth in Section 01 11 13 – Summary of Work, the Contractor's sole remedy and compensation shall be an extension of time not greater than the delay. Any such time extension shall be requested in writing by the Contractor.

1.5 RECEIPT, TRANSPORTING AND STORING OWNER FURNISHED MATERIAL

- A. The Contractor shall receive, transport, and protect all material in accordance with accepted industry standards.
- B. All handling charges required for receiving, loading, unloading, hauling, transporting or storing the material shall be provided by the Contractor.
- C. Any demurrage charges of or other fees incurred as a result of the Contractor not receiving, moving and storing the material shall be paid by the Contractor. If the Authority is required to pay these fees, the fees will be deducted from the first Contractor pay request.
- D. The Contractor shall provide proper equipment as necessary to load, unload, and transport Authority furnished material. The equipment shall be rated as required to properly handle the material.

1.6 DAMAGE TO OWNER FURNISHED MATERIAL

- A. Upon receipt of the materials as specified above, the Contractor shall become solely responsible for their care, transportation, storage, and protection. In the event materials are damaged, lost, stolen, or destroyed by any cause whatsoever after the Contractor has signed a receipt for them, their repair or replacement shall be entirely at the Contractor's expense.
- B. All material replaced by the Contractor shall be equal to the material provided by the Authority and shall meet the material purchase specifications.

1.7 STORAGE OF OWNER FURNISHED MATERIAL

- A. The Contractor shall provide secure storage for all Authority furnished material and shall be responsible for transporting the material to the jobsite as required to support the construction schedule.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 73 00
EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements for addressing defects, cleaning, operating and maintenance manuals, spare parts, training, warranties and bonds, and maintenance service.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions: Fiscal provisions, legal submittals, and other administrative requirements.
- B. Section 01 26 63 – Change Procedures.
- C. Section 01 31 19 – Project Meetings.
- D. Section 01 33 00 –Submittal Procedures.
- E. Section 01 33 23 – Shop Drawings, Product Data, and Samples.
- F. Section 01 60 00 – Material and Equipment.
- G. Section 01 74 00 – Cleaning and Waste Management.

1.3 CLOSEOUT PROCEDURES

- A. Comply with Section 01 77 00 - Contract Closeout Procedures.

1.4 DEFECTS

- A. Product defects shall be all items that affect the visual appearance or function of the Products. Defects shall be as identified below unless more stringent requirements are specified within specific sections.
- B. Products shall typically be viewed from a distance of 30.0 inches (760 mm).
- C. Defects shall be solely determined by the Project Manager.

D. Defects, Product:

1. Cuts, Scrapes, Gouges Abrasions 0.250 inch (6 mm) long or longer, and 0.03125 inches (0.79375 mm) wide or wider that are visible at a distance of 30.0 inches (762 mm) shall be considered defects.
2. Abrasions less than the above shall be accepted.
3. Burns of any size that permanently discolor the surface material shall be considered defects.
4. Product color variation.

E. Defects, Joint:

1. Non-alignment of Products. Visual defects and non-alignment of joints shall be considered defective.

F. Defects, Structural:

1. Bent members or other structural damage shall be considered defective.
2. Incorrectly manufactured members shall be considered defective.

G. Defects, Corrosion:

1. Surface corrosion not exceeding one percent (1%) of the surface area shall be considered a visual defect.
2. Surface corrosion exceeding one percent (1%) and not exceeding five percent (5%) of the surface area shall be evaluated by the Project Manager.
3. Surface corrosion exceeding five percent (5%) of the surface area shall be considered a defect.

H. Defects shall be repaired or replaced at no additional cost to the Authority.

1. Structural defects shall be replaced, no exceptions.
2. Visual defects shall be repaired or replaced as solely determined by the Project Manager.

1.5 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain work and storage areas free of waste materials, debris, and rubbish. Maintain site in a neat and orderly condition to maintain safe passage and exits and to avoid fire hazard. Provide covered containers for deposit of waste materials.

- B. Collect and remove waste materials, debris, and rubbish from site periodically and at least weekly, and dispose off-site. Have equipment and personnel available on-site daily to sweep and clean work sites and interior work areas.
- C. Comply with Section 01 74 00 – Cleaning and Waste Management.

1.6 FINAL CLEANING

- A. Execute final cleaning prior to Substantial Completion inspection.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances.
- C. Use materials which will not create hazards to health or property, and which will not damage surfaces. Follow manufacturer's recommendations.
- D. Maintain cleaning until the Authority issues certificate of Substantial Completion.
- E. Remove waste, debris and surplus materials from site. Clean work site and interior work areas; remove stains, spills, and foreign substances from all areas and sweep clean. Rake clean work site. Comply with Section 01 74 00 – Cleaning and Waste Management.

1.7 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.8 OPERATION AND MAINTENANCE (O&M) DATA

- A. Submit data bound in 3-ring slant “D” presentation ring binders, maximum 11-5/8” high and 11-1/4” deep. Spine, front, and back shall be heavy virgin vinyl sealed over heavy board. Binders shall have clear, full size pockets on spine and front cover. Thickness of content shall not exceed 75% of binder manufacturer’s stated capacity. All pages shall be 8 ½” x 11”, or 11” x 17” folded to 8 ½” x 11” in a manner to permit unfolding without removal from binder.

B. O&M Manual binders shall be black, clearly and permanently labeled as follows:

1. Spine

Project Name

Project Number

Operations & Maintenance Manual, Volume _____ of _____

Facility Name:

2. Front Cover:

Project Name:

Project No.:

Facility Name:

Contractor:

Address

City, State, ZIP

Phone:

Fax:

E-mail Address:

Major Sub-Contractors:

Address

City, State, ZIP

Phone:

Fax:

E-mail Address:

Operations & Maintenance Manual, Volume _____ of _____

Discipline:

Date:

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

- D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified. Include the complete Table of Contents in each volume, typed on 24-pound white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and Maintenance instructions, arranged by system process flow and subdivided by Specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. List of equipment.
 - b. Parts list for each component.
 - c. Operating instructions.
 - d. Maintenance instructions for equipment and systems.
 - e. Maintenance instructions for finishes, including recommended cleaning methods and materials, special precautions identifying detrimental agents, and touchup procedures/materials.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Start-up and Commissioning reports.
 - c. Certificates.
 - d. Originals of warranties and bonds.
- E. Submit one (1) draft copy of completed volumes 30 calendar days prior to Training or Substantial Completion inspection, whichever is earliest. This copy will be reviewed and returned, with Authority's comments. Revise content of all document sets as required prior to final submission.
- F. Submit four (4) sets of revised final volumes 7 days prior to Training or Substantial Completion inspection, whichever is earliest.
- G. In addition to required hardcopies, provide electronic copy on *.PDF format with Table of Contents hyperlinked to all referenced sections.

1.9 TRAINING

- A. Before Substantial Completion, instruct the Authority's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. For equipment requiring seasonal operation, or placed into

operation subsequent to Final Completion, perform instructions within six (6) months.

- B. Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- C. Unless specified elsewhere, the duration of on-site instruction shall be eight (8) hours, minimum.
- D. Provide digital video recordings of all provided instruction in format approved by the Authority. Training videos shall be submitted prior to Final Completion.
- E. Prepare and insert additional data in Operation and Maintenance Manual when need for such data that its need becomes apparent during instruction.

1.10 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra Products in quantities specified in individual Specification sections. These shall be labeled and stored per manufacturer's recommendations and as specified.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to Substantial Completion payment.

1.11 WARRANTIES AND BONDS

- A. Provide duplicate notarized copies.
- B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
- C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover, similar to O&M Manual.
- D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.12 MAINTENANCE SERVICE

- A. Furnish service and maintenance of all equipment, products, components, specialties and appurtenances provided for this project for one year from date of Substantial Completion.
- B. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- D. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Authority.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT

PART 1 – GENERAL

1.1 GENERAL

- A. During the term of this Contract, the Contractor shall remove as promptly as possible any materials and equipment which are not required for the completion of the Work. All debris shall be removed from the site and disposed of daily. The Contractor shall take particular care to eliminate any hazards created by these operations.

1.2 RELATED REQUIREMENTS

- A. Section 01 73 00 – Execution Requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 PROGRESS CLEANING

- A. At the completion of the project, or prior thereto if so directed by the Authority, the Contractor shall be responsible for completely cleaning of those portions of the project which his work affects.
 - 1. Contractor shall remove from the facility all tools, equipment, surplus materials, debris, temporary structures, and other material not incorporated in the permanent installation.
- B. Restoration of Damaged Property: To the extent that any roads, vegetation, structures, utilities, or other items are damaged or displaced by the Contractor's operations, these shall be restored to their original or better condition prior to Substantial Completion inspection. This shall include both on-site and off-site items. Any damage which is severe enough to disrupt community travel or utilities shall be repaired by the Contractor immediately.
- C. Cleaning, repair, and restoration must be accomplished prior to Final Inspection, to the satisfaction of, and at no additional cost to the Authority.
- D. Disposal of hazardous and construction materials shall be accomplished as specified in Section 00 70 00 – General Conditions and this Section.

3.2 WASTE DISPOSAL

- A. Demolition Material.
 - 1. Not Used.

- B. General Construction Waste.
 - 1. General construction waste generated during the process of completing the project scope of work shall be removed from the limits of the project site and disposed of. All general construction waste shall be disposed of as required by local, state and federal laws, rules, regulations and requirements.

END OF SECTION

SECTION 01 77 00
CONTRACT CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Requirements for Substantial Completion.
- B. Requirements for Final Completion.
- C. Requirements for Final Acceptance and Payment.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 – General Conditions: Substantial Completion, Final Completion, Final Payment, Final Acceptance.
- B. Section 01 11 13 – Summary of Work.
- C. Section 01 29 73 – Schedule of Values.
- D. Section 01 29 76 – Application for Payment.
- E. Section 01 33 00 – Submittal Procedures.
- F. Section 01 73 00 – Execution Requirements
- G. Section 01 78 39 – Project Record Documents.

1.3 SUBSTANTIAL COMPLETION SUBMITTALS

Submit the following prior to requesting the Substantial Completion Inspection:

- A. Evidence of Compliance with Requirements of the Authority Having Jurisdiction:
 - 1. Certificate of Occupancy.
 - 2. Required Certificates of Inspection.
 - 3. Other approvals as may be required.

- B. Project Record Documents.
- C. Operation and Maintenance Data.
- D. Spare Parts and Maintenance Materials.
- E. Warranties and Bonds.
- F. Keys and Keying Schedule.
- G. No progress payments will be made for Substantial Completion until all required submittals have been submitted and accepted by the Authority.

1.4 SUBSTANTIAL COMPLETION

- A. In accordance with Section 00 70 00 – General Conditions, Article 13.10 Substantial Completion, the Contractor shall notify the Authority in writing that the Work or a portion of the Work which has been specifically identified in the Contract Documents (except for items specifically listed by the Contractor as incomplete) is substantially complete and request that the Authority issue a Certificate of Substantial Completion. The Authority will consider the Contractor's request for Substantial Completion only when:
 - 1. Written request for Substantial Completion is provided at least fourteen (14) calendar days in advance of the Authority's scheduled Substantial Completion inspection date.
 - 2. List of items to be completed or corrected is submitted.
 - 3. All Operation and Maintenance Manuals are submitted and approved by the Authority.
 - 4. All commissioning requirements have been met.
 - 5. All equipment and systems have been tested, adjusted, are properly operating and fully operational.
 - 6. All demonstration and training requirements have been completed, or the date(s) for required demonstration and training have been scheduled with the Authority.
 - 7. All automated and manual controls are fully operational.
 - 8. Operation of all equipment and systems has been demonstrated to the Authority or their designated representative.

9. Certificate of Occupancy is submitted.
 10. Certificates of Inspection for required inspections have been submitted for all required inspections.
 11. Project Record Documents for the Work or the portion of the Work being accepted are submitted and approved.
 12. Spare parts and maintenance materials are turned over to the Authority.
 13. All keys are turned over to the Authority.
 14. All warranties and bonds are submitted and approved.
 15. Final cleaning has been completed to the satisfaction of the Authority.
- B. When all of the preceding requirements for the consideration of Substantial Completion have been met, the Authority will conduct a scheduled Substantial Completion inspection with its Architect/Engineers and other required representatives. If upon the completion of the inspection, the Authority should find that the Work is not substantially complete, the Authority will promptly notify the Contractor in writing, listing observed deficiencies.
- C. The Contractor shall remedy deficiencies and send a second written notice of Substantial Completion.
- D. When the Authority finds the Work is substantially complete, it will have fourteen (14) days to issue a certificate of Substantial Completion with an attached punch list of deficiencies, all in accordance with the provisions of the General Conditions.
- E. The Contractor shall be responsible for scheduling the activities required for Substantial Completion to enable completion within the Contract Time.

1.5 FINAL COMPLETION

- A. In accordance with Section 00 70 00 – General Conditions, Article 13.13 Final Completion, when the Contractor considers that it has completed all the deficiencies listed on the Substantial Completion punch list, and that the Work is otherwise complete, it shall submit written certification that:
1. Contract Documents have been reviewed.

2. Work has been completed in accordance with Contract Documents, and deficiencies listed with certificate of Substantial Completion have been corrected.
 3. Work is complete and ready for final inspection.
- B. Upon the receipt of the preceding written notice, the Authority will conduct a Final Completion inspection. If the Authority should then find the Work to be incomplete, it will promptly notify the Contractor in writing with a list of observed deficiencies.
 - C. The Contractor shall remedy deficiencies and transmit to the Authority a second certification of Final Completion.
 - D. When the Authority determines the Work is complete, all in accordance with the General Conditions article, "Final Completion and Application for Payment", the Contractor may make application for Final Payment.

1.6 REINSPECTION FEES

- A. In accordance with Section 00 70 00 – General Conditions, Articles 13.10 Substantial Completion and 13.12 Final Inspection, the Contractor shall pay for all costs incurred by the Authority for re-inspection.
- B. The Authority may deduct the re-inspection costs from the application for final payment.

1.7 FINAL ACCEPTANCE

- A. Following the issuance of Final Completion, and subject to the completion of requirements specified in Section 00 70 00 – General Conditions, Articles 13.14 Final Payment and 13.15 Final Acceptance, the Authority will review the project files for completeness. The Authority may require the Contractor to submit or re-submit any of the following documents, upon request:
 1. Contractor's transmittal letter: O&M Manuals.
 2. Contractor's transmittal letter: Warranty/Bonds.
 3. Contractor's transmittal letter: Record Documents.
 4. Spare parts, maintenance materials receipts.

5. Contractor's transmittal letter: Keys & keying schedule.
 6. Contractor's certification of insurance.
 7. EEO compliance certification (Federally funded projects only).
 8. Submittals and miscellaneous registers.
 9. Original final pay estimate.
 10. Contractor's release.
 11. Authority of Labor Notice of Completion (NOC).
 12. Other documentation as required by the Authority.
- B. Statement of Adjustment of Accounts – The Authority may require the Contractor to submit a final statement reflecting adjustments to the Contract Price showing:
1. Original Contract Price.
 2. Previous Change Orders.
 3. Changes under Allowances.
 4. Changes under Unit Prices.
 5. Deductions for uncorrected Work.
 6. Penalties and Bonuses.
 7. Deductions for Liquidated Damages.
 8. Deductions for Re-inspection Fees.
 9. Other adjustments to Contract Price.
 10. Total Contract Price as adjusted.
 11. Previous payments.
 12. Sum remaining due.
- C. The Authority will issue a final Change Order reflecting all remaining adjustments to Contract Price not previously made by Change Orders.
- D. See Section 01 29 73 – Schedule of Values for minimum value that shall be assigned for Final Acceptance.

- E. The Contractor shall cooperate with the Authority and shall provide the requested documentation.
- F. When the Authority determines its files are complete, it may make final payment and issue a letter of Final Acceptance.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Maintenance of Record Documents and Samples.
- B. Submittal of Record Documents and Samples.

1.2 RELATED REQUIREMENTS

- A. Section 00 70 00 - General Conditions: Record Documents.
- B. Section 01 11 13 – Summary of Work.
- C. Section 01 29 76 – Application for Payment.
- D. Section 01 33 23 – Shop Drawings, Product Data, and Samples.
- E. Section 01 77 00 – Contract Closeout Procedures.
- F. Individual Specifications Sections: Manufacturer's certificates and certificates of inspection.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. In addition to requirements in General Conditions, maintain at the site for the Authority one accurate and up to date record copy of:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, product data, and samples.
 - 6. Field test records.

7. Inspection certificates.
 8. Manufacturer's certificates.
- B. Prior to Substantial Completion, provide original or legible copies of each item maintained by the Contractor in other Sections, as listed by spec section in Paragraph 1.2.B, C, and D above.
 - C. Delegate responsibility for management of maintenance of Record Documents to one person on the Contractor's staff as approved in advance by Project Manager.
 - D. Promptly following award of Contract, secure from the Authority, at no cost to the Contractor, one complete set of all Documents comprising the Contract.
 - E. Immediately upon receipt of job set described above, identify each Document with title "RECORD DOCUMENTS – JOB SET".
 - F. Store record documents and samples in field office apart from documents used for Construction. Provide files, racks, and secure storage for Record Documents and samples.
 - G. 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.
 - H. Maintain Record Documents in a clean, dry and legible condition. Do not use record documents for construction purposes.
 - I. Use all means necessary to maintain job set of Record Documents completely protected from deterioration and from loss and damage until completion of Work and transfer of recorded data to the Authority.
 - J. Keep record documents and samples available for inspection by the Authority.
 - K. Upon request by the Authority, and at time of each Application for Payment, enable inspection of Record Documents by the Authority for review as to completeness.
 - L. The Authority's approval of the current status of Record Documents will be prerequisite to the Authority's approval of requests for progress payments and request for final payment.

1. Prior to submitting each request for progress payment, secure the Authority's approval of Record Documents as currently maintained.
 2. Prior to submitting request for Final Payment, obtain the Authority's approval of final Record Documents.
- M. Do not use job set for any purpose except entry of new data and for review and copying by the Authority.

1.4 RECORDING

- A. Record information on a set of 'black-line' opaque Drawings, and in a copy of a Project manual, provided by the Authority.
- B. Using felt tip marking pens or colored pencil, maintaining separate colors for each major system, clearly describe changes by note and by graphic line, as required. Date all entries. Call attention to entry by a "cloud" around area or areas affected.
- C. Thoroughly coordinate all changes within Record Documents, making adequate and proper entries on each Specification Section and each sheet of Drawings and other Documents where such entry is required to properly show change or selection.
- D. When a change within Record Documents is referenced to another document, such as a RFI's, Shop Drawing or Change Order, attach a copy of the referenced document to the respective Record Drawing or Record Specification where the entry is made.
- E. 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 dimension and detail.
 3. Changes made by modifications.
 4. Details not on original Contract Drawings.
 5. References to related Shop Drawings and modifications.
 6. Clearly label all changes and show dimensions to establish size and location. All identifications shall be sufficiently descriptive to relate reliably to Specifications.

- F. Other Documents: Maintain manufacturer's certifications, inspection certifications, and field test records required by individual Specifications sections.

1.5 SUBMITTALS

- A. Upon submittal of the completed Record Documents, make changes in Record Documents as required by the Authority.
- B. Transmit with cover letter in duplicate, listing:
 - 1. Date.
 - 2. The Authority's Project title and number.
 - 3. Contractor's name, address, and telephone number.
 - 4. Number and title of each record document.
 - 5. Signature of the Contractor or authorized representative.
- C. Final Record Documents shall include both hard copies and digitally scanned copies in *.PDF format (high quality grayscale scans, minimum 200 pixels/inch). Scans shall include front and back of drawings/documents where information occurs on both sides.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

DIVISIONS 02 – 20

(NOT USED)

SECTION 21 13 29.10

FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. The work involves design, installation, testing, and certification of an automatic fire suppression system for two power generation modules. The modules will each contain three diesel engine generators as indicated.
- B. The modules will be completely assembled off-site (shop fabricated), not field constructed in the communities of Clark's Point and Port Heiden. All fire suppression system installation, and the initial testing will occur off site and shall include but not be limited to:
 - 1. Design system in accordance with the latest adopted editions of all applicable codes and standards, manufacturer's requirements, these specifications, and the Drawings.
 - 2. Obtain a State of Alaska, Fire Marshal Plan Review Permit.
 - 3. Furnish and install a complete system.
 - 4. Program fire control panel.
 - 5. Acceptance testing and certification of completed system.
 - 6. Preliminary operation training with Authority staff.
 - 7. Preparation for shipping.
 - 8. Operation and Maintenance Manuals including as-built drawings.
- C. Upon acceptance of shop fabrication installation and testing by the Authority, one module will be shipped to Clark's Point, Alaska, and one module will be shipped to Port Heiden, Alaska, for permanent installation and commissioning under a separate on-site contract. All final system testing, certification, commissioning, and training will occur on-site in these communities and will include but not be limited to:
 - 1. Filling and charging system.
 - 2. Final acceptance testing and certification of completed system.
 - 3. Minimum four hours operation training with local operators and Authority staff.

1.2 RELATED SECTIONS

- A. Submittals including CAD drawings.
- B. Division 1.
- C. Division 23.
- D. Division 26.

1.3 QUALITY ASSURANCE

- A. All equipment shall be new and shall be listed for the intended application. The entire system shall be designed and fabricated in accordance with recognized and acceptable engineering and industry practices.
- B. Design shall be prepared by a registered mechanical engineer or technician with minimum NICET Level 3 certification. Designer shall have an appropriate State of Alaska design permit.
- C. The Contractor shall be authorized by the fire suppression system manufacturer to furnish and install the specified system. Field installation shall be performed by technicians certified by the manufacturer to install the specified system.

1.4 REFERENCED STANDARDS:

- A. National Fire Protection Association (NFPA) 750: Standard on Water Mist Fire Protection Systems.
- B. Underwriters Laboratories (UL) UL 864 Control Units for Fire Protective Signaling Systems
- C. National Fire Protection Association (NFPA) NFPA 72 National Fire Alarm Code
- D. National Electrical Manufacturer's Association (NEMA).

1.5 SUBMITTALS

- A. Provide submittals in the manner described herein and in Division 1.
- B. Provide submittals for all products and systems described in Division 21 specifications and shown on the Drawings to demonstrate compliance with the requirements of the project. Submittal to include:
 - 1. Manufacturer, model numbers and quantity of each device.
 - 2. Manufacturer and model of control panel, including installed options.
 - 3. Agent piping layout including size and quantity of nozzles.
 - 4. Calculations.
 - 5. Shop drawings shall indicate compliance with all requirements of the specifications and shall contain at a minimum:
 - a. Floor Plans and Isometrics for agent piping.
 - b. Floor Plans and Diagrams for Wiring complete with circuit designation in accordance with Wire Schedule on the Drawings (A-B-C-D-E).
 - c. Panel and device installation details.
 - d. Bill of Materials
 - e. Installation notes and system Sequence of Operation.
- C. Based upon review comments by the Authority issue final revised submittal including final construction drawings.
- D. Submit a copy of State of Alaska, Fire Marshal Plan Review Permit to the Authority.

- E. Prior to testing, certification, and training provide Operation and Maintenance Manuals. Manuals to include system description, manufacturer's catalog information, programming, instructions, operations and maintenance literature, Material Safety Data Sheets (MSDS) for extinguishing agent, and as-built drawings of completed system. Deliverables to include one bound copy plus 4 CD's with PDF format electronic files of the entire manual.

1.6 SUBSTITUTIONS

- A. All substitutions shall be noted on equipment submittals.

1.7 WARRANTY

- A. Division 1 - Closeout Requirements: Warranties.
- B. Provide a one-year manufacturer's warranty covering all materials and workmanship of all products supplied. Warranty shall commence from the date of system certification.

PART 2 - MATERIALS

2.1 FIRE SUPPRESSION AGENT

- A. A high pressure water mist fire suppression system shall be furnished, Marioff Hi-Fog or approved equal. In order for a substitution of the suppression system to be approved it must have at a minimum the following salient features:
 - 1) The system must use water mist as the sole extinguishing agent.
 - 2) The system must use high pressure (2,000 PSI nominal) nitrogen as the sole driving agent without the aid of any pumps.
 - 3) The system shall be a single pipe system utilizing stainless steel tubing not exceeding 1" outside diameter.
 - 4) The complete agent rack including all water and nitrogen storage for one zone of coverage shall not exceed the following dimensions: 4'-6" Long x 1'-4" Wide x 7'-6" High.

2.2 AGENT RACK AND WATER TANK

- A. Wall or floor mounted racks shall be provided that contain the agent cylinders, nitrogen cylinder, and piping. Marioff Hi-Fog MAU 150 FS or approved equal.
- B. The racks shall be designed for the appropriate seismic code and shall be adequately anchored to the building structure.

2.3 FIRE CONTROL PANEL

- A. The Fire Control Panel shall be a Fike Cheetah XI-50 10-071-R1 or approved equal, and shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with, supervise and control the following types of equipment used to make up the system: intelligent self-calibrating smoke and flame detectors, addressable modules, annunciators, and other system controlled devices.
- B. Basic equipment to be included with Fire Control Panel shall be main board with display and keypad, door, hardware, and backbox for panel surface mount installation.

C. System Capacity and General Operation

1. The control panel shall be capable of 50 intelligent/addressable devices.
2. The system shall include two Class B (NFPA Style Y) programmable Notification Appliance Circuits. It shall also include three additional programmable Form-C alarm and trouble relays rated at a minimum of 2.0 amps @ 30 VDC.
3. The system shall support up to 99 programmable EIA-485 driven relays for an overall system capacity of 301 circuits.
4. The Fire Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire system.
5. All programming or editing of the existing program in the system shall be achieved without special equipment, and without interrupting the alarm monitoring functions of the Fire Control Panel.
6. The Fire Control Panel shall provide the following features:
 - a. Automatic detect test and drift compensation to extend detector accuracy over life (smoke and flame detectors monitored and automatically calibrated)
 - b. Sensitivity Test, meeting requirements of NFPA 72, Chapter 5.
 - c. Maintenance Alert to warn of excessive smoke detector dirt or dust accumulation.
 - d. System Status Reports to display.
 - e. Positive Alarm Sequence pre-signal, meeting NFPA 72 3-8.3 requirements.
 - f. Periodic Detector Test, conducted automatically by software.
 - g. Pre-alarm for advanced fire warning.
 - h. Cross Zoning with the capability of: counting two detectors in alarm, two software zones in alarm, or one smoke detector and one thermal detector.
 - i. Walk Test, with check for two detectors set to same address.
 - j. Adjustable delay and discharge timers.
 - k. The detector software shall meet NFPA 72, Chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.
 - l. The detector software shall allow manual or automatic sensitivity adjustment.
 - m. Event history file in nonvolatile memory.
 - n. Panel to have abort option to manually prevent release of extinguishing agent.
 - o. Battery back-up in the event of normal AC power failure.
 - p. Unit to be able to release extinguishing agent in at least two independent hazard zones.

2.4 SECONDARY POWER SOURCE BATTERIES

- A. Secondary power shall be provided by 12 volt, gelled electrolyte batteries. The batteries shall be completely maintenance free. Fluid level checks and refilling shall not be required.
- B. Batteries shall have sufficient capacity to power the fire system for not less than twenty-four hours standby operation plus 30 minutes of alarm upon a normal AC power failure. Note that this is in excess of minimum NFPA requirements.

2.5 HEAT DETECTOR

- A. UL Listed, adjustable temperature heat detector. Fike 60-1039 or approved equal. Set to activate at 135°F for normal temperature and 190°F for high temperature.

2.6 FLAME (OPTICAL) DETECTOR

- A. UL Listed, flame detectors shall be multi-spectrum, electro-optical, automatic calibrating, digital fire detectors. Fire Sentry Corporation Model SS4-A2 or approved equal. Install on SM4 swivel mount.

2.7 SMOKE (PHOTOELECTRIC) DETECTOR

- A. UL Listed, automatic calibrating type, photoelectric smoke detector. Detector to be addressable and provide analog signal to the control panel which may be used for maintenance of detector. Fike 63-1052 or approved equal.

2.8 ANNUNCIATORS

- A. Interior Annunciator (Alarm and Discharge) - UL Listed, Horn/strobe combination, minimum 75 candela. Gentex GEC3-24WR or approved equal.
- B. Exterior Annunciator (Alarm) - Weatherproof, UL Listed horn/strobe combination, minimum 75 candela. Gentex WGEC24-75WR or approved equal.
- C. Exterior Strobe (Discharge) - Weatherproof, UL Listed strobe, minimum 75 candela. Gentex WGEC24-75WR or approved equal.

2.9 MANUAL PULL STATION

- A. Manual pull station(s) shall be UL Listed, addressable, double action, and provide visible indication that station has been operated. Fike 02-3710 or approved equal.

2.10 ABORT STATION

- A. UL Listed, mushroom button abort station. Station coloring to be highly visible. Label or provide placard. Fike 10-1639 or approved equal.

2.11 DEVICE MONITORING MODULES

- A. UL Listed modules designed for use with intelligent and addressable equipment as required. Fike Series 55 or approved equal.

2.12 PLACARDS

- A. Provide placards in compliance with NFPA as required. Provide additional warning placards as indicated on the plan in accordance with the Placard Schedule.

2.13 RACEWAYS AND CONDUCTORS

- A. Route all wiring in separate dedicated raceways for all fire suppression system wiring at no cost to Contractor. All raceways shall be electrical metallic tubing (EMT). All raceways, junction boxes, pull boxes, and cover plates shall be painted red.
- B. All conductors shall be soft drawn copper, Type XHHW insulation; 600V and 75C rated; gauge and color as indicated by service in accordance with the following schedule:
 - 120V AC Power - 12 AWG, stranded, color per station service scheme.
 - 24V DC Power, Detection, and Alarm Circuits - 14 AWG, color in accordance with the Wire Schedule.

2.14 NOZZLES

- A. In Total Flooding and Local Application zones nozzles shall be open spray head type, Marioff 4S 1MC 8MB 1000 or approved equal.

2.15 PIPING

- A. Contractor shall furnish, install, and pressure test agent discharge tubing/piping in accordance with manufacturer's recommendations.

2.16 SUPPORT

- A. Contractor shall furnish and install industry standard hangers for agent discharge piping, raceways, panel and all devices.

2.17 FITTINGS, VALVES, CONTROLS, AND DEVICES

- A. Contractor shall furnish and install all required fittings, valves, control devices, and accessories as required to provide the types of coverage required for each zone as indicated on the Drawings.

PART 3 - EXECUTION

3.1 DESIGN

- A. Design fire suppression system with two zones of coverage as shown on the Drawings.
 - 1. Zone 1 (Generation Room) shall contain agent rack, discharge piping and nozzles. Two flame detectors shall be cross-zoned so that any one detector will set off alarm and shut-down generators. Any second detector will begin a 30 second countdown to agent release. Two high temperature heat detectors shall be cross-zoned in the same sequence as the flame detectors. Exit shall have a manual "Agent Release" pull station which will begin a 30 second countdown to agent release when activated.
 - 2. Zone 2 (Control Room) shall contain the control panel, one smoke detector and one normal temperature heat detector. Either detector will set off alarm and will shut-down generators. Exit shall have a manual "Agent Release" pull station which will begin a 30 second countdown to agent release when activated. An abort station shall be located near the control panel. In the event of a false alarm,

pressing and holding the abort button will stop the 30 second countdown to release, and silence audible alarms. Once released, audible alarms will resume and 30 second countdown will restart. The abort will not function in the event of a Manual Agent Release.

- B. Provide annunciators and other devices where specifically indicated on the Drawings.

3.2 INSTALLATION - GENERAL

- A. The system shall be installed in accordance with the Contract Documents, the approved submittal, and all manufacturer's requirements.
- B. Contractor shall perform all work with skilled craftsmen specializing in said work with all required certifications. Install all materials in a neat, orderly, and secure fashion, as required by these specifications, manufacturer's requirements, and commonly recognized standards of good workmanship.

3.3 INSTALLATION – SHOP MODULE ASSEMBLY

- A. Upon completion of shop testing, all water shall be drained and/or blown out of the system to prevent freeze damage and the batteries shall be disconnected.
- B. Each system shall be left with one fully charged nitrogen cylinder installed in the rack plus one fully charged spare nitrogen cylinder shipped loose with the module.

3.4 INSTALLATION – ON SITE

- A. As previously specified, the final testing and commissioning will occur on site under a separate contract. The on-site work by others will include but not be limited to:
 - 1. Filling and charging systems.
 - 2. Final acceptance testing and certification of completed systems.
 - 3. Minimum four hours operation training at each site with local operators and Authority staff.
 - 4. Verify that each system has one fully charged nitrogen cylinder installed in the rack plus one fully charged spare nitrogen cylinder.

END OF SECTION

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SECTION 23 05 00

COMMON WORK RESULTS FOR MECHANICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

- 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. Section includes:
 - 1. General mechanical work.
 - 2. Painting and marking.
 - 3. Valve tags, signs, and placards.
 - 4. Flashing and sealing.

1.2 RELATED SECTIONS

- A. Division 1
- B. All other Division 23 Specifications
- C. Divisions 21 and 26

1.3 PROJECT RECORD DRAWINGS

- A. In addition to other requirements of Division 1, 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.
- B. Provide one set of drawings clearly marked up with all as-built information to the Authority within two weeks of completion.
- C. At completion of project, deliver these drawings to the Authority and obtain a written receipt.

1.4 SUBMITTALS

- A. Provide submittals for all products and systems described in Division 23 specifications and shown on the Drawings to demonstrate compliance with the requirements of the project. Provide submittals in the manner described herein and in Division 1.
- B. Painting and Marking: Submit manufacturers catalog literature for each product required.
- C. Valve Tags: Submit manufacturers catalog literature for tags as indicated on the Schedule on Sheet M1.2.

- D. Signs and Placards: Submit manufacturers catalog literature as indicated on the Schedule on Sheet M1.2.
- E. Equipment: Submit manufacturers catalog literature for each item indicated on the Mechanical Schedules on Sheet M1.1 under the Division 23 Sections that follow. See specific requirements under each section.

1.5 RECEIVING AND HANDLING

- A. See general conditions and the general requirements in Division 1 regarding material handling.
- B. Deliver packaged materials to the jobsite in unbroken packaging with manufacturer's label, and store to facilitate inspection and installation sequence.
- C. Protect all materials and equipment during the duration of construction work against contamination and damage. Replace or repair to original manufactured condition any items damaged during construction. Immediately report any items found damaged to the Authority prior to commencing construction.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Division 1 - Material and Equipment: Storage and protection.

1.7 QUALITY ASSURANCE

- A. Division 1 - Quality Control
- B. Perform all work in accordance with the latest adopted editions of the International Fire Code, the International Building Code, and the International Mechanical Code including State of Alaska amendments. Comply with all applicable State and Federal regulations.
- C. Perform work with skilled craftsman specializing in said work. Install all materials in a neat and orderly, and secure fashion as required by specifications and commonly recognized standards of good workmanship.

1.8 SCHEDULE OF WORK

- A. The work 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 meet scheduled completion dates, and to avoid delaying any other trade.
- B. The Authority will set up completion dates. Each Contractor shall cooperate in establishing these times and locations and shall process his work so as to ensure the proper execution of it.

1.9 SUBSTANTIAL COMPLETION

- A. Contact the Authority one week prior to completion of all work to schedule substantial completion inspection. The Authority will generate a punchlist of corrective action items during the inspection. Work will not be considered complete until all corrective action items in the Authority's punch list have been satisfactorily completed and photographic or other positive documentation has been provided to the Authority.

1.10 COOPERATION AND CLEANING UP

- A. The Contractor for the work under each section of the specifications shall coordinate his work with the work described in all other sections of the specifications, and shall carry on his 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 Authority, clear any designated area or areas 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.

1.11 SPECIAL CONDITIONS

- A. Ensure that the appropriate safety measures are implemented and the all workers are aware of the potential hazards from electrical shock, burn, rotating fans, pulleys, belts, hot manifolds, noise, etc. associated with working near power generation and control equipment.

1.12 WARRANTY

- A. Division 1 - Closeout Requirements: Warranties.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Provide all equipment and materials required for a complete system.
- B. All equipment and materials supplied under this Contract are new unless specifically indicated as existing. Where additional or replacement items are required, provide like items by the same manufacturer to the maximum extent practical.
- C. Install all material and equipment in accordance with manufacturer's installation instructions and recommendations unless specifically indicated otherwise.

2.2 PAINTING

- A. Carbon Steel Pipe - Paint all exposed carbon steel pipe that is not insulated except for engine exhaust. Wire brush and wipe down with solvent. Prime and finish with two coats of direct to metal alkyd enamel, Sherwin Williams DTM or approved equal, color Structural Gray 4031.
- B. Paint all steel fabrications and tanks. Sandblast or wire brush to bare metal and wipe down with solvent. Prime and finish with two coats of self-priming epoxy, Sherwin Williams Macropoxy 646 or approved equal, color Structural Gray 4031.
- C. Touch-up – finish all cut ends and damaged surfaces of galvanized and zinc plated supports and fasteners with spray on Cold Galvanizing Compound, ZRC or approved equal. Touch up paint on fabricated items to match original.

2.3 VALVE TAGS

- A. Specific Function Valve Tags – For all valves marked with a specific function, provide tags color coded and worded as indicated on the Schedule on Sheet M1.2.
- B. Standard Valve Tags – For all valves not marked with a specific function, provide NO/NC tags as indicated on the schedules.
- C. Install all tags as noted.

2.4 SIGNS AND PLACARDS

- A. Provide decals and sign boards, color coded and worded as indicated on the Schedule on Sheet M1.2. Install as noted.

2.5 PIPE MARKING

- A. Install flow arrows on diesel fuel, used oil, cooling, and heat recovery piping. On insulated piping install flow arrows over jackets. Black or white arrows over colored backgrounds, self-adhesive vinyl, Seton arrows on roll or approved equal. Background color scheme to match the Specific Function Valve Tags.

2.6 FLASHING AND SEALING

- A. Caps & Coverings: Steel, 16 gauge minimum.
- B. For penetration of all interior wall penetrations seal with polyurethane caulking.
- C. For piping smaller than 2" through exterior walls seal with polyurethane caulking unless noted otherwise.
- D. For piping 2" and larger through exterior walls install flashing as indicated on Drawings. Best Materials Multi-Flash Master Flash or approved equal, Black EPDM. Note that the retro-fit style may be used for convenience.

PART 3 - EXECUTION

3.1 DRAWINGS

- A. The mechanical Drawings are generally diagrammatic and do not necessarily show all features of the required work. Provide all equipment and materials required for a complete system. Complete details of the building which affect the mechanical installation may not be shown. For additional details, see other Drawings which may include electrical, architectural, structural, and civil. Coordinate work under this section with that of all related trades.
- B. Contractor to field verify all dimensions and conditions prior to start of construction. Immediately contact the Authority for clarification of questionable items or apparent conflicts.

3.2 CUTTING, FITTING, REPAIRING, PATCHING, AND FINISHING

- A. Where previously completed building surfaces or other features must be cut, penetrated, or otherwise altered, such work shall be carefully laid out and patched to the original condition. Perform work only with craftsmen skilled in their respective trades.
- B. Do not cut, drill, or notch structural members unless specifically approved by the Authority. Minimize penetrations and disruption of building features.
- C. Seal all exterior ceiling and wall penetrations as indicated. Where exterior wall penetrations are accessible from the inside seal both interior and exterior surfaces as indicated.

3.3 EXAMINATION

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials.

3.4 INSTALLATION OF EQUIPMENT

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials
- B. Unless otherwise indicated, support all equipment and install in accordance with manufacturer's recommendations and approved submittals.
- C. Maintain manufacturer's recommended minimum clearances for access and maintenance.
- D. Where equipment is to be anchored to structure, furnish and locate necessary anchoring and vibration isolation devices.
- E. 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.
- F. Openings: Arrange for necessary openings in buildings to allow for admittance and reasonable maintenance or replacement of all apparatus furnished.

3.5 SCOPE OF ISOLATION AND RESTRAINT WORK

- A. All vibrating equipment and the interconnecting pipe and ductwork shall be isolated to eliminate the transmission of objectionable noise and vibration from the structure.
- B. Mechanical equipment shall be carefully checked upon delivery for proper mechanical performance, which shall include proper noise and vibration operation.
- C. All installed rotating equipment with excessive noise and/or vibration, which cannot be corrected in place, shall be replaced at no cost to the Authority.

END OF SECTION

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SECTION 23 05 29

HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Pipe hangers and supports.
 - 2. Hanger rods.
 - 3. Formed steel channel.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical
- B. Section 23 21 13 - Hydronic Piping
- C. Section 23 11 13 - Fuel and Lube Oil Piping
- D. Section 23 35 16.10 - Engine Exhaust and Crank Vent Piping
- E. Section 26 05 29 - Hangers and Supports for Electrical Systems

1.3 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.1 - Power Piping.
 - 2. ASME B31.9 - Building Services Piping.
- B. ASTM International:
 - 1. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 2. ASTM E814 - Standard Test Method for Fire Tests of Through Penetration Fire Stops.
 - 3. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
 - 4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.
- C. American Welding Society:
 - 1. AWS D1.1 - Structural Welding Code - Steel.
- D. Manufacturers Standardization Society of the Valve and Fittings Industry:
 - 1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
 - 2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
 - 3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.4 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data: Hangers and Supports: Submit manufacturers catalog data including load capacity. Indicate finish for interior and exterior applications.
- C. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers. Indicate calculations used to determine load carrying capacity of trapeze, multiple pipe, and riser support hangers.

1.5 QUALITY ASSURANCE

- A. Division 1 – Quality Control
- B. Conform to applicable code for support of coolant and hydronic piping.
- C. Perform Work in accordance with State of Alaska Standards.

1.6 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.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- B. Protect from weather and construction traffic, dirt, water, chemical, and damage, by storing in original packaging.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 STRUCTURAL STEEL

- A. Miscellaneous shapes and plate: ASTM A-36.
- B. Rectangular tubing: ASTM A-500 Grade B.
- C. Structural Pipe: ASTM A-53 or ASTM A-106B.
- D. Paint as indicated.

2.2 PIPE HANGERS AND SUPPORTS

- A. Support equipment and raceways on strut, brackets, trapeze hangers, or as detailed. Anvil, B-Line, Grinnell, Unistrut, or approved equal.

2.3 FORMED STEEL CHANNEL

- A. Strut: Cold formed mild steel channel strut, pre-galvanized finish and slotted back unless specifically indicated otherwise.
- B. Standard Strut: 12 gauge thick steel, 1-5/8" x 1-5/8", B-line B22-SH-Galv or equal.
- C. Double Strut: 12 gauge thick steel, 1-5/8" x 3-1/4", B-line B22A-SH-Galv or equal.
- D. Shallow Strut: 14 gauge thick steel, 1-5/8" x 13/16", B-line B54-SH-Galv or equal.
- E. Where strut is welded to tanks or structures provided plain (unfinished black) solid back strut: 12 gauge thick steel, 1-5/8" x 1-5/8", B-line B22-PLN or approved equal.
- F. On all exterior installations provide hot dip galvanized strut and fittings.

2.4 FITTINGS AND ACCESSORIES

- A. Provide fittings, brackets, channel nuts, and accessories designed specifically for use with specified channel strut. Zinc plated carbon steel except for exterior installations provide hot dip galvanized.
- B. Pipe Clamps: Two piece pipe clamp designed to support pipe tight to strut, B-line B20##, or approved equal, as indicated on the Pipe/Tubing Strut Clamp Schedule on Sheet M1.1. Zinc plated carbon steel except for exterior installations provide hot dip galvanized.
- C. Pipe Straps: Two-hole steel pipe strap. Zinc plated carbon steel except for exterior installations provide hot dip galvanized.

2.5 FASTENERS

- A. All bolts, nuts, and washers to be zinc plated carbon steel except as specifically noted otherwise.
- B. On exterior installations provide hot dip galvanized or stainless steel bolts, nuts, and washers.
- C. On exhaust piping flanges provide plain carbon steel (black) or stainless steel bolts, nuts, and washers. Coat with high temperature anti-seize prior to assembly.
- D. Hanger Rods: Continuous threaded rod. Zinc plated carbon steel except for exterior installations provide hot dip galvanized.

2.6 EARTHQUAKE ANCHORAGE

- A. Anchor equipment weighing more than 100 pounds to the building structure to resist lateral earthquake forces.
- B. Total lateral (earthquake) force shall be 1.00 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.
- C. Provide equipment supported by flexible isolation mounts with earthquake restraining supports positioned as close to equipment as possible without contact in normal operation

(earthquake bumpers). The maximum lateral displacement due to the computed earthquake force from above shall not exceed 1.5 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials.

3.2 PREPARATION

- A. Obtain permission from the Authority before drilling or cutting structural members.

3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Support piping and equipment as shown on Drawings using specified supports and fasteners. If not detailed on Drawings, support from structural members with pipe hangers, clamps or pipe straps specifically intended for the application.
- B. Independently support pumps and equipment. Supporting piping from connections to equipment shall not be permitted.
- C. Support horizontal piping as scheduled.
- D. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- E. Place hangers within 12 inches of each horizontal elbow or as indicated.
- F. Use hangers with 1-1/2 inch minimum vertical adjustment.
- G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. Design hangers for pipe movement without disengagement of supported pipe.
- J. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 23 07 19.
- K. For specific piping and equipment support details reference Drawings.

3.4 INSTALLATION - FLASHING

- A. Seal and flash all wall penetrations as indicated.

3.5 PROTECTION OF FINISHED WORK

- A. Protect adjacent surfaces from damage by material installation.

3.6 SCHEDULES

A. Copper Tube and Steel Pipe Hanger Spacing:

PIPE SIZE Inches	Copper Tube Maximum Hanger Spacing (Ft)	Steel Pipe Maximum Hanger Spacing (Ft)	Copper Tube Hanger Rod Diameter (In)	Steel Pipe Hanger Rod Diameter (In)
1/2 & 3/4	5	7	3/8	3/8
1 & 1-1/4"	6	7	3/8	3/8
1-1/2	8	9	3/8	3/8
2	8	10	3/8	3/8
3	10	10	1/2	1/2
4	12	10	1/2	5/8

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SECTION 23 07 19
PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Piping insulation, jackets and accessories.
 - 2. Exhaust piping insulation, jackets and accessories.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Section 23 21 13 – Hydronic Piping.
- D. Section 23 35 16.10 - Engine Exhaust and Crank Vent Piping.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM C450 - Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging.
 - 3. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
 - 4. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
 - 5. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

1.4 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Division 1 – Quality Control

- B. Pipe insulation maximum flame spread index of 25 and maximum smoke developed index of 50 in accordance with ASTM E84.
- C. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.
- D. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.
- B. Applicator: Company specializing in performing work specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 COOLANT/HEAT RECOVERY PIPE INSULATION

- A. TYPE P-1: ASTM C547, 1" preformed rigid fiberglass pipe insulation. Thermal Conductivity: 0.23 at 75 degrees F. Operating Temperature Range: 0 to 850 degrees F. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self-sealing adhesive joints. Jacket Temperature Limit: minus 20 to 150 degrees F. Johns-Manville "Micro-Lok" or approved equal.

2.2 EXHAUST PIPE INSULATION

- A. TYPE P-2: ASTM C547, 1-1/2" preformed rigid mineral wool fiber insulation made with basalt rock and slag. Thermal Conductivity: 0.25 at 100 degrees F. Maximum Operating Temperature: 1200 degrees F. ROXUL Tecton 1200 or approved equal.
- B. Wall Penetrations: Where indicated on Drawings install TYPE 1 mineral wool fiber batt insulation. Rockwool Safe-N-Sound or approved equal. Fill entire void with insulation.

2.3 PIPE INSULATION JACKETS

- A. Aluminum Pipe Jacket: ASTM B209. Exterior grade, 0.016 inch thick sheet, embossed finish.
- B. Fittings: Pre-formed aluminum covers. PABCO or approved Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials.
- B. Verify piping has been tested before applying insulation materials.
- C. Verify surfaces are clean and dry, with foreign material removed.
- D. Verify piping has been painted up to areas to be insulated.

3.2 INSTALLATION - PIPING SYSTEMS

- A. Install insulation in accordance with manufacturer's installation instructions.
- B. Install insulation where indicated on Drawings.
- C. Cover all piping insulation with aluminum jackets. Join with longitudinal slip joints and minimum 2 inch laps.

END OF SECTION

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SECTION 23 09 00
INSTRUMENTATION AND CONTROL DEVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Instrumentation Equipment
 - 2. Pressure gauges.
 - 3. Differential Pressure gauges.
 - 4. Thermometers.
 - 5. Thermometer thermowell.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 21 16 - Hydronic Equipment and Specialties.
- C. Division 26 - Electrical

1.3 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 - 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - 3. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
 - 4. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
- B. ASTM International:
 - 1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - 2. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 3. ASTM B32 - Standard Specification for Solder Metal.
 - 4. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
 - 5. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
 - 6. ASTM D2737 - Standard Specification for Polyethylene (PE) Plastic Tubing.
 - 7. ASTM E1 - Standard Specification for ASTM Thermometers.

8. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.
- C. American Welding Society:
 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- D. National Fire Protection Association:
 1. NFPA 72 - National Fire Alarm Code.
 2. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

1.4 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Note that related Electrical Instrumentation devices are specified under Division 26 and are not included in this section.

1.5 CLOSEOUT

- A. Division 1 - Closeout Requirements
- B. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors.
- C. Operation and Maintenance Data: Submit inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.
- B. Installer: Company specializing in performing Work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Accept controls on site in original factory packaging. Inspect for damage.

1.8 COORDINATION

- A. Coordinate installation of control components in work of Division 26.

PART 2 PRODUCTS

2.1 PRESSURE GAUGES

- A. Dry type stainless steel case, tube, and socket, 1/4" NPT bottom connection, 2-1/2" dial size. Range as indicated on Drawings.
- B. Range 0-15 psi: Trerice Model 700SS-25-02-L-A-080 or approved equal.
- C. Range 0-100 psi: Trerice Model 700SS-25-02-L-A-110 or approved equal.

2.2 DIFFERENTIAL PRESSURE GAUGES

- A. Diaphragm type, brass body, 1/4" FPT in-line connections, 2-1/2" size basic dial, hermetically sealed SPDT switch with terminal strip.
- B. 0-1 PSI Range: Orange Research 1516DGS-1E-2.5B-C-0-1PSID or approved equal.
- C. 0-15 PSI Range: Orange Research 1516DGS-1E-2.5B-C-0-15PSID or approved equal.

2.3 THERMOMETERS

- A. Digital thermometer, solar powered, LCD display, -50 to +300 F range or dual F/C range, 1% of reading accuracy, variable angle display, 3-1/2" stem length.
- B. Weiss DVU35 or approved equal.
- C. Provide all thermometers with a 3/4" NPT brass thermowell.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Check equipment for damage that may have occurred during shipment. Repair damaged equipment as required or replace with new equipment.
- B. Verify location of thermostats and other exposed control sensors with Drawings before installation.
- C. Verify building systems to be controlled are ready to operate.

3.2 INSTALLATION

- A. Install instrumentation where indicated on the Drawings in accordance with manufacturer's installation instructions.
- B. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- C. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate.
- D. Isolate hydronic pressure gauges during pressure testing.
- E. Install conduit and electrical wiring in accordance with Division 26.
- F. After completion of installation, test and calibrate all instrumentation.

END OF SECTION

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SECTION 23 11 13
FUEL AND LUBE OIL PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Scope: This section applies to all diesel fuel and lube oil (oil) piping systems.
- B. Section includes:
 - 1. Fuel oil piping.
 - 2. Lube oil (used oil) piping.
 - 3. Unions and flanges.
 - 4. Valves and strainers.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Section 23 12 13 - Fuel and Lube Oil Equipment and Specialties.
- D. Section 26 32 13.10 – Engine Generators.

1.3 PERFORMANCE REQUIREMENTS

- A. Minimum Working-Pressure Rating: Unless otherwise indicated, minimum pressure requirement for fuel and lube oil piping is 150 psig.

1.4 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.1 - Power Piping.
 - 2. ASME B31.9 - Building Services Piping.
 - 3. ASME B16.5 Flanges and Flanged Fittings
 - 4. ASME B16.9 Factory-Made Wrought Steel Butt welding Fittings
 - 5. ASME B16.11 Forged Fittings, Socket-Welding and Threaded
 - 6. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. ASTM International:
 - 1. ASTM A106B – Standard Specification for Seamless Carbon Steel Pipe for High Temperature Services.
 - 2. ASME B16.11 Forged Fittings, Socket-Welding and Threaded

- C. Underwriters Laboratories Inc.: UL 142 – Steel Aboveground Tanks for Flammable and Combustible Liquids.

1.5 SYSTEM DESCRIPTION

- A. Provide piping of material as specified in PART 2.
- B. Provide flanges, unions, or couplings at locations requiring servicing. Use unions, flanges, or couplings downstream of valves and at equipment connections. Do not use direct welded connections to valves, equipment.
- C. Provide pipe hangers and supports per Drawings and specifications.

1.6 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data:
 - 1. Piping: Submit manufacturers catalog information for pipe materials, fittings, and accessories.
 - 2. Valves and Strainers: Submit manufacturer's catalog information with data and ratings for each service.
- C. Welders' Certificate: Include welders' certification of compliance in accordance with Quality Assurance below.

1.7 CLOSEOUT

- A. Division 1 - Closeout Requirements.

1.8 QUALITY ASSURANCE

- A. Division 1 – Quality Control.
- B. Perform Work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.
- C. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.
- D. Perform pipe welding with experienced welder with current API or equivalent certification for pipe welding in all positions.

1.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.
- B. Installer: Company specializing in performing Work of this section with current certification.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

- B. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation.

1.11 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials shall be new unless otherwise specified. All items of the same type shall be of the same manufacturer.
- B. Oil pipe shall have welded joints except for threaded connections to equipment and valves as required and shown. Provide flanged joints where indicated on Drawings to allow removal of individual components.
- C. Provide butt weld joints for all pipe 1-1/2 inches in diameter and larger and on smaller pipe where specifically indicated on Drawings. Provide socket weld or threaded joints for all piping smaller than 1-1/2 inches in diameter unless indicated otherwise.
- D. Vent piping shall be galvanized with threaded joints.

2.2 PIPE

- A. Oil Pipe (DFS, DFR, UOR): ASTM A106B seamless black steel pipe, Schedule 80.
- B. Vent Pipe: ASTM A53B ERW welded galvanized steel pipe, Schedule 40.

2.3 PIPE FITTINGS

- A. Fittings: ASTM A235 seamless carbon steel butt weld fittings for all pipe 1-1/2 inches in diameter and larger and on smaller pipe where specifically indicated on Drawings. Provide socket weld or threaded joints for all piping smaller than 1-1/2 inches in diameter using ASTM 105, forged steel fittings, minimum 3000 lb.
- B. Flanges: ASTM A105 forged steel, ANSI 150# raised face unless indicated otherwise. Butt or socket weld as indicated.
- C. Flange Gaskets: Spiral wound metallic gaskets, Flexitallic or approved equal. Coat with anti-seize prior to assembly.
- D. Flange Bolts: On all exterior piping provide stainless steel bolts, nuts, and washers. Coat with anti-seize prior to assembly.
- E. Vent pipe shall have threaded joints with minimum 300# galvanized threaded fittings.

2.4 BALL VALVES

- A. Flanged Ball Valves: Reduced port, carbon steel uni-body, ANSI 150# raised face flanged ends, stainless steel ball and trim, TFM seat and PTFE seals for NACE MR0175 service, lockable handle, 150 psig minimum working pressure. PBV C-5410-31-2236-FTNL or approved equal. Note that for a substitute valve to be approved it must be a domestic manufactured high quality industrial valve such as Apollo or Nibco.

- B. Threaded Ball Valves: Carbon steel body, threaded ends, stainless steel ball and trim, PTFE seat and Graphite/PTFE seals for NACE MR0175 service, lockable handle, 150 PSIG minimum working pressure. PBV C-5312-38-2236-TL-NC, PBV C-5322-38-2236-TL-NC or approved equal. Note that for a substitute valve to be approved it must be a domestic manufactured high quality industrial valve such as Apollo or Nibco.

2.5 CHECK VALVES

- A. Threaded Check Valves: Brass body, threaded ends, swing check style, 150 psig minimum working pressure. Domestic only. Hammond, Milwaukee, Nibco, or approved equal.

2.6 PRESSURE RELIEF VALVES

- A. Threaded Pressure Relief Valves: Bronze body, hard seat, MPT inlet by FPT outlet, size and pressure setting as indicated on the Drawings, Kingston 103SS or approved equal.

2.7 FUSIBLE VALVES

- A. Fusible Link Valves: Brass body, FPT ends, 165°F fusible head. Firematic or approved equal. Size as indicated on Drawings:
1/2" Valve Model #12130, 3/4" Valve Model #12112, 1" Valve Model #12113.

2.8 SOLENOID VALVES

- A. Normally Closed Solenoid Valves: Brass body, 1/2" FPT ends, 1/2" NPT conduit connection, 120VAC, stainless steel core, molded epoxy coil enclosure, internal pilot operated, 150 PSI differential opening pressure, liquid tight and full modulation at 0 PSI differential. Asco Catalog No. 8210G94 or approved equal.
- B. Normally Open Solenoid Valves: Brass body, 1/2" FPT ends, 1/2" NPT conduit connection, 120VAC, stainless steel core, molded epoxy coil enclosure, internal pilot operated, 150 PSI differential closing pressure, liquid tight and full modulation at 0 PSI differential. Asco Catalog No. 8210G34 or approved equal.

2.9 STRAINERS

- A. Type Y pattern, bronze body, screwed ends, gasketed cap, 20 mesh stainless steel screen. 200 psig minimum working pressure, Mueller No. 351 or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials.

3.2 PREPARATION

- A. Ream threaded pipe ends and remove burrs. Remove scale and dirt, on inside and outside, before assembly.
- B. Thoroughly coat male pipe ends with Teflon tape and Teflon pipe joint compound prior to assembling.

- C. Coat flange gaskets and bolts with anti-seize compound prior to assembling joints.

3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install pipe hangers and supports in accordance with Drawings and Section 23 05 29.

3.4 INSTALLATION - PIPING

- A. Route piping in orderly manner and maintain gradient.
- B. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations.
- C. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Install valves with stems upright or horizontal, not inverted. Provide access where valves are not exposed.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- F. Prepare and paint pipe, fittings, supports, and accessories not pre-finished in accordance with Section 23 05 00.
- G. Install identification on piping systems in accordance with Section 23 05 00.

3.5 TESTING

- A. Division 1 – Quality Control
- B. Test all oil piping with minimum 125 psig air. Test 100% of welds visually for leaks with each joint soaked in a foaming soapy water solution, and visually inspect each joint for leaks. Isolate and pressure test each run of piping for a minimum of one hour. Provide blind flanges, threaded caps or plugs at each end of the test section as needed. Do not conceal pipe joints before pressure testing is complete. Isolate equipment and components rated for lesser pressures so as not to damage these.
- C. Pressure test piping system again after all equipment is installed at 50 psi for a minimum of one hour, or the maximum rated pressure of the weakest component, whichever is less.
- D. Submit written procedures for testing, including test pressures, equipment to be used and items to be tested.
- E. Notify the Authority in writing seven (7) days in advance of pressure tests. The Authority shall be present at all testing. Pressure testing performed without the Authority present will be rejected, unless prior written approval is received from the Authority.
- F. Cut out, re-weld and re-test all leaking welded joints. Repair any leakage found and retest until system proves leak-free. Retesting after the repair of defects shall be performed at no cost to the Authority.
- G. Certified test results shall be submitted to the Authority for approval. Test certification shall include gauge pressure, air temperature, time, date, witness, and pipeline identification.

3.6 SYSTEM STARTUP

- A. Prime equipment and piping prior to testing and verify operation as indicated in 23 12 13.

END OF SECTION

SECTION 23 12 13
FUEL AND LUBE OIL EQUIPMENT AND SPECIALTIES

PART 1 – GENERAL

1.1 SUMMARY

- A. Scope: This section applies to all fuel and lube oil (oil) piping systems.
- B. Section Includes:
 - 1. Fuel and Lube Oil System Equipment.
 - 2. Day Tank, Hopper, and Filter.
 - 3. Hoses.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Section 23 11 13 - Fuel and Lube Oil Piping
- D. Division 26 - Electrical

1.3 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data:
 - 1. Submit manufacturers catalog literature for each item indicated on the Fuel System Equipment Schedule on Sheet M1.1.
 - 2. Submit manufacturer's catalog information for hoses and all other items specified herein.
- C. Shop Drawings: Submit shop drawings for fabrication of day tank, hopper, and filter bank. Note that if all items will be fabricated exactly as indicated on the Drawings, the design Drawings can be submitted in lieu of shop drawings.

1.4 CLOSEOUT

- A. Division 1 - Closeout Requirements.
- B. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

PART 2 – PRODUCTS

2.1 DIESEL FUEL SYSTEM EQUIPMENT

- A. Provide pumps, meters, gauges, equipment, and appurtenances as indicated in the Fuel System Equipment Schedule on Sheet M1.1.
- B. Day Tank Filter: Provide Day Tank Filter as indicated in the Fuel System Equipment Schedule on Sheet M1.1. Provide wrench and five spare filter elements as indicated.
- C. Used Oil Blender Filter Elements: Provide elements of each type as specified below. In addition to elements installed in filter bank assembly, provide two spare elements of each type:
 - 1. Water Blocking: 10 Micron Hydrosorb II Filter Cartridges. Cim-Tek #300342 or approved equal.
 - 2. Particulate: 2 Micron Particulate Filter Cartridges. Cim-Tek #30066 or approved equal.

2.2 DAY TANK, HOPPER, AND FILTER BANK

- A. Day Tank: Rectangular heavy gauge welded steel tank, capacity and configuration as indicated, manufactured in accordance with UL standard 142 and Drawings. Furnish and install all accessories as indicated.
- B. Hopper: Welded steel assembly manufactured as shown on Drawings. Furnish and install all accessories as indicated.
- C. Filter Bank: Welded steel assembly manufactured as shown on Drawings. Furnish and install all accessories as indicated.

2.3 HOSES

- A. Fuel rated hose, Eaton Weatherhead H569, Aeroquip FC300, or approved equal. Sized as indicated on Drawings. Provide re-useable plated steel straight JIC swivel ends with NPT adapters.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Check equipment for damage that may have occurred during shipment. Repair damaged equipment as required or replace with new equipment.

3.2 PREPARATION

- A. Protect bright finished shafts, bearing housings, and similar items until in service. No rust will be permitted.

3.3 INSTALLATION

- A. Install pumps and associated equipment in accordance with Drawings and manufacturer's installation instructions.
- B. Install fuel oil day tank, hopper, and filter bank as indicated on Drawings.
- C. Electrical installation shall be in accordance with Division 26 Specifications.

3.4 SYSTEM STARTUP

- A. Prior to starting fuel and oil pumps, prime cavities with lube oil then energize momentarily to verify proper rotation.
- B. Fuel Piping: Prime all piping, fill filters with diesel fuel, and bleed off air prior to starting pumps.
- C. Verify operation of all day tank and blender controls including timers and level alarms.

END OF SECTION

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SECTION 23 21 13
HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Scope: This section applies to all hydronic (glycol) piping systems.
- B. Section includes:
 - 1. Coolant (engine cooling) piping.
 - 2. Heat recovery piping.
 - 3. Unions and flanges.
 - 4. Valves and strainers.
 - 5. Engine coolant (ethylene glycol).

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Section 23 07 19 - Piping Insulation
- D. Section 23 21 16 - Hydronic Specialties.
- E. Section 26 32 13.10 – Engine Generators.

1.3 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B16.3 - Malleable Iron Threaded Fittings.
 - 2. ASME B16.4 - Gray Iron Threaded Fittings.
 - 3. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
 - 4. ASME B31.1 - Power Piping.
 - 5. ASME B31.9 - Building Services Piping.
 - 6. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. ASTM International:
 - 1. ASTM A53B - Standard Specification for Pipe, Steel, Black and Hot-Dipped.
 - 2. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
- C. American Welding Society:
 - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

2. AWS D1.1 - Structural Welding Code - Steel.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.

1.4 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified, provide compatible system components and joints.
- B. Provide flanges, unions, and couplings at locations requiring servicing. Use unions, flanges, and couplings downstream of valves and at equipment connections.
- C. Provide pipe hangers and supports in accordance with Drawings and specifications.
- D. Use ball valves or butterfly valves for shut-off and to isolate equipment where indicated.
- E. Use gauge cock isolation valves to isolate instrumentation and small devices where indicated.
- F. Use hose end drain valves with cap for drains where indicated.
- G. Flexible Connectors: Use flexible connectors and hoses where indicated.

1.5 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data:
 1. Piping: Submit manufacturers catalog information for pipe materials, fittings, and accessories.
 2. Valves and strainers: Submit manufacturer's catalog information with data and ratings for each service.

1.6 CLOSEOUT

- A. Division 1 - Closeout Requirements

1.7 QUALITY ASSURANCE

- A. Division 1 – Quality Control
- B. Perform Work in accordance with ASME B31.1 and ASME B31.9 code for installation of piping systems.
- C. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.

- B. Fabricator or Installer: Company specializing in performing Work of this section with current certification.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 PIPING

- A. Provide copper tube mains and branch piping as indicated on Drawings.
 - 1. Copper Tubing: ASTM B88, Type L drawn.
 - 2. Fittings: ASME B16.22 solder wrought copper.
 - 3. Joints: soldered with 95-5 tin-antimony solder or silver solder except on tee drill connections use copper brazing rod.

2.2 UNIONS AND FLANGES

- A. Unions:
 - 1. Copper Piping: Bronze unions with solder ends except where specifically indicated as fitting unions provide solder by NPT bronze unions.
- B. Flanges:
 - 1. Copper Piping: Class 150, bronze companion flanges for transition to steel piping or flanged valves and equipment.
 - 2. Flange Gaskets: Full faced 1/8" thick nitrile rubber, Alaska Rubber or approved equal.
 - 3. Flange Bolts: On all exterior piping provide stainless steel bolts, nuts, and washers. Coat with anti-seize prior to assembly.

2.3 BUTTERFLY VALVES

- A. Lug style ductile or cast iron body, ANSI 150# flange pattern ends, stainless steel stem with bronze bushing, bronze disc, EPDM seats, locking handle. Milwaukee ML-233E, Bray Series 31, or approved equal.

2.4 BALL VALVES

- A. Threaded or soldered end as indicated and required, bronze body, chrome plated bronze or brass ball, full port, TFE or Viton packing and seat ring, minimum 200 psig WOG rating. Domestic only. Apollo, Hammond, Milwaukee, Nibco, or approved equal.

2.5 CHECK VALVES

- A. Threaded or soldered end as indicated and required, bronze body, swing check style, minimum 200 psig WOG rating. Domestic only. Hammond, Milwaukee, Nibco, or approved equal.

2.6 DRAIN VALVES

- A. Bronze body, 1/2" or 3/4" size and solder cup or MPT connection to match associated pipe connection, 3/4" male hose end with cap and jack chain. FNW 426D, 426F, 427D, or 427F or approved equal.

2.7 GAUGE COCK ISOLATION VALVE

- A. Brass body, MPT by FPT ends, T-handle, Legend Valve item 101-531 (1/4") or Item 101-532 (3/8"), or approved equal.
- B. Install on all pressure gauges, small hose connections, and where indicated on Drawings.

2.8 STRAINERS

- A. Type Y pattern, bronze body, solder ends, gasketed cap, 20 mesh stainless steel screen. 200 psig minimum working pressure, Mueller No. 358S or approved equal.

2.9 ENGINE COOLANT (ETHYLENE GLYCOL)

- A. Glycol Solution for Engine Cooling Service: The glycol shall be extended life (heavy duty) ethylene glycol, Shell Rotella ELC, or approved equal. Note that standard life coolant will not be accepted.
- B. The solution shall be premixed to a ratio of 50% ethylene glycol to 50% water. The water shall be treated in accordance with glycol manufacturer's recommendations. The mixed solution shall be dyed bright pink, no exceptions.
- C. The solution shall be packaged in sealed 55 gallon drums and labeled "Ethylene Glycol" with pink lettering.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials.

3.2 PREPARATION

- A. Ream pipe ends and remove burrs. Remove scale and dirt, on inside and outside, before assembly.

- B. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- C. On copper tube and solder fittings mechanically clean to bright metal and flux prior to assembling.
- D. On threaded pipe and fittings thoroughly coat male threads with Teflon tape and Teflon based pipe joint compound prior to assembling.

3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install pipe hangers and supports in accordance with Section 23 05 29.

3.4 INSTALLATION - PIPING SYSTEMS

- A. Route piping in orderly manner and slope to drain at low points and vent at high points.
- B. Install piping to conserve building space and not interfere with use of space. Group piping whenever practical at common elevations.
- C. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Install valves with stems upright or horizontal, not inverted. Provide access where valves are not exposed.
- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- F. Prepare and paint piping, supports, and accessories not pre-finished in accordance with Section 23 05 00.
- G. Insulate piping in accordance with Section 23 07 19.
- H. Install identification on piping systems in accordance with Section 23 05 00.

3.5 COOLING SYSTEM SHOP TESTING AND FLUSHING

- A. Install conical "witch hat" strainers on inlets to radiators. Orient "witch hat" to collect debris inside cone.
- B. Fill the entire system with potable water and hydrostatically test all piping at 100 psig minimum for one hour with no noticeable water leaks or pressure drops except as caused by temperature change. Isolate engines and radiators prior to pressure testing.
- C. Flush the entire system with potable water. Run engines briefly with limited load as required to obtain circulation through the entire system. To ensure engines are not damaged, do not run under high load or for extended periods of time with potable water.
- D. Drain system completely. Remove "witch hat" strainers.

3.6 COOLING SYSTEM SHOP FILLING AND CHARGING

- A. After pressure testing and flushing, fill entire system with ethylene glycol solution. Perform all functional testing of the module required by the Contract Documents. Ensure

that engines are operated long enough with adequate load to get thermostats fully open and to circulate glycol through all piping and accessories.

- B. Operate control room heating system to ensure it is fully charged with glycol.
- C. Verify proper function of all instrumentation and calibrate all devices.
- D. All excess glycol solution glycol solution shall be left with the modules in the original drums and sealed for shipping with the module

3.7 HEAT RECOVERY SYSTEM SHOP TESTING AND FLUSHING

- A. Install temporary pipe or hose jumper between flanges where module heat recovery pipe terminates.
- B. Hydrostatically test all piping at 100 psig minimum for one hour with no noticeable water leaks or pressure drops except as caused by temperature change.
- C. Fill the entire system with potable water and flush thoroughly. Run pumps as required to obtain circulation through the entire system.
- D. Operate heat recovery system with engines under load and engine cooling system up to normal temperature. Verify proper function of all instrumentation and calibrate all devices.
- E. Upon completion of testing allow system to cool down to ambient temperature. Drain system completely. Blow out with air as required to ensure freeze protection.

END OF SECTION

SECTION 23 21 16
HYDRONIC EQUIPMENT AND SPECIALTIES

PART 1 – GENERAL

1.1 SUMMARY

- A. Scope: This section applies to all hydronic (glycol) piping systems.
- B. Section includes:
 - 1. Engine Cooling System Equipment.
 - 2. Heating Recovery and Plant Heating Equipment.
 - 3. Expansion tank sight gauge and cap.
 - 4. Hoses.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Section 23 21 13 - Hydronic Piping.
- D. Division 26 – Electrical.

1.3 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data:
 - 1. Submit manufacturers catalog literature including manufacturer's installation instructions for each item indicated on the Cooling System Equipment Schedule and the Heat Recovery & Plant Heating Equipment Schedule on Sheet M1.1.
 - 2. Submit manufacturer's catalog information for hoses and all other items specified herein.
- C. Shop Drawings: Submit shop drawings for glycol storage and expansion tank fabrication. Note that if all items will be fabricated exactly as indicated on the Drawings, the design Drawings can be submitted in lieu of shop drawings.

1.4 CLOSEOUT

- A. Division 1 - Closeout Requirements.
- B. Operation and Maintenance Data: Submit instructions for calibrating instruments, installation instructions, assembly views, servicing requirements, lubrication instruction, and replacement parts list.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.
- B. Installer: Company specializing in performing Work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept material on site in shipping containers with labeling in place. Inspect for damage.
- B. Protect systems from entry of foreign materials by temporary covers, caps and closures, completing sections of the work, and isolating parts of completed system until installation.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Division 1 – Material and Equipment: Storage and Protection.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements before fabrication.

PART 2 - PRODUCTS

2.1 COOLING SYSTEM EQUIPMENT

- A. Provide all equipment and appurtenances as indicated in the Cooling System Equipment Schedule on Sheet M1.1.

2.2 HEAT RECOVERY & PLANT HEATING EQUIPMENT SYSTEM EQUIPMENT

- A. Provide all equipment and appurtenances as indicated in the Heat Recovery & Plant Heating Equipment Schedule on Sheet M1.1.

2.3 LIQUID LEVEL SIGHT GAUGE

- A. Borosilicate glass tube, aluminum body, Buna n seals, 1/2" MPT connections, 9" centers. Lube Devices G607-09-A-1-4 or approved equal.

2.4 EXPANSION TANK CAP

- A. Fabricated fitting, filler neck by 2" MPT with 3/8" hose barb vent, Alaska Rubber Part# IV8017SS2431307 or approved equal. Furnish with 4 PSI pressure cap.

2.5 HOSES

- A. Wire reinforced corrugated silicone hose. Parker 6621 or approved equal. Sized as indicated on the Drawings.
- B. Install on barbed hose (king) nipples with stainless steel T-Bolt clamps, Nycosupra W2, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check equipment for damage that may have occurred during shipment. Repair damaged equipment as required or replace with new equipment.

3.2 INSTALLATION

- A. Install equipment and accessories in strict compliance with manufacturer's instructions.
- B. Install piping system and appurtenances as indicated on Drawings.

3.3 CLEANING

- A. Clean and flush glycol system before adding glycol solution. See Section 23 21 13 - Hydronic Piping.

END OF SECTION

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SECTION 23 31 13
METAL DUCTS AND VENTILATION EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Duct Materials.
 - 2. Fans.
 - 3. Dampers.
 - 4. Actuators.
 - 5. Filters.

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Division 26 – Electrical.

1.3 REFERENCES

- A. ASTM International:
 - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B. Air Movement and Control Association International, Inc.: AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.
- C. National Fire Protection Association: NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
- D. Sheet Metal and Air Conditioning Contractors: SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.4 PERFORMANCE REQUIREMENTS

- A. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission.

1.5 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.

- B. Product Data:
 - 1. Submit data for duct materials and accessories.
 - 2. Submit manufacturers catalog literature for each item indicated on the Ventilation Equipment Schedule on Sheet M1.1.
- C. Shop Drawings: Submit shop drawings for fabrication of ductwork. Note that if ductwork will be fabricated exactly as indicated on the Drawings, the design Drawings can be submitted in lieu of shop drawings.

1.6 CLOSEOUT

- A. Division 1 - Closeout Requirements.
- B. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.7 QUALITY ASSURANCE

- A. Division 1 – Quality Control
- B. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and Flexible and International Mechanical Code.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.
- B. Installer: Company specializing in performing work of this section.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures during and after installation of duct sealant.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel: ASTM A653/A653M galvanized steel sheet, lock-forming quality, having zinc coating in conformance with ASTM A90.
- B. Aluminum: Type 5052 alloy, minimum 0.090" thick.
- C. Fasteners: Rivets, bolts, or sheet metal screws except where indicated as welded.
- D. Sealants, Mastics and Tapes: Conform to UL 181A. Provide products bearing appropriate UL 181A markings.

2.2 FABRICATION

- A. Fabricate and support rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and as indicated on the Drawings. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Fabricate assemblies from galvanized steel or aluminum as indicated on the Drawings. Galvanized sheet metal assemblies shall have standard mechanical joints sealed airtight. Aluminum assemblies shall have continuous welded joints. Grind weld joints smooth after fabrication.
- C. Exterior Hood Fabrications: fabricate all exterior hoods from minimum 0.090" thick Type 5052 aluminum using welded joints.
- D. Provide stainless steel mesh and frames where indicated on the Drawings.

2.3 CONTROL DAMPER

- A. Opposed blade low-leakage control damper, galvanized steel constructions, 304 stainless steel bearings and jamb seals, EPDM blades seals, Greenheck VCD-23 or approved equal. See fabrication details on Drawings for sizes.

2.4 ACTUATORS

- A. On duct dampers install 120V spring return actuator, Belimo AFBUP or approved equal.

2.5 FILTERS

- A. High capacity pleated panel filter, MERV 8 rating. Camfill 30/30 or approved equal. See fabrication details on Drawings for sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check equipment for damage that may have occurred during shipment. Repair damaged equipment as required or replace with new equipment.
- B. Verify sizes of equipment connections before fabricating transitions.

3.2 INSTALLATION

- A. Fabricate and install ducts as indicated on Drawings and in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- B. Verify proper operation of fans and dampers.
- C. Provide two complete sets of filters for all intake ducts new in boxes and package with modules for field installation by others.

END OF SECTION

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SECTION 23 35 16.10
ENGINE EXHAUST AND CRANK VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Engine Exhaust piping
 - 2. Crank Vent piping
 - 3. Mufflers
 - 4. Flanges and Gaskets
 - 5. Crank Vent Hose

1.2 RELATED SECTIONS

- A. Section 23 05 00 – Common Work Requirements for Mechanical.
- B. Section 23 05 29 - Hangers and Supports for Piping and Equipment.
- C. Section 23 07 19 - Piping Insulation.
- D. Section 26 32 13.10 – Engine Generators.

1.3 REFERENCES

- A. American Society of Mechanical Engineers:
 - 1. ASME B31.1 - Power Piping.
 - 2. ASME B31.9 - Building Services Piping.
 - 3. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. ASTM International:
 - 1. ASTM A53B - Standard Specification for Pipe, Steel, Black and Hot-Dipped.
- C. Underwriters Laboratories Inc.:
 - 1. UL 536 - Flexible Metallic Hose.

1.4 SYSTEM DESCRIPTION

- A. Provide piping of material as specified in PART 2.
- B. Where more than one piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections when joining dissimilar metals in systems.
- C. Provide flanges or couplings at locations requiring servicing and where indicated. Do not use direct welded connections to equipment.

- D. Provide pipe hangers and supports per Drawings and specifications.
- E. Flexible Connector: Use at exhaust piping connections to engine as indicated in Drawings.

1.5 SUBMITTALS

- A. Provide submittals for all products and systems described herein. Provide in accordance with the requirements of Section 23 05 00 - Common Work Results for Mechanical and Division 1.
- B. Product Data:
 - 1. Piping: Submit manufacturers catalog information for pipe and fittings, both carbon steel and stainless steel as indicated.
 - 2. Flanges and Gaskets: Submit manufacturer's catalog information with data and ratings for each service.
 - 3. Mufflers: Submit manufacturer's catalog information.
 - 4. Rain Caps: Submit manufacturer's catalog information.
 - 5. Crank Vent Hose: Submit manufacturer's catalog information.

1.6 CLOSEOUT SUBMITTALS

- A. Division 1 - Closeout Requirements.

1.7 QUALITY ASSURANCE

- A. Division 1 – Quality Control
- B. Perform Work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.
- C. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.
- D. Perform pipe welding with experienced welder with current API or equivalent certification for pipe welding in all positions.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section.
- B. Fabricator or Installer: Company specializing in performing Work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Division 1 - Material and Equipment: Transportation and Handling.
- B. Accept piping and materials 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.

1.10 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 PIPING (EXHAUST, CRANK VENT)

- A. Interior Exhaust Pipe (riser from engine to muffler): ASTM A53 welded black steel pipe, Schedule 40, with ASTM A235 seamless carbon steel butt weld fittings and ASTM A105 weld flanges. Note that at Contractors option interior piping may be stainless equivalent to exterior.
- B. Exterior Exhaust Pipe: ASTM A312 Type 304L welded low carbon stainless steel pipe, Schedule 10, with ASTM A403 Type 304L low carbon stainless steel butt weld fittings and ASTM A182 weld flanges.
- C. Interior Crank Vent Pipe: ASTM A106B black steel pipe, Schedule 40, with ASTM A105 socket weld fittings. Note that at Contractors option interior piping may be stainless equivalent to exterior.
- D. Exterior Crank Vent Pipe: ASTM A312 Type 304L welded low carbon stainless steel pipe, Schedule 40, with ASTM A403 Type 304L low carbon stainless steel butt weld fittings and ASTM A182 weld flanges.
- E. Perform pipe welding with experienced welder with current API or equivalent certification for pipe welding in all positions.

2.2 FLEXIBLE CONNECTORS

- A. Exhaust Pipe Flexible Connectors: Furnished with Engine Generator, see Section 26 32 13.10 – Engine Generators.

2.3 FLANGED JOINTS

- A. Flanges: ANSI 150#, configuration as indicated on Drawings.
- B. Flange Gaskets: High temperature, full face, Frenzelit Novatec 925F or approved equal.
- C. Flange Bolts: Plain carbon steel (black) or stainless steel bolts, nuts, and washers. Coat with high temperature anti-seize prior to assembly.

2.4 MUFFLERS

- A. Mufflers to be disc style, bottom center in and side out, ASA 125# flanges, 2" internal acoustical/thermal wrap, four mounting tabs, high temperature satin black finish. Mufflers shall be critical grade with minimum 28db reduction at 125Hz. E.M. Products DCK2, G.T. Exhaust Systems H1-5, or approved equal. See Drawings for size.

2.5 RAIN CAPS

- A. Exhaust rain caps, hinged type, all stainless steel construction, G.T. Exhaust Systems or approved equal. See Drawings for size

2.6 CRANK VENT HOSE

- A. Crank Vent Hose: Heavy duty oil resistant PVC suction hose. Tigerflex ORV or approved equal. See design drawings for size.
- B. Install on barbed hose (king) nipples with stainless steel T-Bolt Clamps Fasten with lined stainless steel T-bolt clamps, Nyco Supra W2, or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Check materials for damage that may have occurred during shipment. Repair damaged materials as required or replace with new materials.

3.2 PREPARATION

- A. Remove scale and dirt, on inside and outside, before assembly.

3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Install pipe hangers and supports in accordance with Drawings and specifications. Refer to Section 23 05 29.

3.4 INSTALLATION - PIPING

- A. Route piping in orderly manner and maintain gradient.
- B. Install piping to conserve building space and not interfere with use of space.
- C. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- E. Prepare and paint crank vent pipe, fittings, supports, and accessories in accordance with Section 23 05 00.
- F. Piping Insulation: Insulate interior exhaust piping as indicated on the Drawings.

3.5 INSTALLATION – MUFFLER

- A. Install muffler in accordance with manufacturer's installation instructions and support as indicated on the Drawings.

END OF SECTION

DIVISIONS 24 – 25

(NOT USED)

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. Provide the labor, materials, equipment and test equipment necessary to furnish, install, and place into operation the power, motor, lighting, control, alarm, and associated electrical systems of this Contract. Connect motors, meters, panels, sensors, switches, and outlets or any other electrical device installed or provided as part of the project. Mark and identify circuits, terminal boards, equipment, enclosures, etc. with identification numbers, wire numbers, nameplates, and warning signs. Test, adjust and calibrate equipment and start-up all electrical equipment and its associated mechanical attachments as necessary to place the project into operation.
- B. Provide and install all control equipment and wiring to instruments and devices installed by others.
- C. Where the work of several crafts is involved, coordinate all related work to provide each system in complete and in proper operating order.
- D. Cooperate with all others involved in the project, with due regard to their work, to promote rapid completion.
- E. Local Conditions: The Contractor shall thoroughly familiarize himself with the work as well as the local conditions under which the work is to be performed. Schedule work with regard to seasons, weather, climate conditions, and all other local conditions which may affect the progress and quality of work.
- F. See Division 1 of which contain information and requirements that apply to work specified herein.
- G. The Contractor shall provide electrical service to, connection and/or interconnection of various units of equipment supplied by others. The Contractor shall not be required to set in place or align motors or calibrate devices supplied as an integral part of equipment provided by others.

1.2 RELATED REQUIREMENTS

- A. This section applies to all Division 26 work.
- B. See Divisions 1, 21, 23, and 26 which contain information and requirements that apply to work specified herein.

1.3 TELEPHONE SERVICE

- A. Telephone service is not a part of this project.

1.4 CODES AND STANDARDS

- A. Codes: Perform all work in strict accordance with all applicable national, state, and local codes; including, but not limited to the latest legally enacted editions of the following specifically noted requirements:
 - 1. NFPA 70, National Electric Code - NEC;
 - 2. ANSI-C2, National Electrical Safety Code - NESC;
 - 3. International Building Code - IBC; and
 - 4. International Fire Code - IFC.
- B. Standards: Reference to the following standards infers that installation, equipment, and materials shall be within the limits for which it was designed, tested, and approved, in conformance with the current publications and standards of the following organizations:
 - 1. American National Standards Institute - ANSI;
 - 2. American Society for Testing and Materials - ASTM;
 - 3. American Society of Heating, Refrigerating and Air Conditioning Consultants - ASHRAE (Standard 90-75);
 - 4. Factory Mutual – FM;
 - 5. Institute of Electrical and Electronics Consultants - IEEE;
 - 6. National Electrical Contractors Association - NECA;
 - 7. National Electrical Manufacturers' Association - NEMA;
 - 8. National Fire Protection Association - NFPA, and
 - 9. Underwriters Laboratory - UL

1.5 SPECIFIC TERMINOLOGY

- A. Streamlining: In many instances, the products, reference standards, and other itemized specifications have been listed without verbiage. In these cases, it is implied that the Contractor shall provide the products and perform in accordance with the references listed.
- B. The word "Contractor" as used in Division 26 specifications shall mean "Electrical Contractor."

- C. The word "General Contractor" as used in Division 26 specifications shall mean the Contractor responsible for the project.
- D. "Furnish" means to purchase material as shown and specified, and cart the material to an approved location at the site or elsewhere as noted or agreed to be installed by supporting crafts.
- E. "Install" means to set in place and connect, ready for use and in complete and properly operating finished condition, material that has been furnished.
- F. "Provide" means furnish all products, labor, sub-contracts, and appurtenances required and install to a complete and properly operating, finished condition.
- G. "Rough-in and Connect" means provide an appropriate system connection such as conduit with "J" boxes, wiring, switches, disconnects, etc., and all wiring connections. Equipment furnished is received, uncrated, assembled and set in place under the Division in which it is specified.
- H. "Accessible" means arranged so that an appropriately dressed man 6-foot 2 inches tall, weighing 250 pounds, may approach the area in question with the tools and products necessary for the work intended, and may then position himself to properly perform the task to be accomplished, without disassembly or damage to the surrounding installation.
- I. "Serviceable" means arranged so that the component or product in question may be properly removed and replaced without disassembly, destruction, or damage to the surrounding installation.
- J. "Product" is a generic term which includes materials, equipment, fixtures, and any physical item used on the project.

1.6 DRAWINGS, SPECIFICATIONS & SYMBOLS

- A. The Drawings and Specifications are complementary; what is shown on one is as binding as if called for in both. Do not scale the Drawings. Locations of devices, fixtures, and equipment are approximate unless dimensioned.
- B. The Drawings are partly diagrammatic and do not show precise routing of conduits or exact location of all products, and may not show in minute detail all features of the installation; however, provide all systems complete and in proper operating order.
- C. Drawing symbols used for basic materials, equipment and methods are commonly used by the industry and should be universally understood. Special items are identified by a supplementary list of graphical illustrations, or called for on the Drawings or in the specifications.

1.7 SUBMITTALS, MANUALS AND SHOP DRAWINGS

- A. Submittals: Provide submittals for all products and systems described in Division 26 specifications and shown on the Drawings to demonstrate compliance with the requirements of the project. Furnish submittals in the manner described herein, and in Division 1. In addition, include data for review, and organize data, as noted below: In addition, include data for review, and organize data, as noted below:
1. Specific reference and/or drawings reference for which literature is submitted for review with an index, following specification format, and item by item identification.
 2. Manufacturer's name and address, and supplier's name, address, and phone number.
 3. Catalog designation or model number with rough-in data and dimensions.
 4. Operation characteristics.
 5. Complete customized listing of characteristics required. Indicate whether item is "As Specified" or "Proposed Substitution." Indicate any deviations on submittal. Mark out all non- applicable items. The terminology "As Specified" used without this customized listing is not acceptable.
 6. Wiring diagrams for the specific system.
 7. Coordination data to check protective devices.
 8. Working construction Drawings (Shop Drawings).
- B. Submittal Data:
1. Individual Special Systems (Control Panels, etc.)
 2. Transformers.
 3. Potential and current transformers.
 4. Electrical Utilities material and equipment.
 5. Lighting Fixtures, Lamps and Accessories
 6. Service, Disconnects.
 7. Raceways, Fittings, and Supports.
 8. Conductors.
 9. Wire and Cable.
 10. Wiring Devices.
 11. Instrumentation.

12. Additional items that may be listed on the Schedules, Bill of Materials or specified on the drawings.
- C. Submittal review is for general design and arrangement only and does not relieve the Contractor from any of the requirements of the Contract Documents. Submittals will not be checked for quantity, dimension, fit or proper technical design of manufactured equipment. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the Contractor, provision of a complete and satisfactory working installation of equal quality to system specified is the sole responsibility of the Contractor.

1.8 TESTS

- A. Division 1 - Closeout Requirements.
- B. The Contractor shall be responsible for field testing all station service and other electrical systems and equipment shown on the drawings. Testing of the generators and switchgear will be performed by the Authority after substantial completion.
- C. The Contractor shall prepare and submit a test plan for review and approval by the Authority.
 1. Field testing cannot take place without an approved test plan.
 - a. The Test Plan shall outline the tests planned for each item of equipment.
 - b. The Test Procedures shall identify the test equipment to be utilized, the action of each test step and the expected result so that a test technician who has no knowledge of the details of the equipment design shall be able to successfully conduct the test.
 2. In the presence of the Authority,
 - a. Test the equipment and electrical circuits for proper connection, continuity, and absence of undesirable shorts and grounds.
 - b. Test wire and cable installation, when complete.
 - c. Check for continuity, visual damage, marking, and proper phase sequence before performing insulation testing.
 - 1) Megger bus work, switches, breakers and circuits phase-to-phase and phase-to-ground disconnecting and reconnecting equipment which cannot be meggered otherwise.

- 2) The minimum acceptable steady-state value is 50 megohms. Ambient temperature and humidity during testing shall be recorded.
 3. Verify operation, calibration, and settings of the meters, relays and indicating devices.
 4. Check all auxiliary equipment, i.e., heaters, thermostats, lights, and all illuminated indicating devices and lamps, and all audible alarm devices to verify that they function properly.
 5. Take station service equipment test load readings after all loads are connected. Obtain the maximum reading for each phase and neutral with all lighting, appliances, motors (as applicable use largest combination), and other loads connected to the panels in service.
 6. Check fuses with an ohmmeter; ring out wiring and busing; check operation of control and safety interlocks.
 7. Test motor driven equipment motors before energization. Insulation test shall consist of megohmmeter check phase-to-ground, per IEEE Standard 43 or manufacturer's recommendations.
 8. Load test each motor of motor driven equipment showing the following:
 - a. Nameplate ratings (horsepower), (speed), (voltage), (phase), (ampere rating of motor at full load).
 - b. Measured load in amperes on lines 1-2.
 9. Load test pump motors, noting the operating conditions at the time of the test. Motor test data shall show suction and discharge conditions (pressure, temperature, humidity, to where such conditions affect load).
 10. Overload heaters shall be checked and the size on each phase shall be noted at this time on the test sheet.
- D. Report all test results in writing. Where tests disclose problem areas, retest after the defect has been corrected.
- E. Demonstrate that the electrical installation is working by operating all electrical systems and equipment. Simulate control inputs, responses to outputs and alarm conditions and their acknowledgement, artificially where necessary, for complete system tests.
- F. Operate the electrical systems until acceptance of the work. Instruct operators in the correct operation of all electrical and control systems under your jurisdiction.
- G. Any rework or repair of equipment required during or as a result of the testing shall be done by the Contractor at no additional expense to the Authority.

- H. The Contractor shall furnish to the Authority at the time the project is accepted, any special tools, calibration equipment, and testing apparatus specified or furnished by the equipment manufacturer for the proper adjustment and maintenance of the electrical equipment provided.

1.9 CODES AND INSPECTIONS

- A. Electrical work shall be installed in accordance with the latest edition of the National Electric Code and local and state codes in legal force in the project area.
 - 1. If the Contractor observes that the Drawings and/or Specifications are at variance with such codes and regulations, he shall promptly notify the Authority in writing.
 - 2. Should the Contractor perform any work in non-compliance with the above-mentioned codes and regulations without such notice to the Authority, the Contractor shall bear all costs arising therefrom.
- B. The above codes are referenced to establish minimum requirements and wherever this specification requires higher grades of material or workmanship than required by the codes, this specification shall prevail.
- C. All electrical work shall be performed by Alaska licensed Journeyman Electricians or licensed Apprentice Electricians under the direct supervision of a licensed Electrical Administrator.
- D. Submit written proof of all Journeyman and Apprentice Electricians' current licenses.
- E. Submit certification for tests and inspections required by the electrical inspector having jurisdiction. Certificates of approval that are issued shall be transmitted to the Authority.
- F. The Contractor shall pay all costs and fees required by inspecting and other agencies required for his work.
- G. Cooperate with the Authority and provide assistance at all times for the inspection of the electrical work performed under this Contract. Remove covers, operate machinery, or perform any reasonable work which, in the opinion of the Authority, will be necessary to determine the completeness, quality, or adequacy of the work.

1.10 COORDINATION

- A. Electrical Drawings are partly diagrammatic and it is not the intent to show in detail all features of work or exact physical arrangement of equipment. The location of outlets and equipment are approximate unless dimensioned. The exact locations and routing of conduits shall be governed by structural conditions and

physical interferences and by the location of electrical terminations on equipment. Equipment shall be located and installed so that it will be readily accessible for operation and maintenance.

- B. If conduit is placed incorrectly with respect to equipment connections or if equipment connections are relocated without appropriate changes in the electrical work, and the resulting work is not coordinated, the work affected shall be removed and re-installed at the Contractor's expense, even if removal and replacement of structural and/or mechanical parts of the work are necessary.
- C. The Contractor shall schedule his work to coordinate through the General Contractor and with all other subcontractors, power and telephone utilities in order to maintain job progress and to avoid conflicts with equipment installation or work done by the various trades.
- D. The Contractor is responsible for maintaining required clearspace. Should the Contractor become aware of a clearspace violation or if the installation of electrical equipment as shown produces a clear pace violation, notify the Authority in writing before proceeding with the installation.

1.11 LOCATIONS

- A. If hazardous location boundaries exist, they will be shown on the drawings. Locations for seal-off fittings shall be field determined by the Contractor.
- B. Wet Locations: Wet locations shall include all areas underground (below grade), in direct contact with the earth, areas subject to saturation with water or other liquids from splashing, surface water, exposed to the weather and unprotected.

1.12 RECORD DRAWINGS

- A. Division 1 – Project Record Documents.
- B. Reference requirements stated elsewhere in these specifications.
- C. In addition to 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 or work in permanently concealed blind spaces within the facility. Show complete routing and sizing of any significant revisions to the systems shown.
- D. Maintain Record drawings in an up-to-date fashion in conjunction with the actual progress of installation. "Record" progress mark-ups shall be available on-site for examination by the Authority at all times.

- E. Prepare wiring diagrams on reproducible media using AutoCAD V.2012 or later for all individual special systems as installed. Identify all components and show all wire and terminal numbers and connections.
- F. Prior to substantial completion, deliver these drawings and their electronic files in both .dwg and full size .pdf format to the Authority and obtain a written receipt.

1.13 OPERATING INSTRUCTIONS

- A. Prior to final acceptance, instruct operators on the proper operation and maintenance of all electrical systems and equipment under this contract. Make available a qualified technician for each component of the installation for this instruction. Give these operating instructions after the operation and maintenance manuals have been furnished to the Authority.

1.14 OPERATION AND MAINTENANCE MANUALS

- A. Provide Operation and Maintenance Manuals in the manner described elsewhere in these specifications. In addition, organize manual and include data and narrative as noted below. Submit in accordance with Division 1.
- B. Provide a separate chapter for each section of the electrical specifications with subchapters for each class of equipment or system. Provide a table of contents for each chapter, and each major item in each chapter, to indicate the page number of each. Label all pages to assure correct placement in manual. Identify each piece of equipment with its associated nameplate number, i.e. pump P-1A, etc.
- C. Operating Sequence Narrative:
 - 1. In each chapter, describe the procedures necessary for personnel to operate the system and equipment covered in that chapter.
 - 2. Describe procedures for start-up, operation, emergency operation and shutdown of each system. If a particular sequence is required, give step-by-step instructions in that order.
 - 3. Describe all seasonal adjustments which should be accomplished for each system.
 - 4. Provide the above descriptions in typewritten, simple outline, narrative form.
- D. Maintenance Instructions:
 - 1. Provide complete information for preventive maintenance for each product, including recommended frequency of performance for each preventive maintenance task.

2. Provide all information of a maintenance nature covering warranty items, etc., which have not been discussed in the manufacturer's literature or the operating sequence narrative.
 3. Provide complete informational data for all the spare and replacement parts for each product and system. Properly identify each component by part number and manufacturer.
- E. **Manufacturers' Brochures:** Include manufacturers' descriptive literature covering all products used in each system, together with illustrations, exploded views and renewal parts lists. Highlight all applicable items and instructions, or mark-out non-applicable items. Brochure bearing submittal review stamp are not acceptable.
- F. **Shop Drawings:** Provide a copy of all corrected, approved shop drawings for the project either with the manufacturers' brochures or properly identified in a separate subsection.

1.15 INSTRUCTION OF OPERATING PERSONNEL

- A. Provide services of qualified representative of supplier of each item or system listed below to instruct operators 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.
1. Electrical Distribution Equipment: 2 hours
 2. Alarm and Control Panels: 2 hours per panel
- C. Have approved operating and maintenance data, and parts lists for all equipment on hand at the time of instruction.

1.16 PROJECT COMPLETION AND DEMONSTRATION

- A. Division 1 - Closeout Requirements.
- B. Tests: During final inspection, conduct operating tests for approval.
- C. Demonstrate installation to operate satisfactorily in accordance with requirements of Contract Documents. Should a 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.
- D. Have instruments available for measuring, voltage and current values and for demonstration of continuity, ground, or open circuit conditions. Furnish personnel to assist in taking measurements and making tests.

- E. In the event that systems are not complete and fully operational at the time of Final Inspection, all costs of any subsequent inspections shall be borne by the Contractor at no additional cost to the Authority.

1.17 CERTIFICATE OF COMPLETION

- A. Submit, at time of request for Final Inspection, a completed letter in the following format:

I, _____(Name), of _____(Firm), certify that the Electrical Work is complete in accordance with Contract Drawings and Specifications, and authorized change orders (copies of which are attached hereto), and will be ready for Final Inspection as of _____(Date). I further certify that the following Specification requirements have been fulfilled:

1. Megger readings performed, ____ copies of log attached.
2. Operating manuals completed and instructions of operating personnel _____ performed _____(Date).

_____(Signed)
Alaska Energy Authority

3. Record drawings up-to-date and ready to deliver to the Authority.
4. Emergency systems tested and fully operational.
5. All other tests required by Specifications have been performed.
6. All systems are fully operational. Project is ready for Final Inspection.

SIGNED: _____ DATE: _____

TITLE: _____

PART 2 – MATERIALS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

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SECTION 26 05 02
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. This Section describes specific requirements, products, and methods of execution which are typical throughout the Electrical Work of this Project. Additional requirements for the specific systems will be found in the Division specifying those systems.

1.2 RELATED REQUIREMENTS

- A. Division 1
- B. Section 26 05 00 Common Work Results for Electrical
- C. All other Divisions 21, 23, and 26 Specifications

1.3 COORDINATION

- A. Layout all the work in advance and avoid conflict with other Work in progress. Physical dimensions shall be determined from Civil and Structural Drawings. Verify locations for junction boxes, disconnect switches, stub-ups, etc., for connection to equipment furnished by others, or in other Divisions of this Work.

1.4 SERVICEABILITY OF PRODUCTS

- A. Furnish all products to provide the proper orientation of serviceable components to access space provided.
- B. Coordinate installation of all products to allow proper service areas for any items requiring periodic maintenance inspection or replacement.
- C. Replace or relocate all products incorrectly ordered or installed.

1.5 ACCESSIBILITY OF PRODUCTS

- A. Arrange all work to provide access to all serviceable and/or operable products. Layout work to optimize net usable access space within confines of space available. Advise the Authority, in a timely manner, of areas where proper access or required clearance cannot be maintained. Furnish Layout Drawings to verify this claim, if requested.
- B. Provide access doors in ceilings, walls, floors, etc., for access to j-boxes, automatic devices, and all serviceable or operable equipment in concealed spaces.

PART 2 – PRODUCTS

2.1 PRODUCTS FURNISHED IN DIVISION 26

- A. All products furnished and installed in permanent construction shall be new, full-weight, standard in every way, and in first class condition.
- B. All equipment furnished by the Contractor shall be listed by and shall bear the label of Underwriters' Laboratories, Incorporated, (UL) or of an independent testing laboratory acceptable to the local Code-enforcement agency having jurisdiction.
- C. Products shall be identical with apparatus or equipment which has been in successful operation for at least two years. All products of similar class or service shall be of one manufacturer.
- D. Capacities, sizes, and dimensions given are minimum unless otherwise indicated. All systems and products proposed for use on this project shall be subject to review for adequacy and compliance with Contract Documents.

2.2 PRODUCTS FURNISHED IN OTHER DIVISIONS

- A. Controls, including conduit, wiring, and control devices required for the operation of systems furnished in other Divisions shall be installed in accordance with Division 26 Specifications.
- B. All equipment furnished by the Contractor shall be listed by and shall bear the label of Underwriters' Laboratories, Incorporated (UL) or of an independent testing laboratory acceptable to the local Code-enforcement agency having jurisdiction.
- C. All work on the project that falls under the jurisdiction of the electrical trade shall be performed by Licensed Electricians in possession of Alaska State Fitness Cards in conformance with the Electrical Specifications.
- D. Provide complete power connections to equipment including but not limited to feeders, connections, disconnects and motor running overcurrent protection. Where starters are provided as part of a packaged product, overcurrent heaters shall be provided.

2.3 IDENTIFICATION

- A. Equipment Labels and Nameplates:
 - 1. Provide rigid engraved labels and nameplates of laminated plastic 1/16-inch thick with white letters on a black or gray background. Label for emergency equipment shall be red with white letters.
 - a. Securely attach labels with two screws, minimum, per label, unless rating of panel is affected, use epoxy.

- b. Temporary markings not permitted on equipment. Repaint trims housings, etc., where markings cannot be readily removed. Refinish defaced surfaces.
 - c. No labeling abbreviations will be permitted without prior approval.
 - 2. Label and Nameplate Locations:
 - a. Provide 1/2-inch minimum height letters on following equipment:
 - 1) Service disconnects (red background).
 - 2) Secondary feeder breakers in distribution equipment. Designation as required by load served.
 - 3) Special equipment housed in cabinets, as designated on Drawings, on outside of door.
 - b. Provide 1/4-inch minimum height letters on:
 - 1) Disconnects and starters for motors or fixed appliances - (include item designation and branch feeder circuit number); and
 - 2) Designated electrical equipment.
- B. Branch Circuit Panelboard Schedules: Provide neatly typed schedule (odd numbered circuits on left side or top, even on right side or bottom) under plastic jacket or protective cover to protect the schedule from damage or dirt. Securely mount on inside face of panelboard door. Define briefly, but accurately, nature of connected load (i.e., Lighting, interior; receptacles, work bench; etc.) as approved.
- C. Empty Conduits: Provide tags with typed description of purpose, and location of opposite end, wired to each end of conduits provided for future equipment.
- D. Conduits: Mark all conduits entering or leaving panels with indelible black magic marker with the circuit numbers of the circuits contained inside.
- E. Junction Boxes: Mark the circuit numbers of wiring on all junction boxes with steel covers. Mark with indelible black marker.
- F. Conductors:
 - 1. Conductors shall be color coded as indicated on the Electrical Conductor Schedule on Sheet E1.1.
 - 2. Control and alarm circuit conductors
 - a. Field conductors shall be identified by destination panel and terminal block designations.
 - b. Internal (Control Panel) numbering system shall be provided by the Contractor. The numbering system shall assign each logical conductor set a unique identification number that will be reflected on the as-built drawings.

PART 3 – EXECUTION

3.1 STORAGE AND HANDLING

- A. Division 1 – Material and Equipment.
- B. All items shall be delivered and stored in original containers, which shall indicate manufacturer's name, the brand, and the identifying number.
- C. Items subject to moisture and/or thermal damage shall be stored in a dry, heated place.
- D. All items shall be covered and protected against dirt, water, chemical and/or mechanical damage.

3.2 PROTECTION OF PRODUCTS

- A. The Contractor shall be held responsible for products to be installed under this Contract.
- B. The Contractor will be required to make good, at his own cost, any injury or damage which said products may sustain before Final Acceptance.

3.3 INSTALLATION

- A. All products shall be installed by skilled craftsmen. The norms for execution of the work shall be in conformity with NEC Chapter 3 and the NECA "Standards of Installation," which herewith is made part of these Specifications.
- B. Provide working space in accordance with NEC 110.26 to permit ready and safe operation and maintenance of equipment.
- C. Repair all surfaces and furnish all required products and labor to maintain fire-proof, air-tight and water- proof characteristics of the construction.
- D. Installation of all equipment shall be in accordance with manufacturer's instructions.

3.4 SUPPORT SYSTEMS

- A. All interior materials used shall be galvanized or zinc plated.
- B. All exterior materials used shall be stainless steel. Where support elements are field cut, exposed metal shall be coated with spray-on galvanizing.
- C. Support from structure only.
- D. Conduits shown to be run at grade shall be supported by wood sleepers as shown on the drawings. Conduits may share fuel piping sleepers if installed such that neither system will require removal during maintenance or replacement.

3.5 MOUNTING HEIGHTS

- A. Mounting heights shall be above finished floor (AFF) or above finished grade as noted below, unless otherwise shown or indicated.
 - 1. Lighting Switches, 48 inches to center
 - 2. Receptacles shall be mounted as indicated on the Drawings.
- B. Other mounting heights are indicated on the Drawings by detail.

3.6 CUTTING AND PATCHING

- A. Obtain written permission from the Authority before cutting or piercing structural members.
- B. Sleeves through floors and walls to be galvanized iron pipe, flush with walls, ceilings or finished floors, sized to accommodate the raceway. Interstitial space around conduit passing through sleeves shall be filled with non-hardening duct sealant.

3.7 PROTECTIVE FINISHES

- A. Take care not to scratch or deface factory finish on electrical apparatus and devices. Repaint all marred or scratched surfaces.
- B. Provide hot dip galvanized components for ferrous materials exposed to the weather.

3.8 CLEAN-UP AND COMMISSIONING

- A. Throughout the Work, the Contractor shall keep the work area reasonably neat and orderly by periodic clean-ups.
- B. As independent parts of the installation are completed, they may be commissioned and utilized during construction.

3.9 WARRANTY

- A. Division 1 - Closeout Requirements: Warranties.
- B. Unless otherwise specified, the Warranty starts on the date Written Notice is given that the project is complete and all required corrections have been made. Warranty shall certify that all defects in products or workmanship shall be promptly repaired or replaced by the Contractor, to the satisfaction of the Authority, for a period of one year, except when, in the opinion of the Authority such failure is due to neglect or carelessness by the Authority.

3.10 OPERATIONAL INSTRUCTIONS

- A. The Contractor shall instruct operators in the operation of the products shown and/or specified.

END OF SECTION

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SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. This section describes general requirements, products, and methods of execution relating to the furnishing and installation of a grounding system complete as required for this project.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results for Electrical
- B. Section 26 05 02 Basic Materials and Methods

1.3 MINIMUM REQUIREMENTS

- A. The minimum requirement for the system shall conform to Article 250 of the NEC.

1.4 SUBMITTALS

- A. Shop Drawings and Product Data: Provide in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.

PART 2 – PRODUCTS

2.1 GROUND CONNECTIONS

- A. Grounding conductor connections to building structure and generator skids shall be made with mechanical lugs as indicated.

PART 3 – EXECUTION

3.1 SERVICE AND STRUCTURE GROUND

- A. Create a Grounding Electrode System (GES) for this project by connecting the following:
 1. Generators, switchgear, and transformers grounded as shown on the Drawings.
 2. The neutral conductors grounded only where specifically indicated on the Drawings.
 3. Other items or equipment as indicated on the Drawings.
 4. Current carrying capacity of the grounding and bonding conductors shall be in conformity with Tables 250.66 and 250.122 of the NEC.
- B. All structure bonding shall be in accordance with manufacturer's recommended practice.

3.2 EQUIPMENT GROUND

- A. The raceway system shall be bonded in conformity with NEC requirements to provide a continuous ground path. Where required by code or where called for on the Drawings, an additional grounding conductor shall be sized in conformity with Table 250.122 of the NEC.
- B. Provide a separate copper equipment grounding conductor for each feeder and for each branch circuit indicated. Install the grounding conductor in the same raceway with the related phase and neutral conductors, and connect the grounding conductor to pull boxes or outlet boxes at intervals of 100 feet or less. Where paralleled conductors in separate raceways occur, provide a grounding conductor in each raceway. Connect all grounding conductors to bare grounding bars in panel boards, and to ground buses in service equipment to the end that there will be an uninterrupted grounding circuit from the point of a ground fault back to the point of connection of the equipment ground and system neutral. All grounding conductors shall be sized in conformity with Table 250.122 of the NEC.
- C. Provide separate grounding conductor securely bonded and effectively grounded to both ends of all non-metallic raceways and all flexible conduit.
- D. If non-metallic enclosures are provided, all metal conduits terminating or entering the enclosure shall be bonded together with approved bonding bushings and #6 AWG copper cable.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. Support and align raceways, cabinets, boxes, fixtures, etc., in an approved manner and as specified.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results for Electrical
- B. Section 26 05 02 Basic Materials and Methods
- C. Section 26 05 33 Raceway and Boxes for Electrical Systems

1.3 SUBMITTALS

- A. Shop Drawings and Product Data: Provide in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.

PART 2 – PRODUCTS

2.1 HANGERS AND SUPPORTS

- A. Support equipment and raceways on strut, brackets, trapeze hangers, or as detailed. Anvil, B-Line, Grinnell, Unistrut, or approved equal.

2.2 FORMED STEEL CHANNEL

- A. Strut: Cold formed mild steel channel strut, pre-galvanized finish and slotted back unless specifically indicated otherwise.
- B. Standard Strut: 12 gauge thick steel, 1-5/8" x 1-5/8", B-line B22-SH-Galv or equal.
- C. Double Strut: 12 gauge thick steel, 1-5/8" x 3-1/4", B-line B22A-SH-Galv or equal.
- D. Shallow Strut: 14 gauge thick steel, 1-5/8" x 13/16", B-line B54-SH-Galv or equal.
- E. On all exterior installations provide hot dip galvanized strut and fittings.

2.3 FITTINGS AND ACCESSORIES

- A. Hanger Rods: Continuous threaded rod. Zinc plated carbon steel except for exterior installations provide hot dip galvanized.

- B. Provide fittings, brackets, channel nuts, and accessories designed specifically for use with specified channel strut. Zinc plated carbon steel except for exterior installations provide hot dip galvanized.
- C. Pipe Clamps: Two piece pipe clamp designed to support pipe tight to strut, B-line B20##, or approved equal. Zinc plated carbon steel except for exterior installations provide hot dip galvanized
- D. Fasteners: All bolts, nuts, and washers to be zinc plated carbon steel except on exterior installations provide hot dip galvanized or stainless steel.

2.4 EARTHQUAKE ANCHORAGE

- A. Anchor equipment weighing more than 100 pounds to the building structure to resist lateral earthquake forces.
- B. Total lateral (earthquake) force shall be 1.00 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.
- C. Provide equipment supported by flexible isolation mounts with earthquake restraining supports positioned as close to equipment as possible without contact in normal operation (earthquake bumpers). The maximum lateral displacement due to the computed earthquake force from above shall not exceed 1.5 inches. Floor mounted equipment weighing less than 2000 pounds may have one 6-inch by 6-inch by 3/8-inch by 18-inch steel angle bolted to the floor with four 5/8-inch diameter bolts placed on each of four sides of the equipment.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Conduits and equipment shall be mounted using strut or similar supports unless otherwise noted.
- B. Do not strap conduits to piping. When run in parallel with piping maintain adequate separation to allow maintenance to take place on either piping or conduit system so that the other does not have to be removed when maintenance is required.

END OF SECTION

SECTION 26 05 33
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. This section describes specific requirements, products, and methods of execution relating to conduit and conduit fittings approved for use on this project. Type, size and installation methods shall be as shown on the Plans, required by Code and specified in these specifications.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results for Electrical
- B. Section 26 05 02 Basic Materials and Methods
- C. Section 26 05 26 Grounding and Bonding for Electrical Systems

1.3 QUALITY ASSURANCE

- A. Conduit and conduit fittings shall be standard types and sizes as manufactured by a nationally recognized manufacturer of this type of materials and be in conformity with applicable standards and UL listings.

1.4 SUBMITTALS

- A. Shop Drawings and Product Data: Provide in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.

PART 2 – PRODUCTS

2.1 GALVANIZED RIGID CONDUIT (GRC)

- A. Galvanized rigid conduit shall be mild steel with continuous welded seam, hot-dip galvanized complying with ANSI C80.1 and shall be UL listed.
- B. Elbows, bends, and fittings shall be made of full weight materials complying with the above and shall be coated and threaded the same as conduit.
- C. Threads for conduit shall be tapered and clean cut. All threads shall be hot dip galvanized after cutting.
- D. Conduit shall be 1/2-inch trade size or larger and shall be manufactured by Allied Tube and Conduit Corp., Triangle PWC, Inc., or approved equal.

2.2 ELECTRICAL METALLIC TUBING (EMT)

- A. Steel tubing, galvanized outside and provided with a slick corrosion resistant interior coating; UL listed and labeled according to Standard 797; conforming to ANSI Standard C80.3.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Liquidtight flexible conduit shall be manufactured from galvanized steel strip, sealed with a polyvinyl outer jacket and shall be UL listed.
- B. Fittings shall be designed for use with liquidtight flexible conduit and shall maintain electrical continuity throughout fittings and conduit.
- C. Liquidtight flexible metal conduit shall be 1/2-inch trade size or larger and shall be manufactured by O-Z/Gedney Co., Southwire Co., or approved equal.

2.4 FITTINGS

- A. Expansion fittings shall be O.Z. type AX, EX, EXDS, TX, or EXE; Crouse Hinds type XJ; or approved equal.
- B. Fittings utilized with rigid steel shall be galvanized steel. Conduit bushings shall be of the insulated type. Where grounding bushings are required, insulated grounding bushings with pressure type lugs shall be provided. Lock rings shall be of the sealing gland type. Provide conduit bushings on all penetrations without hubs.
- C. Couplings and Terminations for Electrical Metallic Tubing (EMT): Join lengths of EMT with steel compression type couplings and connectors. The connectors shall have insulated throats or a smooth interior so as not to damage the insulation during pulling operations.
- D. Fittings for liquid-tight flexible conduit shall be steel or malleable iron, of a type incorporating a threaded grounding cone, nylon or plastic compression ring, and a tightening gland, providing a low resistance ground connection. All throats shall be insulated.

2.5 WIREWAY

- A. Interior Use: UL listed; NEMA 1, enamel finished; hinged covers except where indicated otherwise. Furnish complete with all fittings, couplings, hangers and accessories; Hoffman, B-Line or equivalent.

PART 3 – EXECUTION

3.1 CONDUIT USAGE

- A. INTERIOR - All interior locations shall be electrical metallic tubing (EMT) except where specifically indicated as wireway.
- B. EXTERIOR - All exterior above grade locations shall be galvanized rigid conduit (GRC).
- C. Liquidtight flexible metal conduit shall be used in lengths 18 to 24 inches for connections to motors or equipment subject to vibration and where indicated on the Drawings. Longer lengths may be used for equipment connection if grounding conductor is installed through conduit.

3.2 CONDUIT INSTALLATION, GENERAL

- A. Conduit field joints shall be cut square and reamed smooth. Threads shall be cleanly cut and joints drawn up tight. Running threads shall not be permitted.
- B. After cutting and threading exterior GRC, threads shall be cleaned and degreased and shall receive two coats of cold galvanizing compound.
- C. Offsets and bends shall be made carefully, without reducing cross sectional area, and shall not be less than the radius of standard elbows.
- D. Convenience outlets, switches, and other devices located on walls shall be serviced from above, unless otherwise indicated.
- E. Raceways penetrating vapor barriers or traversing from warm to cold areas shall be sealed (at the penetration point) with a non-hardening duct sealing compound to prevent the accumulation of moisture.
- F. All metal conduits shall have insulating bushings and shall have locknuts inside and outside of enclosure box, etc. Conduits smaller than 1-1/4-inch trade size shall be equipped with bushings and shall have locknuts inside and outside of enclosure.
- G. All conduit runs shall be grounded in an effective and approved manner at point of origin and shall maintain a continuous ground throughout all runs, cabinets, pull boxes, and fittings from point of service to all outlets.
- H. Conduit Supports:
 - 1. Support conduits by wall brackets, pipe straps and strut sections, or trapeze hangers spaced not more than 10 feet on center.
 - 2. Conduits shall be supported from the structural system. Provide additional support as required for junction and pull boxes.
- I. All conduit runs shall be completed and cleaned free from foreign matter inside before conductors are drawn in. After installation conduit ends shall be plugged or capped to prevent the entrance of foreign materials.
- J. All conduits not used by this Contract shall have a pull wire installed and securely tied off at each end for future conductor installation.

END OF SECTION

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SECTION 26 23 00.10

PRIME POWER LOW-VOLTAGE SWITCHGEAR

PART 1 - GENERAL

1.1 SCOPE

- A. The Work included herein shall consist of providing design, drawings, materials, and accessories as specified for paralleling switchgear to be used to parallel diesel generating units for prime power generation in the communities of Clark's Point and Port Heiden as indicated on the project design drawings. The Work included herein shall consist of, but not be limited to, designing, fabricating, and factory testing, and providing complete paralleling switchgear as specified herein.
- B. The switchgear for both projects shall include provisions to control an electric boiler for alternative energy integration. The Clark's Point facility will include an electric boiler while the Port Heiden facility will include provisions for future installation of an electric boiler.
- C. Work included herein shall also include, but not be limited to, designing, fabricating, providing, and factory testing an SCR panel for the control of the Clark's Point electric boiler as indicated under Part 4. The boiler SCR panel which shall enclose the SCRs and associated equipment and shall control the electric boiler in accordance with the Sequence of Operations specified herein.
- D. Project design drawings shall be used in the design of the switchgear and boiler SCR panel.
- E. The specifications and project design drawings are complementary. What is shown on one is binding whether or not it is shown or specified in the other. Failure to check both the drawings and specifications will not be grounds for a change order if additional equipment or material is required to be provided by the Fabricator after the Authority reviews the drawings, or deficiencies are identified during testing, either in the Factory or the field.
- F. The Fabricator shall provide complete and operational systems as specified herein. Certain components are identified in these specifications to be provided by the Fabricator. However, the components identified shall not be construed to be the complete list of components required for the successful operation of the system as specified. The Fabricator shall provide all components and design required for the complete and successful operation of the system, conforming to all of the requirements specified herein, whether the components are identified or not. The Fabricator shall ensure that all devices are installed and operate within their intended purposes. The Fabricator shall check all catalog numbers indicated and shall coordinate all devices installed.
- G. The paralleling switchgear shall be capable of unattended automatic and manual operation as described herein. The switchgear shall be a fully coordinated system that provides the functions and features as specified herein.

- H. The automatic control and overall sequencing and starting and stopping of the generators shall be performed by a Programmable Logic Controller (PLC). Failure of the PLC shall not inhibit manual control and operation and paralleling of the individual generator units.
- I. Automatic start/stop and demand control shall be accomplished through the Genset Controllers (GC). Each generator shall have an electrically operated circuit breaker to perform the normal on line/off line paralleling functions of the generator load controlled by the GC.
- J. The distribution feeder shall have an electrically operated circuit breaker for equipment and conductor protection.
- K. Variable frequency drives shall be incorporated into the switchgear for radiator fan control as indicated on the project design drawings and specified herein.
- L. The Fabricator shall fully test the switchgear separately from the generating equipment as specified herein.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 – Common Work Results for Electrical
- B. Section 26 05 02 – Basic Materials and Methods
- C. Section 26 32 13.10 – Engine Generators
- D. Section 26 23 00.50 – SCADA System for Prime Power Switchgear

1.3 SUBMITTALS

- A. Provide in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.
- B. Provide complete and accurate shop drawings of the equipment including outline drawings and dimensional data which fully describe the height, width, and depth of the equipment; cabinet construction; one-line and three-line diagrams; schematics; wiring diagrams, and other relevant details.
- C. Show the dimensioned location of the GC interface screen.
- D. The one-line diagram provided with the Fabricator's submittal shall show all breakers, protective devices, and control devices and shall use standard ANSI symbols.
- E. The drawings shall show the switchgear layout, shall show all terminal blocks and all connections between terminal blocks, auxiliary switch contacts, control devices, instrumentation, protection devices, etc. Drawings shall also show all details of enclosure construction. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.
- F. Provide a bill of material for all equipment or material provided as part of the switchgear.

- G. Provide manufacturer's catalog literature for all accessories and equipment. Manufacturer's literature for all components shall be included in the submittal. Literature shall be limited to only the items furnished and shall not include entire sections of catalogs or data sheets for items not used. Items shall be marked electronically such that it is clear which items is for what purpose.
- H. In addition to other submittal requirements, all drawing files shall be provided upon request in AutoCAD 2012 format, complete with all title blocks and external references such that the AutoCAD file provided appears like the PDF file when the proper fonts are used. Special fonts that may be required shall be provided by the Fabricator.
- I. Drawings. Provide the following drawings for review.
 - 1. All drawings submitted shall be drawn to accurate scale on sheets not less than 11" x 17"; except for actual pattern or template type drawings, the maximum sheet size shall not exceed 24" x 36". The preferable sheet size is 22" x 34". Indicate the name of the firm that prepared each shop drawing and provide appropriate project identification in the title block. Do not reproduce contract documents or copy standard printed information as the basis of shop drawings.
 - 2. All drawings shall use standard ANSI symbols.
 - 3. Provide drawings showing all details of enclosure construction.
 - 4. Provide internal wiring and connection diagrams for each section of the switchgear, a one-line diagram, and three-line diagrams. The one-line diagram shall show all breakers, protective devices, control devices, and cable sizes for all power conductors.
 - 5. Provide drawings of all AC and DC wiring. Provide a communication connection diagram showing all buses, devices, and expansion block cables.
 - 6. Provide schematics of all controls. Schematics shall be in ladder diagram format and shall show all control devices and external terminal block numbers.
 - 7. Provide drawings showing terminal block layouts and interconnecting wiring. The drawings shall show the physical layout of the terminal blocks with their appropriate designations and all connections between terminal blocks, auxiliary switch contacts, control devices, instrumentation, protection devices, etc.
 - 8. Provide drawings that show nameplate engraving. Provide drawings of control switches showing all terminals with numbers, including terminals not used. Identify the use of the terminals.

9. Provide pertinent information for the PLC. Pertinent information shall include a complete ladder diagram showing all address numbers, rung reference numbers, all preset register values, extensive commentaries describing the purpose of each rung, complete tables or schedules listing all utilized I/O addresses, internal relay addresses, and timer, counter, and register addresses and values, and the date of the latest revision.
 10. All shipping splits shall be clearly identified. Wiring harnesses shall be provided between shipping splits for any control wiring required to connect between units. Drawings shall clearly indicate the wiring harness and connections. Terminal blocks shall be provided between the shipping splits for ease in wiring in the field.
- J. Provide proposed settings for review for the GC and Feeder Protection Relay (FPR) as specified herein.

1.4 QUALITY ASSURANCE

- A. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practices. Equipment shall not have been in service any time prior to delivery, except as required by testing.
- B. The switchgear shall comply with the requirements of the National Electrical Code for Essential Electrical Systems. The switchgear shall be listed as an assembly under UL Standard 891 for switchboards or equivalent independent testing laboratory standard recognized by the State of Alaska. A nameplate indicating the listing shall be permanently affixed to each section of the switchgear.
- C. The boiler SCR panel shall be listed as an assembly under UL Standard 508A for industrial control panels or equivalent independent testing laboratory standard recognized by the State of Alaska. A nameplate indicating the listing shall be permanently affixed to the panel.
- D. The switchgear and boiler SCR panel shall also be assembled and tested in strict accordance with the applicable standards of UL 508A, NEC, ANSI, IEEE and NEMA, for metal enclosed low voltage switchgear.
- E. Solid-state circuitry shall meet or exceed the Transient Overvoltage Withstand Test per NEMA ICS1-109 and the Surge Withstand Capability Test (SWC) per IEEE Standard 472 (ANSI C37.90A). In addition, where UL Standards exist for components, devices and/or assemblies, such standards shall apply.

1.5 FABRICATOR QUALIFICATIONS

- A. The switchgear and boiler SCR panel shall be designed, assembled, and tested by a qualified fabricator (Fabricator) who is regularly engaged in the business of providing generation switchgear. A list of five prior projects that key staff have worked on may be requested by the Authority after the bid opening and prior to award in order to verify Fabricator qualifications. The list shall include installation date, description of installation, and a reference contact for each installation.

- B. At the time of bid submittal, the Fabricator shall have current authorization from a third party listing agency to provide listed switchgear as required by the specifications. Evidence of authorization may be requested by the Authority after the bid opening in order to verify Fabricator qualifications.

1.6 FABRICATOR WARRANTIES

- A. The Fabricator shall warrant the work for a period of not less than one-year after energization of the equipment. In the event of equipment or component failure during the warranty period, the Fabricator shall replace such defective equipment or components and bear all associated costs. The Fabricator shall pursue manufacturer's warranties to the extent necessary to obtain replacement equipment and provide proof of action taken upon request. Assist Authority as directed in determining cause of failure.
- B. The warranty shall state in clear terms exactly what warranty coverage the seller provides, for each unit and attachments. This shall include the terms, length of coverage, reporting responsibilities, how the warranty applies to accessory equipment, restrictions, locations of local facilities for handling warranty and other repairs (including contact names), and any other available information pertaining to warranty.
- C. The Fabricator shall repair or replace any part of the equipment found to be defective.
- D. Provide a nametag on each piece of equipment that clearly identifies the party responsible for the warranty. Nametag shall include the name, address, and phone number, and shop order or Fabricator's serial number.

1.7 OPERATION AND MAINTENANCE MANUALS

- A. Provide operation and maintenance (O&M) manuals for all equipment provided under this contract.
- B. The O&M manuals shall be in addition to any instructions or parts list packed with or attached to the equipment when delivered, or any information submitted for review.
- C. Include the following information in the O&M manuals:
 - 1. Theory of operation of the switchgear system.
 - 2. Equipment function, normal operating characteristics, and limiting conditions.
 - 3. Assembly, installation, alignment, adjustment, and checking instructions.
 - 4. Operating instructions for start-up, routine and normal operation, regulation and control, shutdown, and emergency conditions.
 - 5. Guide to "troubleshooting."
 - 6. Parts lists, with vendor name and telephone number, and predicted life of parts subject to wear.
 - 7. Complete as-built drawings showing all details of construction.

- D. The O&M manuals shall consist of a single CD, or flash drive, with a single Adobe Acrobat PDF file. O&M manuals shall be complete with all revisions and as-built data and shall reflect the actual equipment and material installed. The O&M manual shall be organized as follows:
1. The PDF file shall be provided with book marks that will allow easy navigation within the PDF file. Each chapter shall have its own book mark and the chapter shall be broken down into subsections based on each different item provided in that chapter, or tab. Each item in the chapter, or tab, shall be bookmarked such that each item can be navigated to from the bookmark.
 2. The PDF file shall be provided with a Bill of Material that shall be near the front of the file. The Bill of Material shall be organized in such a manner that each item listed is identified with the chapter or subchapter that the item documentation is located.
 3. The PDF file shall be organized into chapters or tabs that separate the different components of the switchgear into logical groupings, i.e. theory of operation, warranty, bill of material, breakers, enclosures, battery system, meters, etc. At the beginning of each section, provide a page with the section number.
 4. At the end of the PDF file, provide all drawings, inserted horizontally. Provide a chapter tab for the drawings and each drawing shall be individually bookmarked.
- E. Mail three CDs, or flash drive, with the final O&M file directly to the Authority.
- F. Ship one CD, or flash drive, with the final O&M file one complete hardcopy of the switchgear drawings with the switchgear. Drawings shall be printed on 11"X17" paper and placed inside the switchgear enclosure along with the CD, or flash drive.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All equipment and material shall be new. Equipment furnished and installed under this section shall be fabricated and assembled in full conformity with the project design drawings, specifications, engineering data, instructions, and applicable standards.

2.2 ACCEPTABLE MANUFACTURERS OF SWITCHGEAR COMPONENTS

- A. Specific parts manufacturer and model have been specified in the following paragraphs not only to meet performance function but also to coordinate and interface with other devices and systems. Approved equal substitutions will be allowed only by Authority's approval. To obtain approval, submittals shall clearly demonstrate how substitute item meets or exceeds specified item quality and performance characteristics and also complies with electrical connections and physical layout requirements.

- B. The following products are specified by brand and part number to maintain commonality for programming and service with similar switchgear used in other rural Alaskan communities. Substitutes will not be allowed for the following components:
1. Programmable Logic Controller (PLC): Allen-Bradley.
 2. Genset Controller (GC): Woodward.
 3. Feeder Protection Relay (FPR): Schweitzer Engineering Laboratories, Inc.
- C. Acceptable manufacturers of all components not otherwise indicated shall be: Allen-Bradley, Eaton, General Electric, IDEC, or Square D.

2.3 SWITCHGEAR ENCLOSURE

The following paragraphs describe general fabrication requirements for the switchgear enclosure.

- A. Provide a freestanding enclosure that is factory built, wired, and tested by the switchgear fabricator. Hinged front-opening doors shall provide required access to all components. Control wire shall have termination identification of each wire for ease of tracing. Terminal blocks shall be provided for control wires that run between the switchgear and external equipment such as generator sets. Nameplates shall be provided to identify each device or function.
- B. The switchgear shall be front access for all control devices.
- C. All switchgear sections shall be dead front type NEMA 1A construction and labeled in accordance with UL-891, or equivalent. The enclosure shall be divided into individual sections as indicated on the project design drawings. The maximum dimensions of each section shall be as indicated by the enclosure layout detail on the project design drawings. All sections shall be rear aligned and shall be capable of being rolled, moved or lifted into the installation position and bolted directly to the floor without the addition of floor sills. Each switchgear section shall be a completely self-supporting structure. Individual sections shall be bolted together to form the required arrangement.
- D. The structure frame shall be die formed 12 gauge steel with reinforcing corner gussets internal and external to the structure members. Alternatively, a 2"x 2"x 3/16" steel angle frame may be used. Bolt-on side, top and rear covers shall be code gauge steel, minimum.
- E. Each section shall be provided with an individual door. Doors shall be provided with latches and concealed hinge construction.
- Latches shall be one of the following.
1. One three-point single handle operated latch.

2. Multiple single-point latches consisting of captive knurled handle quarter-turn cam fasteners. Doors which are 36 inches or less in height shall have a minimum of two single-point latches; doors which are greater than 36 inches in height shall have three single-point latches.
- F. The individual generation sections shall be divided into high and low voltage cubicles using interior barrier panels to ensure isolation of equipment for safety to personnel during service and maintenance or cable pulling. The upper portion of the generator cubicles shall be the low voltage (120V max) controls cubicle. The lower portion of the generator cubicles shall be the high voltage (480V) power cubicle.
- G. The control cubicles shall be provided with back and or side pans as required for mounting equipment and wiring. Mounting attachments shall be welded studs or other approved methods. No bolts, screws, or other attachment hardware shall be visible from the exterior.
- H. Control cubicles shall have hinged doors. The master cubicle door shall swing so the door front is visible from the control cubicles. Warning labels and source voltage labels shall be provided. The switchboard shall have one cubicle designated as a master cubicle. See the enclosure layout detail on the project design drawings.
- I. Power and control cables shall enter from the top of the enclosure as indicated by the enclosure layout detail on the project design drawings. A cable area shall be provided behind the controls cubicle of each engine/generator cubicle to allow power cables to be installed behind the controls. Isolation barriers shall be provided between each cable area such that each cubicle is completely isolated from any adjacent cubicle. Where top cable entry is indicated by the enclosure layout detail on the project design drawings, a removable cover plate shall be installed on top of the cable area large enough to terminate a 3" rigid conduit with locknuts and conduit bushing. The removable cover plate shall cover the entire cable area.
- J. Where the main bus is not isolated by barrier plates, it shall be provided with a glastic cover for isolation over the entire length of the bus.
- K. The top of the GC interface screen shall not exceed 60" above the bottom of the switchgear.

2.4 PAINTING

- A. Steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces that will be inaccessible after assembly shall be protected for the life of the equipment. Surfaces shall be cleaned and prepared in the shop. All mill scale, oxides, and other coatings shall be removed.
- B. All metal enclosure parts shall be phosphatized to ensure that the metal is properly degreased and cleaned.

- C. Exposed surfaces shall be finished smooth, thoroughly cleaned and filled as necessary to provide a smooth uniform base for painting and painted with one or more coats of primer and two or more finish coats of alkyd resin machinery enamel or lacquer as required to produce a smooth hard durable finish. The color of the finish coats shall be light gray.
- D. Provide a premium painting system throughout the painting process from initial cleaning to final assembly to assure a superior paint finish. All coatings shall be applied using an electro static paint system.
- E. Interior shall be light gray, except that back and side pans shall be white.

2.5 CONTROL WIRING

- A. All control wiring for the switchgear and boiler control panel shall be minimum 600 volt, copper 16 gauge, strand type SIS wire or equivalent. The Fabricator shall be responsible for sizing the appropriate wire for each component and circuit. Current transformer wiring shall be 12 gauge wire.
- B. Only one wire shall be inserted into a lug. Lugs shall be installed with a ratcheting type crimping tool. All wires shall be tagged with wire markers at both ends.
- C. All wiring shall terminate on terminal blocks or devices. No more than two wires shall be connected to a termination point. Terminal blocks for control wiring shall be 20 amp, 600 volt. All terminal blocks and exposed relays located in the controls compartment shall be provided with a plastic safety cover. Terminal blocks for DC circuits shall be separated from terminal blocks for 120V AC.
- D. Splicing of control or CT wires is not allowed.
- E. All control wiring landing on screw terminals shall have solderless terminals, T&B Sta-Kon or approved equal. Solderless terminals for current transformer leads shall be insulated ring-tongue type, all others shall be insulated fork-tongue type. All lugs and solderless terminals shall be tin-plated copper.
- F. Current transformer leads shall be wired to shorting type terminal blocks. Shorting pins shall be provided with storage locations for the shorting pins.
- G. Terminal blocks shall be clearly labeled and shall match the designation shown on the Fabricator's drawings. A separate terminal strip shall be provided for interconnection with each generator. The generator terminal strip shall be arranged and numbered exactly as shown by the terminal strip detail on the project design drawings.
- H. Each end of each wire shall be identified per the marking and numbering shown on the wiring drawings with heat shrink or wrap-around adhesive labels. Each conductor shall have the terminal or device the conductor is terminated to at both ends positively identified at both ends of the conductor.
- I. Wiring shall be installed neatly in bundles and wireways. Adhesive backed tywrap bases shall not be used to support bundles. All wiring bases shall be securely attached with metal screws.

2.6 BUS BAR AND GROUNDING

- A. The switchgear shall be provided with silver-plated copper main bus bars. The main bus shall be rated 1,000 amperes. If the actual ampacity of the bus installed exceeds this value, the switchgear bus shall be rated 1,000 amperes.
- B. The main bus shall be well braced to meet the short circuit ratings of the generators. Minimum bus bracing shall be 30,000 amperes symmetrical, unless indicated otherwise on the project design drawings. The main bus shall be installed on insulators to provide proper clearances between phases and phase to ground.
- C. Generator and feeder circuit breakers shall be connected to the common bus bar.
- D. An isolated copper neutral bus shall be provided and shall have the same ratings as the main bus. The neutral bus shall have a single removable connection to the ground bus. The connection shall be accessible in the feeder section.
- E. The switchgear shall have a bonded copper ground bus minimum size 2" x 1/4", or as required for the bus ampacity.
- F. Horizontal bus joints between each section shall be silver-plated copper. Bus joints shall be bolted with high tensile steel bolts with spring loaded Belleville type washers.
- G. A-B-C type bus arrangement (left-to-right, top-to-bottom, front-to-back) shall be used throughout to assure convenient and safe testing and maintenance.
- H. Termination bars shall be provided on the load side of the feeder breaker and on the line side of the generator breakers for termination of field wiring. Provide holes in the termination bars for field connection of lugs suitable for termination of #4/0 AWG cables, minimum 2 for each phase. Provide additional holes where specifically indicated.
- I. The feeder, generator, VFD, electric boiler, and station service circuit breakers shall be connected to the main bus by cables. All cables and connections shall be rated for the full ampacity of the circuit breaker frame.

2.7 SWITCHGEAR AND BOILER SCR PANEL DEVICES.

- A. Nameplates. All nameplates shall be black with white core type. Nameplates shall have beveled edges and shall be secured with a minimum of two mounting screws. Nameplates shall be provided for each device on the front of the switchgear and inside the switchgear. Inside the switchgear compartments, all relays, control switches, lights, etc. to which control or instrument transformer wiring connects, shall be marked by nameplates, with designations corresponding to the same device designations used on the wiring drawings and approved by the Authority. Nameplates inside the switchgear located on the front doors may be attached using adhesive epoxy.

Relays shall have the nameplates installed separate from the relay such that the relay can be removed without affecting the nameplate. All wiring shall be routed such that it does not inhibit the visibility of the nameplate or interfere with the removal of the relay.

- B. Overall nameplate. Provide an overall nameplate that provides the following information:
1. Fabricator's name and address.
 2. Fabricator's type designation (optional).
 3. Fabricator's shop order number.
 4. Third party listing identification.
 5. Rated maximum voltage.
 6. Rated bus ampacity.
 7. Rated bus interrupting capacity.
- C. Third Party Listing Tag. Provide a tag identifying the third party listing of the equipment. If the enclosure was fabricated by a sub-Fabricator, the enclosure shall be provided with the third party listing tag. The overall assembly shall also be provided with a third party listing identification tag that meets the requirements of the State of Alaska.
- D. Selector Switches. Selector switches shall be heavy-duty type. Contacts shall have silver butting or sliding contacts, rated 10 amperes continuous at 120 volts AC. Contact configuration shall be as required for the application. Legends shall be engraved on the switch nameplate.
- Unless otherwise specified, all selector switches located on the front of the enclosure shall be Electroswitch Series 24, or approved equal.
- E. Annunciator Lights. Annunciator lights shall be panel mount LED cluster type lamps. IDEC Corp. Series SLC40, or approved equal.
- F. Control Relays/Time Delays. Relays and timers for control operations or isolation shall be of the plug-in socket base type with dustproof plastic enclosures unless noted otherwise. Relays and timers shall be UL recognized, have 120-volt AC or 24-volt DC coils, depending on the application. Relays shall not have less than double-pole, double-throw contacts. Control circuit relays shall have silver-cadmium oxide contacts rated for 10 amperes at 120 volts AC. Electronic switching duty relays shall have gold-plated or gold alloy contacts suitable for use with low-level signals. Relays utilized for PLC input, alarm input or indicating light service shall have contacts rated not less than 3 amperes. All relays and timers shall be provided with indicating lights. IDEC Corp. or approved equal.
- G. Relays for use on 24-volt DC circuits shall be provided with different bases than those for use on 120-volt AC circuits to prevent inadvertent swapping of relays.
- H. Auxiliary power relays shall be Allen-Bradley series 700, minimum 20A rated, or approved equal.
- I. Circuit Breakers.
1. Protective devices shall be resettable circuit breaker type for all AC and DC circuits in the switchgear. Replaceable fuse type devices are not acceptable.

2. Circuit breakers shall be molded case circuit breakers of the amperage, voltage, short circuit capacity, and number of poles required for the application or as indicated on the one-line diagram.
 3. The station service transformer and the electric boiler shall be protected by a manually operated molded case circuit breaker, sized as indicated by the one-line diagram on the project design drawings. Auxiliary contacts shall be provided to indicate position. The closed position contact shall be wired to the PLC to provide alarm indication any time the breaker is not closed (either tripped or manually opened). The station service and the electric boiler circuit breakers shall be mounted in the face of the switchgear and shall be provided with a protective guard.
 4. Variable Frequency Drives (VFD) shall be protected by a manually operated molded case circuit breaker as indicated on the project design drawings and as specified herein.
 5. Generator and feeder circuit breakers shall be provided as specified herein.
- J. Current Transformers. Instrument current transformers shall be specifically designed for installation in switchgear. The design shall coordinate the thermal, mechanical, and insulation limits of the current transformers with those of the breakers and bus of the switchgear in which they are to be installed. Current transformers shall be of the wound or window type, with silver-plated primary terminals. Insulation shall be suitable for 600 volt.
1. Current transformers for relay service shall be provided with a minimum C20 accuracy class with a rating factor of 2.0.
 2. Current transformers for totalizing and feeder meters shall be metering class with a minimum 0.3% accuracy and with a rating factor of 2.0.
 3. Current transformers for the station service meter shall be metering class with a minimum 0.3% accuracy.
 4. Current transformers identified as multi-ratio shall be provided in the ratios indicated and shall be provided with the accuracy specified at full distributed windings.
 5. The CT burden shall be suitable for the devices attached without saturating.
- K. Potential Transformers. Instrument rated potential transformer shall be provided in the quantity and ratio as indicated on the project design drawings.
1. All potential transformers shall have primary and secondary protection using circuit breakers as specified herein.
 2. All potential transformer grounds shall be made directly to switchgear ground bus.

- L. Protective Relays. Protective relays shall be provided with indicating lights and time delays as specified.
 - 1. Generator protection shall be provided by use of the GC as specified herein.
 - 2. Distribution feeder protection shall be provided by use of the FPR as specified herein.
 - 3. The Fabricator shall determine complete settings for the FPR and each GC provided as part of the switchgear. Submit proposed settings for review prior to witness testing.

2.8 GENSET CONTROL PACKAGE

- A. Genset Control Package (GC). Provide the following components to make up the GC.
 - 1. Genset Control Package (GC): EasYgen 3100XT back mounted controller without display, Woodward part number 8440-2081, no substitutes.
 - 2. EasYgen digital I/O expansion module, 8 inputs, 8 outputs. DIN rail mounting, 24V DC. Woodward part number 8440-2028, no substitutes.
 - 3. GC Interface Screen. Technologic Systems, Inc. catalog number TS-TPC-8900 or approved equal.
 - 4. 800 MHz ARM Cortex-A8 Macrocontroller with 256 MB RAM and 256 MB XNAND drive, RoHS. Technologic Systems, Inc. catalog number TS-4800-258-256XF or approved equal.
 - 5. DB9M-IDC-10 serial ports. Technologic Systems, Inc. catalog number RC-DB9 or approved equal.
- B. Additional items, components, or wiring that may be required for a complete and operational system as specified herein.
- C. Quantities as required to meet the intent and requirements of the Specifications.

2.9 GENERATOR AND DISTRIBUTION FEEDER CIRCUIT BREAKER

- A. Each generator shall be provided with an electrically operated stationary mount type circuit breaker. Circuit breakers shall be the Square D Masterpact NT, General Electric EntelliGuard G, Eaton Magnum DS, or approved equal.
- B. Circuit breakers shall be designed for continuous operation at 100% of the circuit breaker rating. Circuit breakers shall be suitable for power flow in either direction through the breaker.
- C. Minimum interrupting rating of breakers shall be 50,000 amperes symmetrical.
- D. Breakers shall be provided with a frame size as indicated on the drawings.
- E. Circuit breakers do not require a protective trip element as protection will be provided by the GC for the generator breakers and by the FPR for the distribution feeder breaker.
- F. The circuit breakers shall be provided with the following features:

1. Three-pole stationary mount.
2. Remote open/close.
3. Shunt trip.
4. 24V DC control voltage.
5. 120V AC spring charging motor for automatic recharging of the breaker stored energy mechanism. The stored energy mechanism shall be capable of an open-close open cycle without recharging.
6. Anti-pumping feature.
7. Manual spring charging mechanism.
8. Mechanical operation counter.
9. Auxiliary switch module.
10. Lockable push button cover.

2.10 PROGRAMMABLE LOGIC CONTROLLER

- A. Programmable Logic Controller. Allen-Bradley, CompactLogix 1769, no substitutes. Provide the following:
1. 24V DC power supply. Allen-Bradley 1769-PB4.
 2. CPU (1.5 Mb Memory, Ethernet). Allen-Bradley 1769-L33ER.
 3. Device Net Scanner. Allen-Bradley 1769-SDN.
 4. ModBus TCP/IP Communications Module. Pro-Soft MVI69E-MBTCP.
 5. Right End Cap/Terminator. 1769-ECR.
 6. Compact Blocks, 24V DC, as required which may include the following:
 - a. LDX I/O input base module 16 point, universal.
Allen-Bradley 1790D-T16BVO.
 - b. LDX I/O input expansion module 16 point, universal.
Allen-Bradley 1790D-T16BVOX.
 - c. LDX I/O output base module 16 point, sourcing.
Allen-Bradley 1790D-T0B16.
 - d. LDX I/O output expansion module 16 point, sourcing.
Allen-Bradley 1790D-T0B16X.
 - e. LDX I/O input/output base module 8 point in, 8 point out sourcing.
Allen-Bradley 1790-T8BV8B.
 - f. LDX I/O input/output expansion module 8 point in, 8 point out sourcing.
Allen-Bradley 1790-T8BV8BX.
 - g. LDX I/O output base module 16 point, sourcing.
Allen-Bradley 1790-T0B16X.

- h. LDX I/O analog input module, 4 channel, 4-20 mA DC.
Allen-Bradley 1790D-TN4C0.
 - i. LDX I/O RTD input module, 4 channel.
Allen-Bradley 1760D-T4R0
 - 7. Provide additional items as may be indicated on the project design drawings or required for the proper and complete operation of the system as specified.
- B. Cables, connectors, and interface devices required for a complete and operational system shall be provided.

2.11 OPERATOR INTERFACE UNIT

An operator interface unit (OIU) shall be provided and installed on the front of the switchgear enclosure as indicated on the project design drawings. The OIU shall be provided as follows:

- A. An integrated touch screen display computer with solid state drives shall be provided for the operator interface and have the following minimum requirements;
 - 1. 15" display with minimum of 1024 x 768 pixel resolution.
 - 2. LCD Color: 16.2M, Pixel Pitch (mm): 0.297 (H) x 0.297 (V).
 - 3. Projected Capacitive Touch.
 - 4. Intel Atom Processor E3845 Quad Core. 2 GB SO-DIMM DDR3L 1066/1333MHz memory, 40 GB SATA Solid State Hard Drive, Compact Flash Drive.
 - 5. 3 USB 2.0 Ports, 1 USB 3.0 port, 10/100M Ethernet Port, serial port.
 - 6. 24V DC power supply.
 - 7. Windows 10 Professional, 64 bit.
 - 8. Passive cooling without fan.
- B. Logic Supply CV-115C-P1001, or approved equal.

2.12 FEEDER PROTECTION RELAY

- A. Feeder protection relay (FPR) shall be Schweitzer Engineering Laboratories, Inc. model SEL-751A, no substitutes, with the following protection features. Fabricator shall develop the actual configuration part number to provide a relay that meets all requirements as follows.
 - 1. Under/over frequency.
 - 2. Under/over voltage.
 - 3. Instantaneous overcurrent (phase/neutral).
 - 4. Time overcurrent (phase/neutral).
 - 5. Residual instantaneous overcurrent.

6. Residual time overcurrent.
7. Neutral instantaneous overcurrent.
8. Neutral time overcurrent.
9. Synchronism check.
10. The FPR shall also be provided with the following additional features:
 - a. EIA-232 Rear, Single 10/100BASE-T Ethernet, Modbus TCP, IEC 61850.
 - b. 24V DC power supply and input.
 - c. DI/DO as required to meet the requirements of the specifications.
 - d. Three-phase voltage and current input. Five amp current.
 - e. Synchronism check element.
 - f. Metering to include the following:
 - Voltage, L-L and L-N.
 - Current; three phase and neutral.
 - Percent voltage imbalance.
 - Apparent power (kVA).
 - Real power (kW).
 - Reactive power (kVAR), positive or negative.
 - Power factor.
 - g. Other features that might be required to meet the intent of the specifications.

2.13 METERING EQUIPMENT

- A. Totalizing (Bus) and Station Service Meters. Class 10 current inputs, 120V AC input, 18-60V DC power supply. Provide with Ethernet communications port, panel mount remote display module, and cable. SHARK 200-60-10-V2-D-INP100S-20mAOS, or approved equal.
- B. Station Service Metering Unit. The station service metering unit shall be identical to the bus meter except without the optional 4-20mA I/O card. SHARK 200-60-10-V2-D-INP100S-X, or approved equal.
- C. Electric Boiler Metering Unit. The electric boiler metering unit shall be identical to the bus meter except without the optional 4-20mA I/O card. SHARK 200-60-10-V2-D-INP100S-X, or approved equal.
- D. Provide all cables, connectors, and other devices including CT shorting terminal blocks as required for a complete and operational metering system.

2.14 DATA STORAGE SERVER.

- A. An industrial fanless mini PC server shall be installed in the switchgear. The server shall be used for storage of historical and real time data from the PLC and Totalizing and Station Service Meters. The server shall have remote access capabilities via Ethernet for data retrieval, remote monitoring, and programming.
- B. The mini PC shall be as follows:
 - 1. Processor: Intel Celeron N2930, 1.83 GHz.
 - 2. Ram: 8 GB, DDR3L SO-DIMM (non-ECC).
 - 3. Hard drive: minimum 512 GB SATA 6.0 Gb/sec.
 - 4. Windows 10 Professional, 64 bit.
 - 5. Mounting as required.
 - 6. 24V DC power supply, Auto power on.
 - 7. Logic Supply ML100G-10, or approved equal.
- C. The Fabricator shall:
 - 1. Install the server in the master section.
 - 2. Furnish and install all cables and interface devices required for a complete and operational system plus any additional devices that may be required to meet the requirements as indicated on the project design drawings and elsewhere in this specification.
 - 3. Install all software required as part of this project on the server.

2.15 SOFTWARE INSTALLATION

- A. The Fabricator shall furnish the following software, no substitutes.
 - 1. AB Studio 5000 Mini Edition EN License (PLC programming software).
 - 2. Woodward Toolkit Easygen (GC configuration software).
 - 3. Schweitzer AcSELerator. (FPR software, latest version).
 - 4. SHARK metering software (latest version). Or software for metering equipment provided.
 - 5. Square D (SOMOVE). Or software for VFD provided.
 - 6. Any other devices installed in the switchgear that have custom software.
- B. The original licensed copy of each software package, including the SCADA system, shall be installed on the server. All licenses shall be in the name of the Alaska Energy Authority.
- C. Upon completion of testing, copies of files with all final program settings shall be archived on the server.

2.16 REMOTE ACCESS OF EQUIPMENT

- A. The server shall be provided with an Ethernet connection, which will allow the server to be accessed via high speed internet. The server will provide the primary means for remote monitoring of the system and data acquisition.
- B. The PLC shall be provided with an Ethernet connection which shall allow access via high speed internet. Remote access shall allow a technician in another location to modify and/or view all operational screens and all logic in the PLC.
- C. Provide communications connections as indicated on the project design drawings or required for the proper operation and control of the systems.

2.17 SYSTEM PROGRAMMING AND SCADA

- A. The Fabricator shall provide all programming for the PLC and GC as required to meet the requirements and intent of the specification.
- B. The Fabricator shall prepare a complete tag list of all of the input/output devices including, but not limited to, the PLC, GC, and all external devices. The Tag List shall be in the form of a spreadsheet. If additional I/O or tags are requested by the Authority the Fabricator shall provide that information. The tag list shall be used in the development of the SCADA system. A copy of the final tag list shall be included in the O&M Manual.
- C. The Fabricator shall install the SCADA software in the systems and shall use the SCADA system and programming during testing of the switchgear as specified herein.

2.18 CONTROL POWER

- A. Control power for the switchgear shall be 24V DC except where specifically noted as 120V AC. All meters and other components requiring auxiliary power to operate shall operate from the 24V DC control power source, unless otherwise specified. All control circuits shall be 24V DC.
- B. 24V DC Power – A complete 24V DC power supply with backup shall be provided as part of this switchgear and shall include all items described below plus any other components required for a complete system. The primary source shall be from a 120V AC to 24V DC power converter using 120V AC station service power. The secondary source shall be from a 24V-24V DC battery voltage converter using 24V DC power from the engine batteries as described below. The two power supplies shall be coordinated to automatically switch from the 120V AC source to the 24V DC source upon loss of AC power and automatically switch back when the AC power is restored. The system shall provide continuous power without interruption. The 24V DC control power system shall include the following features:
 - 1. One control power supply shall be installed in the master section. The control power supply shall be 120V AC primary input, 20 amp 24V DC output. Allen-Bradley 1606-XLS480E, or approved equal.
 - 2. One battery voltage converter shall be installed in the master section. The converter shall be 22-29V DC input, minimum 15 amp, 24V DC output.

The converter shall include capacitors to buffer power during engine crank cycles with a minimum capacity of 15A for 9 seconds. Siemens 6EP1933-2EC51, or approved equal.

3. Each generator battery supply shall enter in the respective cubicle. See the terminal strip detail on the project design drawings. A 20A circuit breaker shall be installed on the 24V DC battery power supply.
 4. The 24V outputs from each engine section shall be connected to the 24V input on the battery voltage converter in the master section through a power bridge rectifier, minimum 35A, rated, Powersem or approved equal. Provide multiple rectifiers as required for the quantity of inputs.
 5. The 24V DC power supply to each switchgear section (engines, master, and feeder/VFD) shall be isolated through a 15A circuit breaker in each respective section.
 6. Each major device or meter shall be individually protected by circuit breakers. Clearly mark each circuit breaker for the intended service.
- C. 120V AC Circuit Breaker Charging - Power for the generator and distribution feeder circuit breaker spring charging motor(s) shall be derived from a control power transformer connected to the main bus. Power for the generator circuit breaker spring charging motors shall be derived from a control power transformer connected on the generator side of the circuit breaker.
- D. 120V AC Control and Utility Power – Provide 2 sets of terminals for connection of incoming 120V AC power, 20A, single phase. One shall be for utility power and one for control power as indicated. The 120V AC system shall include:
1. Utility Power – One circuit shall provide power to all sections of the switchgear for convenience receptacles, lights, and ventilation fans as indicated and required for each section.
 2. Control Power - One circuit shall provide power to the UPS and to the 120V AC to 24V DC power converter. No other devices shall be connected to this circuit.
 3. UPS – The UPS shall be a packaged unit for installation on a standard 19” rack. It shall be complete with a sealed leak-proof maintenance free lead acid battery. It shall be 120V, 60Hz input and 120V, 60Hz, 2200VA output. APC SMX 2200RMLV2U, or approved equal.
 4. The UPS shall be installed on the rack in the master section. It shall be connected to provide 120V AC power to the data storage server and to the OIU.

2.19 GENERAL CONTROL SPECIFICATIONS

- A. The generator switchgear shall provide controls to automatically and manually connect and parallel all engine generator sets to the switchgear main bus. The PLC shall control the overall sequencing and starting and stopping of the engine-generators. The GC shall control all functions and features of the individual generator, both manual and automatic. The GC shall start, stop, synchronize, and

provide load sharing of the generator. Each GC shall communicate with adjacent Genset Controllers for load sharing information. If the communications bus is disabled, the GC shall be fully capable of operating the individual generator without the aid of the PLC. The GC shall be configured to control the voltage regulator through the voltage regulator auxiliary voltage bias input.

- B. The Fabricator shall review all project design drawings and information provided and shall incorporate all engine safety functions into the GC.
- C. Automatic Master Control at the generator switchgear shall be PLC based. Automatic start and demand control shall be performed by the PLC. An Operator Interface Unit (OIU) with touch screen shall be provided as the operator's interface to the PLC. The OIU shall modify demand control parameters and monitor the current demand system status.
- D. The generator voltage regulator and droop current transformer will be located at the generator. The GC shall be configured to control the voltage regulator through the voltage regulator auxiliary voltage bias input.

2.20 ENGINE FUNCTION MONITORING

- A. Through the GC, provide remote monitoring and control based on the following sensors and switches for each engine:
 - 1. J1939 CAN bus from engine ECU. Use for monitoring of engine speed, jacket water temperature, lubricating oil pressure and fuel flow rate.
 - 2. Exhaust Gas Temperature. Sensor shall be 2-wire RTD Type, 100 ohm, provided separately from the switchgear. Provide 4-20mA signal converter, INOR or approved equal.
 - 3. Oil Level Switch. A normally open switch, provided separately from the switchgear, will close when the oil level drops below or rises above a pre-determined level.
 - 4. Air Filter Vacuum Sensor. Sensor shall be 2-wire, 4-20mA, -408" H2O to 0 PSIG range, provided separately from the switchgear. Power supply for the transmitter shall be provided from the GC power supply.
 - 5. Log and maintain run time on the engine. Time shall be expressed in hours and minutes.
 - 6. Through the PLC and the OIU, provide monitoring and display of the temperatures and alarms.

2.21 AMBIENT AIR TEMPERATURE MONITORING

Through the PLC and the OIU, provide monitoring and display of ambient temperatures.

- A. Provide three ambient air temperature sensors, one for outside air temperature, one for inside air temperature, and one for VFD cubicle temperature.
- B. Sensors shall be moderate temperature range, 2-wire, platinum RTD, 100 ohms +/- 0.15%, @ 0°C tolerance. Pyrocom RLB73203E10S, or approved equal.

- C. Furnish outside air and inside air temperature sensors loose for field installation. Fabricator shall install VFD temperature sensor inside VFD cubicle.

2.22 FUEL SYSTEM MONITORING

- A. Through the PLC, provide remote monitoring and control of the following sensors and switches (quantity as indicated):
 - 1. Plant Total Fuel Consumption (one only). A pulser in the day tank supply meter, provided separately from the switchgear, will provide one pulse per each gallon of fuel. The PLC shall calculate the total plant fuel consumption.
 - 2. Plant Fuel Efficiency – At the end of each day tank fill cycle the PLC shall calculate the overall plant fuel efficiency (kW-h/gallon) by dividing the total kW-h generated since the end of the last fill cycle (from bus power meter) by the gallons of fuel pumped into the day tank during the latest fill cycle.
 - 3. Low Fuel Level Alarm (one only). A normally closed contact on the day tank control panel will open when the fuel level in the day tank drops below a preset level.
 - 4. Generator Fuel Consumption. The PLC shall read the instantaneous fuel flow rate (gallons per hour) and the total fuel consumption (gallons) for each engine from the engine ECU via J1939.

2.23 ENGINE COOLANT SYSTEM MONITORING

- A. Through the PLC, provide remote monitoring and control of the following sensors and switches (quantity as indicated):
 - 1. Low Coolant Alarm (one only). A normally closed switch in the coolant piping, provided separately from the switchgear, will open when the coolant drops below a preset level.
 - 2. Engine Coolant Level (one only). Sensor shall be 2-wire, 4-20 mA, 0-100% range, provided separately from the switchgear. Power supply for the transmitter shall be provided from the switchgear 24V DC power supply.
 - 3. Engine Coolant Return Temperature (one only). Sensor shall be 2-wire, 4-20 mA, 20-240F range, provided separately from the switchgear. Power supply for the transmitter shall be provided from the switchgear 24V DC power supply.

2.24 HEAT RECOVERY MONITORING

- A. Through the PLC and the OIU, provide monitoring and display of the following inputs:
 - 1. Heat Recovery Supply Temperature. Sensor shall be 2-wire, 4-20 mA, 20-240F range, provided separately from the switchgear. Power supply for the transmitter shall be provided from the switchgear 24V DC power supply.

2. Heat Recovery Return Temperature. Sensor shall be 2-wire platinum RTD, 4-20 mA, 20-240F range, provided separately from the switchgear. Power supply for the transmitter shall be provided from the switchgear 24V DC power supply.
 3. Heat Recovery Pressure. Sensor shall be 2-wire, 4-20mA, 0 to 60 PSIG range, provided separately from the switchgear. Power supply for the transmitter shall be provided from the switchgear 24V DC power supply.
 4. Heat Recovery Flow Rate. A remote flow meter shall provide a 4-20mA signal with 4mA equal to 0 GPM and 20mA equal to 100 GPM.
- B. Through the PLC and the OIU, provide the following alarms and calculations:
1. Heat Recovery No Load Warning. When the heat recovery return temperature is greater than the heat recovery supply temperature for a minimum of 1 hour, an amber lamp "NO LOAD ON HEAT RECOVERY" shall illuminate. When the heat recovery supply temperature is a minimum of 1 degree Fahrenheit greater than the heat recovery return temperature the lamp shall turn off. If either the supply temperature or the return temperature signal is lost, the system shall provide a message on the OIU to read "HEAT RECOVERY SUPPLY TEMPERATURE SIGNAL LOST" or "HEAT RECOVERY RETURN TEMPERATURE SIGNAL LOST".
 2. Heat Recovery Loss of Pressure Alarm. When the heat recovery system pressure drops below 15 PSIG for a minimum of 15 minutes, a red lamp "HEAT RECOVERY LOSS OF PRESSURE" shall illuminate. When the pressure rises above 18 PSIG the lamp shall turn off.
 3. Heat Recovery Loss of Flow Alarm. When the heat recovery system flow rate drops below 10 GPM for a minimum of 15 minutes, a red lamp "HEAT RECOVERY LOSS OF FLOW" shall illuminate. When the flow rate rises above 15 GPM the lamp shall turn off.
 4. Recovered Heat Output. The PLC shall calculate the instantaneous rate of energy delivered based on the supply temperature, return temperature, and flow rate. A specific heat of 450 BTUH/GPM-F shall be used for the fluid.
 5. Total Recovered Heat Delivered. The PLC shall calculate the total energy delivered. The value shall be displayed for every 100,000 BTU of heat delivered with no decimal places.
 6. Engine Coolant Return High Temperature Alarm. When the engine coolant return temperature rises above 190°F for a minimum of 2 minutes, a red lamp "HIGH COOLANT RETURN TEMPERATURE" shall illuminate. Lamp shall remain on until master reset button is pressed.
 7. History. The PLC shall maintain a running total of energy delivered.

Note that all heat recovery alarms shall be tied to the dead bus signal to prevent alarm indication when the power system is off-line.

2.25 ENGINE/GENERATOR CONTROL SECTION.

The following components shall be supplied for each generator section to allow automatic or manual operation and control of the generators. Note that some components have been previously specified.

- A. Genset Control (GC) as previously specified. The GC shall perform the cranking and disconnecting of the starter using feedback from the magnetic pickup, located on the engine, and shall power the engine speed control module. The engine speed shall be controlled using 0.25-4.75V DC signal connected to the engine ECU. Time delays shall be incorporated in the PLC that shall be able to be adjusted through the OIU as required. Use relays and PLC logic for automatic start/stop. Use discrete outputs on the GC for safety shut downs and annunciation through the PLC via device net blocks. The GC shall also perform automatic paralleling, load sensing, generator breaker control, generator protection, and automatic synchronization.
- B. GC Interface Screen as previously specified. The GC Interface Screen shall provide display of engine and generator data from the GC using the SCADA program as specified herein and in the SCADA specification.
- C. GC Interface Controls. The GC Interface Controls shall provide manual control over the GC modes and functions. Provide pushbuttons, lighted pushbuttons, and lighted switches as indicated on the project design drawings. Allen Bradley Series 800, Eaton Series 10250, or approved equal. Provide auxiliary contact blocks as required to perform the required functions.
- D. Gen Lockout Switch. Key operated RUN/OFF switch mounted in GC Interface Controls, Allen Bradley Series 800, Eaton Series 10250, or approved equal. When in the OFF position the switch shall disable the GC and prevent engine starting. All switches for the entire project shall utilize a common key. Provide two keys for each engine section.
- E. Annunciation LED's, mount near top of cabinet, left to right:

Top Row

- 1. Engine Running (green).
- 2. Alarm/Lockout (red).
- 3. Low Oil Pressure (red).
- 4. Oil Level (red).
- 5. High Coolant Temperature (red).
- 6. Over Speed (red).
- 7. Over Crank (red).
- 8. Running Timeout (red).
- 9. Battery Charger Failure (red).
- 10. Air Filter Plugged (red)
- 11. High Exhaust Temp (red).
- 12. Spare (red).

Second Row

13. Lead Engine (green). Note that this is only for units with two or more identical size engines. For single-size engines this will be a spare.
14. Normal Stop (amber).
15. Not in Auto (red).
16. Generator Breaker Trip (red).
17. Fail to Synchronize (red).
18. Over Current (red).
19. Under Voltage (red).
20. Over Voltage (red).
21. Under Frequency (red).
22. Over Frequency (red).
23. Reverse Power (red).
24. Spare (red).

For sections that do not require a specific lamp provide spare lamp with blank nameplate.

Configure the system so that pressing the ALARM RESET button on the GC interface clears all alarms.

- F. Potential Transformers, quantity and ratio as indicated on the project design drawings.
- G. Control power transformer for spring charging motor, size as indicated on the project design drawings.
- H. Current Transformers for relaying, quantity and size as indicated on project design drawings. Provide with shorting terminal blocks.
- I. 24V DC 15A circuit breaker for control power.
- J. LED panel illumination kit, complete with door switch. Hoffman LED24V15, or approved equal.
- K. Terminal Blocks, Relays, Timers, Bases.
- L. Generator Circuit Breaker as previously specified.
- M. Generator breaker Status Annunciation LEDs (mount immediately above generator breaker control switch):
 1. Breaker Closed (red).
 2. Breaker Open (green).

2.26 MASTER SECTION

The load demand system shall be controlled by a programmable logic controller, with operator interface unit, providing operator access to the demand system and shall display the demand system operating status. The following components shall be supplied for the master section. Note that some components may have been previously specified.

- A. Totalizing Meter as previously specified.
- B. Station Service Meter as previously specified.

- C. Electric Boiler Meter as previously specified.
- D. Operator Interface Unit as previously specified.
- E. Master Control Switch, Electroschick, 24201C or approved equal. Configure for two position operation, AUTO / MAN ISOCH.
- F. Emergency Stop Button, maintained pushbutton with guard.
- G. Dead bus relay. IDEC RR3BUL-AC120V with SR3B-05 base, or approved equal.
- H. PLC as previously specified.
- I. Current Transformers for generators, feeders, and totalizing and station service meters, quantity and size as indicated on the project design drawings. Provide with shorting terminal blocks.
- J. Potential Transformers, quantity and ratio as indicated on the project design drawings.
- K. Terminal Blocks, Relays, Timers, Bases.
- L. Control Power Supply, 120V AC / 24V DC as previously specified.
- M. Battery Voltage Converter as previously specified.
- N. UPS/Server Rack – One standard 4-post rack, 19” wide for installation of the UPS and the data storage server.
- O. Uninterrupted Power System (UPS) as previously specified.
- P. Data Storage Server as previously specified.
- Q. Net burner, quantity two. Configured to support RS-232, RS-422, and RS-485 with power two pin terminal connector. NetBurner SB800EX-TDD-IR or approved equal with DIN 200 mounting bracket.
- R. One 15-amp circuit breaker for the switchgear AC power to the lights, and receptacle. Power supply shall be from the station service power. Provide terminals for external power connection.
- S. Convenience outlet: 120 volt duplex receptacle, din rail mount, 15 ampere rating, GFI. Phoenix Contact 5600639, or approved equal.
- T. LED panel illumination kit, complete with door switch. Hoffman LED24V15, or approved equal.
- U. Provide a single RESET push button that manually resets all master section alarms.
- V. Provide a single LAMP TEST push button that tests all annunciation LEDs simultaneously. Note that this includes all master and generator section lamps but does not include VFD lamps.
- W. Master annunciation LED's, mount near top of cabinet, left to right:

Top Row

1. Fire Alarm (red).
2. Emergency Stop (red).
3. Low Coolant Level (red).
4. Fuel Level (red).
5. PLC Failure (red).
6. System Not In Auto (amber).
7. Station Service Breaker Open (red).
8. VFD Main Breaker Open (red).
9. Feeder Breaker Trip (red).
10. Feeder Fail To Close (red).

Second Row

11. Electric Boiler Breaker Open (red).
12. Electric Boiler Low Flow Alarm (red).
13. Electric Boiler High Temperature Alarm (red).
14. No Load On Heat Recovery (amber).
15. Heat Recovery Loss Of Pressure (amber).
16. Heat Recovery Loss Of Flow (amber).
17. High Coolant Return Temp (red).
18. Spare (red).
19. Spare (red).
20. Spare (red).

X. Communications interfaces shall include the following devices and shall be connected as indicated on the project design drawings for the respective community, quantity as indicated.

1. Provide a minimum of 2 each industrial switches, 16 port Ethernet, 10/100 MBPS, 24V DC. N-Tron 116TX or approved equal.

All equipment shall be connected as indicated and shall provide seamless communication between the devices, PLC, and the Ethernet connection.

Y. Spare Input/Output

1. Input: Provide a minimum of 2 spare PLC discreet input pairs wired to terminal blocks.
2. Output: Provide a minimum of 2 spare two-pole relays wired to terminal blocks and controlled by PLC.

2.27 DISTRIBUTION FEEDER SECTION

The distribution feeder section of the switchgear shall be located as indicated by the enclosure layout detail on the project design drawings. The following components shall be supplied for the feeder section. Note that some components may have been previously specified.

- A. Feeder protection relay as previously specified.
- B. Station Service Circuit Breaker, manually operated, with auxiliary contact, sized as indicated on the project design drawings.

- C. Electric Boiler Circuit Breaker, manually operated, with auxiliary contact, sized as indicated on the project design drawings.
- D. Feeder Circuit Breaker as previously specified.
- E. Feeder breaker manual control switch, open/close spring return to center, Electroswitch or approved equal.
- F. Feeder breaker Status LED indicating lights (mount immediately above feeder breaker control switch):
Feeder Breaker Open (green).
Feeder Breaker Closed (red).
- G. Control power transformer for spring charging motor, size as indicated on the project design drawings.
- H. Current Transformers for relaying and metering, quantity and size as indicated on project design drawings. Provide with shorting terminal blocks.
- I. 24V DC 15A circuit breaker for control power.
- J. LED panel illumination kit, complete with door switch. Hoffman LED24V15, or approved equal.

2.28 VARIABLE FREQUENCY DRIVES

The variable frequency drives (VFD) shall be located above the feeder breaker enclosure as indicated on the project design drawings. Requirements for the VFD's shall be as follows.

- A. Provide the following equipment:
 - 1. Main circuit breaker, manually operated molded case circuit breaker, 15A, 3 pole, Allen Bradley 1489-A3D150, or approved equal. Furnish with auxiliary contacts and shunt trip. Auxiliary contacts shall be provided to indicate position. The closed position contact shall be wired to the PLC to provide alarm indication any time the breaker is not closed (either tripped or manually opened). The shunt trip shall be wired to the overload in the VFD.
 - 2. A three-position selector switch to select between VFD, Bypass, and Off operating modes. The switch shall be rated for occasional switching of motors of the size and voltage indicated, Salzer Part # H216-71322-013V1 or approved equal. Furnish with a minimum of 2 each auxiliary contacts.
 - 3. Nameplate on the door above the indicator lights identifying the VFD for Radiator No. 1, etc.
 - 4. LED indicating lights, left to right.
 - Top Row
 - a. VFD Mode (green).
 - b. VFD Running (green).
 - c. Bypass Mode – (amber).

Second Row

- d. VFD Fault (red).
 - e. VFD Breaker Open (red).
 - f. Spare (amber).
5. Cooling fan, with filter and grille, sized to keep the VFD operating within its temperature limitations based on a 100° F ambient temperature. When more than one VFD is installed in a common enclosure install a minimum of two fans. Mount fan(s) at top or bottom of enclosure and provide an exhaust grille in the opposite location, on the front of the enclosure. Fan(s) shall run continuously.
 6. Provide a single control wiring harness for control from the master section. Provide a single cable connection for VFD power from the bus through the VFD main circuit breaker.
 7. LED panel illumination kit, complete with door switch. Hoffman LED24V15, or equal.
 8. Terminal blocks shall be installed in a single location near the top of the VFD enclosure for field connection of all external control and power wiring for all VFD's. Use shielded wiring or separate routing for conductors on the load side of all VFD's as previously specified.
 9. Variable frequency drive: Provide a Square D Altivar ATV320U40N4B, or approved equal, complete with the following features and accessories:
 - a. UL listed.
 - b. Sized for continuous operation of 5 hp motor. Where smaller size motors are indicated use the same VFD. Adjust settings for motor provided.
 - c. Ramp regulation, flying start, and step logic.
 - d. Built-in PID control using 4-20 mA signal as the control variable.
 - e. Sensorless vector slip compensation.
 - f. Motor protection including overload protection, short circuit protection, ground fault protection, and under & over voltage protection.
 - g. 1:100 speed range.
 - h. RS-485, ModBus protocol.
 - i. 4-20 mA analog input.
 - j. Four assignable logic inputs.
 - k. Two relay logic outputs.
 - l. Remote Graphic Display Terminal, Square D VW3A1101, or approved equal.

- m. Remote Graphic Display Mounting Kit, Square D VW3A1102, or approved equal.
 - n. Modbus TCP/IP Ethernet communications card, Square D VW3A3316, or approved equal.
 - o. Cables and connectors as required.
- 10. Contactor for normal run operation. Provide isolation contactor on the load side of the VFD, Allen-Bradley model 100-C23ZJ10, or approved equal, with one normally open auxiliary contact.
- 11. Adjustable solid-state overload relay, 480-volt, 3-phase, adjustable range. Allen-Bradley model 193, or approved equal, complete with din rail adapter. For motor sizes 2 HP and smaller provide 1.0-5.0A trip range. For motor sizes 3 HP and 5 HP provide 3.2-16A trip range.
- B. For radiator control, the 24V DC power supply to drive the temperature sensors shall be provided from the switchgear 24V DC control power.
- C. Sequence of Operation - General. Each variable frequency drive shall operate as follows:
 - 1. When the VFD main circuit breaker is closed and the selector switch is in either the "VFD" or "BYPASS" position, power shall be provided to all control devices. Time delay shall be incorporated into the fault alarm such that there is no alarm due to initial powering up of the VFD.
 - 2. When the VFD main circuit breaker is open, the red "VFD Breaker Open" lamp shall illuminate and remote indication shall be provided to the PLC.
 - 3. When the 3-position selector switch is in the "OFF" position, the motor will not operate and power to all control devices will be off.
 - 4. When the 3-position selector switch is in the "Bypass" position, the motor shall operate at full speed and the "Bypass Mode" light shall be on. The VFD will not be in service and the contactor will be open. Provide remote indication that the VFD is in bypass mode from an auxiliary contact as indicated.
 - 5. When the 3-position selector switch is in the "VFD" position, the motor shall operate under control of the VFD and the "VFD Mode" light shall be on. Upon receipt of a run signal the contactor shall close, the motor shall operate, and the "VFD Running" light shall be on.
 - 6. Upon a fault of the VFD the red "VFD Fault" lamp shall illuminate and remote indication shall be provided to the PLC. After a pre-set time delay, 30 seconds, adjustable and a fault alarm shall be indicated on the associated GC. Placing the selector switch in the "OFF" position shall clear the fault alarm indication.
 - 7. Upon activation of the thermal overload, the VFD main circuit breaker shall trip, the red "VFD Breaker Open" lamp shall illuminate and remote indication shall be provided to the PLC.

- D. Sequence of Operation for Radiator. Each variable frequency drive for glycol coolant radiators shall operate as follows:
1. The remote temperature sensor will sense Coolant Return Temperature and send a 4-20mA signal to the VFD where 20°F equals 4 mA and 240°F equals 20 mA. The operating temperature setpoints shall be adjustable through the OIU and scaled to display in °F.
 2. When the Coolant Return Temperature reaches the Wake Up setpoint the motor will start at minimum speed and ramp up to the required speed.
 3. Using its internal PID control, the VFD will modulate the fan speed as required to maintain Coolant Return Temperature at the PID Reference Temperature setpoint. As the Coolant Return Temperature rises, the VFD will increase the speed of the fan motor up to 100%. Once the fan reaches the Minimum Speed, the VFD will maintain that speed until the Low Speed Time Out expires.
 4. When the Low Speed Time Out expires the motor will stop. The motor will remain off until the Coolant Return Temperature rises to the Wake Up setpoint.
 5. The OIU shall be configured to display the fan speed in percentage and to display the PID Reference Temperature, Wake Up Temperature, and Coolant Return Temperature in °F.
 6. The operating settings shall be set to the following values and shall be adjustable:
 - a. 70°F = PID Reference Temperature
 - b. 160°F = Wake Up Temperature
 - c. 0.93 = Proportional Gain
 - d. 0.3 = Integral Gain
 - e. 0 = Derivative
 - f. 6 Hz = Minimum Speed
 - g. 60 Sec = Low Speed Time Out

2.29 GENERATION SEQUENCE OF OPERATION.

- A. A complete and successfully operating system shall be provided for starting, stopping, and paralleling, both automatically and manually, all generator units. A total of three generator units shall be provided as indicated on the project design drawings. The following paragraphs describe the basic functional requirements of the system. The Fabricator shall be responsible for the detailed design to provide a safe and satisfactorily functioning system.

- B. Control system arrangement shall be such that the PLC provides control of the load sensing, automatic start and stop of each unit, and status. Actual synchronization, governor control, generator protection, load share, and voltage compensation shall be provided by devices exterior to the PLC. Failure of the automatic control system shall not prevent the manual operation of the system to start, stop, or synchronize any one, or all, of the generating units.
- C. Upon activation of the dead bus relay the feeder breaker shall open. This function shall be independent of the PLC and shall operate in all modes.
- D. Automatic Operating Conditions.
 - 1. With the Master Control selector switch in the "Auto" position and each GC in "Auto" mode, the following sequences of operation shall be performed:
 - a. Dead-Bus Startup: All available generating units will start and come up to rated speed. The first unit to stabilize will close to the dead bus. The remaining units shall auto-synchronize to that unit and close to the bus. After a time delay of 15 seconds, the PLC shall close the feeder breaker and energize the feeder. If available, a minimum of two units shall be running and synchronized prior to energizing the feeder. If only one generator is available for operation, the PLC shall use that unit to energize the feeder.
 - b. With all units operating and all GC's in "AUTO" mode, the PLC shall monitor load on the bus and determine which unit best fits the demand load. The PLC shall then send a signal to the GC to unload and shut down any unit not needed to meet the load.
 - c. If the load exceeds a preset percentage of the prime power rating of a unit, as specified herein, the PLC shall send a signal to the GC to automatically start, synchronize, and connect to the bus another unit. The predetermined demand level set points in the PLC shall determine which unit should be placed on line. If that unit is not available, the PLC shall automatically switch to another unit. The PLC shall continue to monitor load and send a command signal to the appropriate GC to start, synchronize, unload, and stop units as required, to match the appropriate unit to the load.
 - d. Where multiple generators of the same capacity are being utilized provide lead/lag control.
 - e. If any unit GC is not in "AUTO" mode, the PLC shall skip that unit and switch to the next available unit. Any time a unit's GC is switched from "STOP" to "AUTO" mode, the PLC shall compare the unit with the operating unit and load to determine which unit is more appropriate for the load. If the new unit is more appropriate, the PLC shall send a command signal to the GC to start, synchronize, and connect the unit to the bus and unload and shut down the other.

- f. If one unit is operating and is dropped from the bus, for any reason, the PLC shall send a command signal to the GC's to automatically start all remaining available units and perform a dead bus start up sequence as previously specified. The entire startup and synchronization sequence shall not exceed 10 seconds. After the bus is stabilized, the PLC shall resume normal demand level control operation and send a command signal to the GC's to shut down units not required to carry the load.
 - g. If two units are operating and one of the units is dropped from the bus for any reason, the PLC shall check the raise level and overload level of the unit operating. If the system demand exceeds the raise level of the operating unit, the PLC shall send a command signal to the GC to start the next unit and place it in service after the raise level time delay times out. If the system demand exceeds the overload level of the operating unit, the PLC shall immediately send a command signal to the GC to start the next unit required for the automatic demand system and place it in service as soon as possible.
 - h. The GC shall provide a programmable cool down period for each unit prior to engine shut down. Each unit shall operate at idle for 3 minutes, and then automatically stop the engine.
 - i. If the GC of an operating unit is switched to "MAN" mode, the PLC shall send a command signal to the GC to start another unit, as specified above, before removing from the bus and shutting down the unit. Once another unit has been connected to the bus, the GC will shed the load to the other unit, open the breaker, and shut off the engine after a cool-down period.
 - j. If the GC of an operating unit is switched to "STOP" mode, the GC will check to see if any other generators are on line. If there is another unit on-line, the GC will shed the load to the other unit, open the breaker, and shut off the engine after a cool-down period. If there is no other unit on-line, the breaker will open and the engine will shut off after a cool-down period.
 - k. Upon shut down of a unit, all parameters shall be reset, if required, to allow the unit to be operated again, either manually or automatically, without further reset action.
2. If the Master Control Switch is switched from the "AUTO" position to the "MAN ISOCH" position while units are operating in automatic mode, the system shall continue to operate in the present state. If the master selector switch is moved back to the "AUTO" position, the PLC shall revert back to operation in the automatic demand mode.

3. Demand Control: The automatic Demand Control System shall provide 1 level of unit stopping control and 2 levels of starting control. The 2nd level of starting control is considered the “overload level”. Each level shall have a kW and timing preset. The “raise level” and “lower level” shall be used by the demand control system as the point at which the level change timing preset begins. The timing preset is the time that the kW load is above a “raise level” or below a “lower level” set point, before the demand level changes. The Demand Control System shall have multiple demand levels. The highest demand level will command all units to start and go on-line.

Clark’s Point Demand Table for load share function:

Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#2 or #3	65	55	---
Level 2	#1	150	130	45
Level 3	#1 & #2 or #3	215	180	110
Level 4	All	280	---	150
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease

Note: Generator #2 and #3 are equal capacity and the operator must select the lead unit using the OIU. If the lead unit faults or fails to start, the Demand Control shall automatically select the other unit.

Port Heiden Demand Table for load share function:

Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#3	100	90	---
Level 2	#1 or #2	210	190	80
Level 3	#1 or #2 & #3	310	280	170
Level 4	#1 & #2	420	380	250
Level 5	All	520	---	330

Note: Generator #1 and #2 are equal capacity and the operator must select the lead unit using the OIU. If the lead unit faults or fails to start, the Demand Control shall automatically select the other unit.

- E. Manual Operating Conditions If the Master Control Switch is in the "MAN ISOCH" position each generator GC shall control the respective generator in isochronous mode. The GC must be placed in MAN mode to start, stop, and control the generator. All functions shall be manually executed through the GC. If multiple generators are placed on line the GC's shall proportionally share load.
- F. Engine and Generation Alarm Conditions and Sequences. Note that these apply to both Auto and Manual operation.
1. Provide the following types of alarm sequences for each condition listed below:
 - a. Type 1 (Engine Alarm Soft Shutdown):

Upon alarm condition bring another generator on line, unload the first generator, open the circuit breaker, run through a cool down cycle, shut down engine, and illuminate "Alarm/Lockout" light and associated alarm annunciation light. Alarm light shall remain illuminated until the problem is corrected and the GC is manually reset. Note that this a Class B Easygen alarm with PLC assist to first start another generator and then take the first off line.
 - b. Type 2 (Engine Alarm Hard Shutdown):

Upon alarm, immediately open the circuit breaker and shut down without going through a cool down cycle. Illuminate "Alarm/Lockout" light and associated alarm annunciation light. Unit shall be locked out and alarm light shall remain illuminated until the problem is corrected and the GC is manually reset. Note that this a Class F Easygen alarm.
 - c. Type 3 (Generation Alarm):

Upon alarm, immediately open the circuit breaker, disable the voltage regulator, run engine through a cool down cycle, shut down engine, and illuminate "Alarm/Lockout" light and associated alarm annunciation light. Unit shall be locked out and alarm light shall remain illuminated until the problem is corrected and the GC is manually reset. Note that this a Class D Easygen alarm.
 2. For the following engine/generator alarm conditions perform the sequence indicated and illuminate the associated alarm light:
 - a. Low Oil Pressure - Provide a Type 1 shut down when the oil pressure drops to the pre-alarm level of 14.5 psig, adjustable, and stays below that level for 5 seconds, or if the signal is lost to the pressure transducer. Provide a Type 2 shutdown when the oil pressure drops to the alarm level of 10 psig, adjustable.
 - b. Oil Level - Provide a Type 1 shut down when the oil level switch closes.

- c. High Coolant Temperature - Provide a Type 1 shut down when the jacket water temperature reaches the pre-alarm level of 210°F, adjustable, and stays above that level for 30 seconds or if the signal is lost to the temperature transducer. Provide a Type 2 shutdown when the jacket water temperature reaches the alarm level of 215°F, adjustable.
- d. Over Speed - Provide a Type 2 shutdown on overspeed.
- e. Over Crank - If a unit fails to start after the over crank time delay has expired lock it out.
- f. Running Timeout - If the engine runs without being placed on line for 5 minutes, adjustable, shut down the engine and lock it out.
- g. Battery Charger Failure - If an alarm is received from the battery charger, illuminate the appropriate alarm light. Do not shut down or lock out the unit.
- h. Air Filter Plugged - Provide a Type 1 shut down when the vacuum on the air filter exceeds the pre-alarm level of 15" H2O, adjustable, and stays above that level for 60 seconds or if the vacuum signal is lost. Provide a Type 2 shut down when the vacuum on the air filter exceeds the alarm level of 20" H2O.
- i. High Exhaust Temperature - Provide a Type 1 shut down when the exhaust temperature exceeds the pre-alarm level of 1000°F, adjustable, and stays above that level for 30 seconds or if the temperature signal is lost. Provide a Type 2 shutdown when the exhaust temperature exceeds the alarm level of 1050°F, adjustable.
- j. Fail to Synchronize - Provide a Type 3 shutdown if a unit fails to synchronize after a preset time delay.
- k. Over Current - Provide a Type 3 shutdown on operation of an overcurrent element.
- l. Under Voltage - Provide a Type 3 shutdown on operation of an under voltage element, 90% of nominal voltage.
- m. Over Voltage - Provide a Type 3 shutdown on operation of an over voltage element, 110% of nominal voltage.
- n. Under Frequency - Provide a Type 3 shutdown on operation of an under frequency element, 58.2 Hz.
- o. Over Frequency - Provide a Type 3 shutdown on operation of an over frequency element, 61.8 Hz.
- p. Reverse Power - Provide a Type 3 shutdown on operation of a reverse power element, 10%.

3. For the following system alarm conditions perform the sequence indicated and illuminate the associated alarm light:
 - a. Fire Alarm - Upon receipt of a contact closure from the fire suppression system, all engines shall be shut down without going through a cool down sequence. The system shall remain in a lockout condition and no units shall be started either manually or automatically until the alarm is cleared.
 - b. Emergency Stop - Upon receipt of a contact closure from the Emergency Stop Pushbutton, all engines shall be shut down without going through a cool down sequence. The system shall remain in a lockout condition and no units shall be started either manually or automatically until the alarm is cleared.
 - c. Low Coolant Level – Opening of the low coolant alarm contact on the system low coolant level switch, all engines shall be shut down without going through a cool down sequence. The system shall remain in a lockout condition and no units shall be started either manually or automatically until the alarm is cleared.
 - d. Low Fuel Level - Opening of the low fuel alarm contact on the day tank control panel (separate external panel) indicates a low fuel level condition. The low fuel level indication shall start a time delay relay, 2 hours, adjustable, and illuminate the alarm lamp. If the fuel level has not been corrected by the end of the timed interval all engines shall go through a Type 1 shutdown and the alarm lamp shall remain illuminated. The manual alarm reset button on the front of the switchgear master section will reset the timer relay for another interval and place the engines back in service if timed out. The reset function shall work any time during or after expiration of the timed interval.
 - e. PLC Failure - Upon failure of the PLC the alarm light shall remain illuminated until the PLC is back in acceptable service.
 - f. System Not In Auto – When the Master Control Switch (MCS) is changed from Auto to Manual the alarm lamp shall illuminate. The alarm lamp shall remain illuminated until the MCS is switched back to Auto.
 - g. Station Service Breaker Trip - Operation of any overcurrent element in the station service breaker trip unit shall immediately trip the circuit breaker.
 - h. Station Service Breaker Open – Any time the station service circuit breaker is open (trip or manually opened) the alarm lamp shall illuminate.
 - i. VFD Main Breaker Trip - Operation of any overcurrent element in the station service breaker trip unit shall immediately trip the circuit breaker.

- j. VFD Main Breaker Open – Any time the station service circuit breaker is open (trip or manually opened) the alarm lamp shall illuminate.
- k. Feeder Breaker Trip - Operation of the trip contact on the feeder breaker trip unit shall immediately trip the feeder circuit breaker, see Feeder Breaker Sequence below. On systems with more than one feeder breaker provide identical trip function for each.
- l. Feeder Breaker Fail to Close – Any time the feeder breaker does not close upon a command to close (after a preset time delay) the alarm lamp shall illuminate. On systems with more than one feeder breaker provide alarm annunciation for each.

2.30 FEEDER BREAKER SEQUENCE OF OPERATION

- A. Automatic Operation - When the Master Control selector switch is in the “AUTO” position the feeder breaker shall operate under control of the PLC. The feeder breaker can be opened at any time by rotating the breaker control knob to the OPEN position. The PLC shall then perform a dead bus start sequence (start all available generators) and re-close the breaker(s) after the pre-set time delay.
- B. Manual Operation - When the Master Control selector switch is in the “MAN ISOCH” position and the bus is energized, the feeder breaker will operate under manual control. The feeder breaker shall close when the control knob is rotated to the CLOSE position and open when the control knob is rotated to the OPEN position.
- C. Trip Function – The trip output contact on the FPR shall be directly connected to the circuit breaker trip coil without any interposing relay. The FPR shall be programmed to trip the breaker for the following conditions:
 - 1. Instantaneous overcurrent (phase/neutral).
 - 2. Time overcurrent (phase/neutral).
 - 3. Residual instantaneous overcurrent.
 - 4. Residual time overcurrent.
 - 5. Neutral instantaneous overcurrent.
 - 6. Neutral time overcurrent.

2.31 BOILER SEQUENCE OF OPERATION

- A. The electric boiler is a 480V, 3-phase, 24 kW capacity industrial clean water heater as indicated on the Mechanical Equipment Schedules. It is installed in the power plant to maintain power stability during periods of low community electric load combined with high wind power output. The boiler is connected to the switchgear 480V bus through a circuit breaker and a Silicone Controlled Rectifier (SCR) Panel. The SCR panel contains a disconnect switch and safety relays. The boiler only operates when required and the SCR modulates the load on the boiler to ensure adequate minimum load is maintained on the diesel generator to keep system voltage and frequency stable.

- B. Control of the remote wind generators will be provided by others and is not part of this contract. The wind generation control system will provide a signal to the switchgear via a wireless link that will indicate when the wind generators are on (supplying power to the grid).
- C. The electric boiler SCR shall run under supervisory control of the switchgear. An electric boiler control algorithm shall be installed in the switchgear PLC to ensure proper integration of the wind power with the diesel generation. The switchgear PLC shall authorize the electric boiler to operate only when the wind generators are on. Using a PID loop, the PLC shall modulate the load on the electric boiler through a 4-20mA signal to maintain minimum load on the diesel generator, 10kW, adjustable. All control functions shall be monitored and the system settings shall be capable of being changed through the switchgear OIU.
- D. The following safeties shall be provided.
 - 1. A high temperature cutout switch in the boiler.
 - 2. A loss of flow (differential pressure) switch in the boiler supply piping.
 - 3. The alarms shall be wired into relays in the SCR panel as indicated on the project design drawings. Activation of either switch shall immediately shut down the SCR, turn on the associated alarm light, and send an alarm signal to the switchgear PLC. Note that the PLC shall only cause the high temperature and low flow alarms indicate on the switchgear annunciation panel when the boiler is authorized to run (wind power on).

2.32 LOCAL AND REMOTE SYSTEM MONITORING

The OIU shall provide the operator local access to the demand system setup parameters and shall display all screens required for system monitoring. The OIU and the server shall communicate with the Pro-Soft card on the PLC via ModBus TCP for tag information to display on the SCADA system. Actual programming of the OIU, GC screens, net burners, and server and development of all display screens shall be provided by the Fabricator as part of this project. The Fabricator shall program the following functions and display the following data. All multiplication factors or other proportional scaling of the raw data shall be provided by the Fabricator so the data in the address provided will not need to be modified.

- A. Demand Control – Generator kW rating (overload level), raise level set point, raise level time duration, lower level set point, lower level time duration.
- B. Generator Control – Amount of time each generator will run off-line before it is shut down (cooldown duration). Enable/disable droop unloading and the kW load or amount of time before going off line. Lead/lag selection between two identical generators.

- C. Generator Monitoring:
 - 1. Alarms – All engine/generator alarm conditions.
 - 2. Status of the breaker (open or closed.)
 - 3. Phases A, B, and C voltage, current, and power factor.
 - 4. Generator Frequency (Hz).
 - 5. Engine Speed (RPM).
 - 6. Engine Run Time (hours).
 - 7. Engine Water Jacket Temperature (°F).
 - 8. Engine Exhaust Temperature (°F).
 - 9. Engine Oil Pressure (PSI).
 - 10. Engine Air Cleaner Vacuum (in-H₂O).
 - 11. Engine Fuel Flow Rate (GPH).
 - 12. Engine Total Fuel Use (Gal).
 - 13. Engine CAN Bus – All available data from Engine Control Unit (ECU).
- D. Bus Power Monitoring:
 - 1. Phases A, B, and C voltage, current, and power factor for bus.
 - 2. Metering – All available data from totalizing meter.
 - 3. Phases A, B, and C voltage, current, and power factor for station service.
 - 4. Metering – All available data from station service meter.
- E. Feeder Circuit Breaker Monitoring:
 - 1. Position indication for the feeder breaker.
 - 2. All available data from the FPR.
- F. Device Net Status.
- G. Fuel system net burner to pull data from Tank Level Monitor and convert to Modbus TCP. SCADA net burner to pull data from PLC Pro-Soft and convert for use by SCADA and also to log and store alarms.
- H. Plant total fuel use.
- I. VFD Monitoring – All data available from Ethernet and/or ModBus connection on each of the variable frequency drives, quantity as indicated on the communication diagram on the project design drawings.
- J. Engine Coolant Monitoring
 - 1. Low engine coolant level alarm.
 - 2. Engine coolant level (%).
 - 3. Engine coolant return temperature (°F).

- K. Heat Recovery Monitoring
 - 1. Alarms.
 - 2. Heat recovery supply temperature (°F) and return temperature (°F).
 - 3. Heat recovery pressure (PSI).
 - 4. Heat recovery flow rate (GPM).
 - 5. Heat output (BTU/hour).
 - 6. Total heat delivered (100,000 BTU).
- L. Electric Boiler Monitoring
 - 1. Boiler on.
 - 2. Actual load on boiler in kW (from meter).
 - 3. Electric boiler outlet temperature (°F) from 4-20mA transmitter.
 - 4. Switchgear circuit breaker open/closed.
 - 5. SCR panel disconnect closed.
 - 6. Low flow alarm.
 - 7. High temperature alarm.

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. Prior to shipment, the Low-Voltage Switchgear Fabricator shall perform factory tests at the shop where the switchgear is assembled. Provide certified copies of all manufacturers' test data and results. Supply sufficient notice to the Authority prior to performing tests. The Authority reserves the right to witness all tests. Test procedures shall conform to ASME, IEEE, and ANSI standards, and NEMA standard practices section on testing, as appropriate and applicable.
- B. The Fabricator shall provide all required equipment and measuring and indicating devices required to perform the tests indicated. All devices shall be certified correct or correction data furnished for the device.
- C. Tests shall indicate satisfactory operation and attainment of guarantees and specified performance. Fabricator shall not ship equipment without approval by the Authority of the shop test reports.
- D. If the Authority elects to witness the testing, prior to actual witness testing by the Authority, the Fabricator shall conduct sufficient tests and provide the test reports to the Authority to ensure that when the witness test is performed, the equipment will operate as specified.
- E. At a minimum, provide the following operational tests:
 - 1. Verify that the system performs the sequence of operations as specified.
Verify that the equipment performs each task as specified.

2. Verify all protective relay functions for the FPR and GC.
 3. Verify that the PLC starts and stops each generator based on the requirements of the demand table specified herein.
 4. Verify that each annunciation point operates correctly. For external alarms, simulate the alarm.
 5. Disconnect 120-volt AC power to the control power supply in the master unit to verify that the system continues to operate without interruption from the 24V DC source.
 6. Test each variable frequency drive unit. Impress a 4-20 mA signal and verify the output of the VFD. Bench test completed unit. Provide a 3-phase motor of the size indicated and verify that the motor operates based on the 4-20 mA input signal.
- F. FPR testing. Provide the following testing of the feeder protection relay.
1. After factory assembly and wiring of equipment, conduct functional tests to prove correct wiring and operation of equipment. The tests shall include but not limited to the following:
 - a. Input 3-phase AC signal voltage to all external terminal blocks where potential transformer connections shall be made. Verify with a voltmeter and phase angle meter that the correct voltage is present at all points indicated.
 - b. Input 3-phase AC signal current to all external terminal blocks where current transformer connections shall be made. Verify with an ammeter, current test plug, and phase angle meter, where possible, that the correct current is present at all points indicated. Currents through devices not provided with current test jacks may be verified with a clamp-on ammeter.
 - c. Operate each control switch and selector switch in all positions to verify that all control circuits operate as shown on the schematic diagrams.
 - d. Verify proper operation of all blocking, closing, and tripping contacts of the FPR.
 - e. Simulate remote contacts and switches by jumpers at the appropriate external terminal blocks to verify proper circuit operation.
 - f. Visually verify that all indicating lights operate properly.
 2. The Fabricator shall calibrate and set all relays. Appropriate testing equipment shall be provided to test the relays as specified herein.
 3. A report shall be provided in the System Operation & Maintenance Manual for all tests performed.

- G. Perform the following tests on the electric boiler SCR panel.
- At a minimum, provide the following operational tests:
1. Verify that the system performs the sequence of operations as described above. Verify that the equipment performs each task as specified.
 2. Verify that each annunciation point operates correctly. For external alarms, simulate the alarm.
- H. Perform the following electrical test and inspections of the switchgear:
- The switchgear equipment and circuit breakers shall receive factory production tests as listed below:
1. Equipment.
 - a. Low frequency dielectric test.
 - b. Grounding of instrument cases.
 - c. Control wiring and device functional test.
 - d. Polarity verification.
 - e. Sequence test.
 - f. Low frequency withstand voltage test on major insulation components.
 - g. Low frequency withstand test on secondary control wiring.
 2. Main Bus: Megger test at 1000 volts each bus to ground and phase-to-phase.
 3. Contactors:
 - a. Coil check test.
 - b. Clearance and mechanical adjustment.
 - c. 300 Electrical and mechanical operation test.
 - d. Conductivity of current path test.
- I. Tests that are provided by the manufacturer of the equipment need not be duplicated. However, documentation shall be provided that the test was performed.
- J. Perform multiple repetitions of individual operations as required by the Authority to adequately demonstrate satisfactory operation of all functions.

3.2 SCADA SYSTEM TESTING

- A. Prior to factory testing of the switchgear, the SCADA system shall be fully functional as specified in Section 26 23 00.50.
- B. The switchgear control system shall be fully tested using the SCADA system as specified herein.

- C. The OIU shall be fully functional and the switchgear shall be fully tested using the OIU. All alarm and control functions specified shall be available and indicated on the OIU.
- D. The GC Screens shall be fully functional and the switchgear shall be fully tested using the GC Screens.

3.3 NOTIFICATION OF WITNESS TESTING

- A. The Authority shall have the right to inspect, at the factory, all equipment covered by these specifications any time during manufacture and assembly and to be present during any tests made on the equipment.
- B. The Authority may visit the manufacturing facility for final performance testing. The Fabricator shall make a technician available to the Authority to assist in the inspection and witness test of the switchgear. The technician shall instruct the Authority in all functions of the equipment.
- C. The Fabricator shall notify the Authority two weeks in advance of the scheduled test date. If the Fabricator ships the equipment without allowing the Authority to witness testing of the equipment, or before the Authority accepts the equipment test, the Authority reserves the right to have a third party test the equipment in Anchorage, Alaska or at the F.O.B. destination. All costs associated with a third party test shall be deducted from the Fabricator's final payment. If the switchgear fails any test, the Fabricator shall be responsible for correction of all deficiencies, retesting, and proving the switchgear operates as specified and meets the requirements of these specifications with no increase in the contract price.

PART 4 – CLARK'S POINT ELECTRIC BOILER SCR PANEL

4.1 SCOPE

- A. This part covers furnishing design, drawings, materials, and accessories as specified herein for the Clark's Point SCR panel to be used to control the operation of an electric boiler.
- B. The Work included herein shall consist of, but not be limited to, designing, fabricating, providing, and factory testing one complete SCR Panel which shall enclose the SCRs and associated equipment.
- C. The Fabricator shall provide a complete and operational system as specified herein. Certain components are identified in these specifications to be provided by the Fabricator. However, the components identified shall not be construed to be the complete list of components required for the successful operation of the system as specified. The Fabricator shall provide all components and design required for the complete and successful operation of the system, conforming to all of the requirements specified herein, whether the components are identified or not. The Fabricator shall ensure that all devices are installed and operate within their intended purposes. The Fabricator shall check all catalog numbers indicated and shall coordinate all devices installed.
- D. The panel sequence of operation is specified elsewhere in this section.

- E. The Fabricator shall fully test the panel as specified elsewhere in this section.
- F. The panel shall be designed and constructed in accordance with these specifications and the project design drawings.

4.2 RATINGS

- A. Power supply to the SCR panel will be 480 volts, 3-phase.
- B. Control power shall be as indicated on the drawings.
- C. The remote boiler shall be provided with six (6) separate heating elements each rated 4.0 kW, 480V, 3-phase, connected in delta configuration.

4.3 ENCLOSURE

Provide one cabinet for the SCR panel. The following paragraphs describe general fabrication requirements for the panel enclosures.

- A. The cabinet shall be wall mounted, single-door, single access, NEMA 12 enclosures with continuous door hinge, lockable door latch, and door gaskets. Hoffman, B-Line, or approved equal.
- B. The cabinets shall be painted using a premium painting system. The color of the exterior shall be ANSI 61 light gray and the interior shall be white.
- C. The cabinets shall be front access only and the hinged front-opening doors shall provide required access to all components for service and replacement.
- D. Furnish with back panels as required for equipment support.
- E. The SCR panel overall cabinet dimensions shall be 48" high by 36" wide, by 10" deep.

4.4 SCR PANEL DEVICES

In addition to the circuit breakers, relays, lights, and other panel devices specified elsewhere in this section, provide the following devices.

- A. Main panel disconnect. Provide a molded case disconnect switch, minimum rating as indicated on the drawings, with lockable external operating handle. Provide an auxiliary contact to indicate breaker position, wired to terminal blocks.
- B. SCR's for control of the boiler heating elements. Single SCR's, 480 volts, 30 amp rated packaged as "6-Paks" with 120 VAC convection cooling fins. Zero cross type with analog control and sync guard function. Control Concepts, Inc. 3021B-48-30-0/5V-LT or approved equal as required.
- C. Capacitors for SCR noise suppression. Control Concepts, Inc. 12330-2000-450 or approved equal.
- D. Control power transformer for input to SCR. Provide one, 480:24V ratio, minimum 25VA.
- E. Fuses for SCR protection. Sized for the SCR, rated 600 volts, in touch safe fuse holders. Ferraz Shawmut or approved equal.

- F. Ground lug.
- G. Power distribution terminal block for distribution to the SCRs.
- H. Output terminals for connection of the remote heater element power leads.
- I. Terminal Blocks, Circuit Breakers, Wiring, and other components as required.

END OF SECTION

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SECTION 26 23 00.50

SCADA SYSTEM FOR PRIME POWER SWITCHGEAR

PART 1 - GENERAL

1.1 SCOPE

- A. The Work included herein consists of providing a complete and operational Supervisory Control and Data Acquisition (SCADA) system, as specified herein, for the Utilities included under this solicitation. The SCADA system shall be provided by an experienced programmer referred to as Developer herein.
- B. The Developer shall develop the SCADA system and programming for the OIU and GC Interface Screens, switchgear data storage server, and remote and local PCs. The SCADA system shall include Supervisory and Trending application software, custom project software file(s), and other software and files required to make a complete and operational system.
- C. The Developer shall provide all labor, equipment, incidentals and resources as specified and needed to furnish, install, calibrate, test, start-up and place in satisfactory operation complete SCADA systems for the Clark's Point and Port Heiden electric utilities (Utilities), as indicated herein.
- D. The Authority and Utilities shall maintain ownership and use of all custom project software files and documentation developed to meet the requirements of this solicitation. All SCADA Supervisory and Trending application software licenses provided under this solicitation shall include the legal right for the Authority and Utilities to use the software for an indefinite period of time. The Authority and Utilities shall have unlimited rights to install and operate the SCADA Supervisory and Trending application software, up to the number of software licenses issued, and to install, operate and modify the custom project files as needed for the benefit of the Utilities, without the requirement to commit to on-going maintenance or service agreements.
- E. The Developer shall fully test the SCADA system with the Prime Power Low-Voltage Switchgear and the generating equipment as specified herein and in Section 26 23 00.10 - Prime Power Low-Voltage Switchgear.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results for Electrical
- B. Section 26 05 02 Basic Electrical Materials and Methods
- C. Section 26 23 00.10 Prime Power Low-Voltage Switchgear

1.3 SUBMITTALS

- A. Provide submittals in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.

- B. Submit data sheets and catalog data showing all supplied features, options and configurations of the SCADA Supervisory and Trending application software.
- C. Submit screen shots of the proposed OIU and GC Interface Screen custom project file(s) for each Utility. Provide a Tag list and narrative operating description of the project file(s).

1.4 SCADA SYSTEM SOFTWARE

- A. All SCADA Supervisory and Trending application software licenses and custom project files, as well as upgrades and maintenance described in the Warranty herein, shall be included in the Developer's bid price. For the purposes of this solicitation the SCADA Supervisory application software is defined as:
 - Machine-readable object code used for the supervision, control and monitoring of the programmable logic controller (PLC) and other switchgear and field devices. The Supervisory application software interacts with custom project file(s) that are configured and customized for each Utility to display and control tags from the PLC and devices, as indicated in Section 26 23 00.10 - Prime Power Low-Voltage Switchgear.

For the purposes of this solicitation the SCADA Trending application software is defined as:

- Software that provides the functions as described in Paragraph 2.2 - Trending
- B. For the SCADA system to function both the Supervisory application software and custom project files shall be installed on a client computer.
- C. The Authority and Utilities shall be able to upgrade the Supervisory and Trending application software and to edit, modify, change, and manipulate the custom project files to fit their requirements.
- D. The Authority shall own outright all other software and files developed under this solicitation by the Developer without license and shall have full rights to the files and programming code and may distribute, modify, or install it on any number of computers that may be owned by the Authority or other utilities the Authority may work with from time-to-time without additional costs or fees.
- E. For the purposes of this contract "other software applications and files" shall include but may not be limited to:
 - Customized screens and parameters developed for use with the Supervisory and Trending application software. (i.e., custom project files)
 - Any other software and interfaces developed between the Supervisory and Trending application software, custom project files, and other application software and files related to collecting and reporting power plant data via the SCADA system.

1.5 QUALITY ASSURANCE

- A. The Developer is responsible for quality assurance and completion of all work identified in these specifications. All work shall be subject to evaluation and inspection by the Authority at all times to assure satisfactory progress, and to verify that work is being performed in accordance with the specifications.
- B. The SCADA system shall be furnished by a single Developer who shall assume all responsibility for providing a complete and integrated SCADA system.

1.6 DEVELOPER QUALIFICATIONS

- A. The SCADA system shall be the product of a Developer who can demonstrate at least five (5) years of continuous satisfactory experience in designing, implementing, furnishing and installing comparable SCADA systems for remote installations.
- B. The Developer shall have a thorough working knowledge of remote, off-grid prime power electric power plant controls and operating practices.
- C. A list of five prior projects that key staff have worked on may be requested by the Authority after the bid opening and prior to award in order to verify Developer qualifications. The list shall include installation date, description of installation, and a reference contact for each installation.

1.7 DEVELOPER WARRANTY

- A. The Developer shall provide a warranty for the work for a period of not less than one-year after final acceptance of the SCADA system by the Authority. Any deficiencies identified in the programming, software, screen images, trending, or other features or aspects of the SCADA system, identified by either the Authority or the Utilities, shall be promptly corrected by the Developer at no additional cost. The Developer shall assist the Authority as directed in determining causes of deficiency or failure.
- B. In addition to the specified requirements for SCADA system programming, testing, commissioning, and warranty work, during the one-year warranty period the Developer shall provide an additional twelve (12) hours of programming assistance and technical support to modify the SCADA as requested by the Authority or the Utilities. These hours are in addition to any technical requirements specified for programming, start-up and commissioning efforts, and shall be included in the Developer's bid price. The programming assistance and technical support may be required to be provided at a single event or may be spread out over the year as directed by the Authority or the Utilities, and will be performed at the Developer's office and not at the location of the Utilities.

1.8 OPERATION AND MAINTENANCE MANUALS

- A. See Section 26 23 00.10 - Prime Power Low-Voltage Switchgear

PART 2 - PRODUCTS

2.1 GENERAL

- A. The Developer shall provide a fully functional SCADA system specified herein and to meet the requirements of Section 26 23 00.10 – Prime Power Low-Voltage Switchgear.
- B. The SCADA system shall be compatible with the switchgear hardware.
- C. The Supervisory system shall not be dependent on the switchgear data server, or any other server, for operation. It shall read information directly from the PLC, switchgear devices, and power plant LAN.
- D. The Supervisory and Trending software may be separate and distinct programs.
- E. Multiple applications of the SCADA system shall run concurrently. The OIU and GC interface screens, alarms, and monitoring points shall be identical for all SCADA applications, regardless if accessed locally or remotely via the internet. All devices in the power plant, and no less than six (6) additional remote or local devices, shall be authorized to run concurrently.
- F. The SCADA system shall function on the power plant LAN without being dependent on connectivity to the internet.
- G. The SCADA system shall not require or depend on external activation, internet or hardware.
- H. The Supervisory and Trending application software and custom project file(s) shall be relatively small in size and have a simple installation routine. The SCADA system and software installation shall tolerate low throughput and high latency connections. Down to as low as 56kbs and 500ms delay without dropping. Pushing software across low quality communications links makes small files sizes necessary.
- I. The SCADA system shall function on Microsoft Windows 7 through Windows 10 Professional.
- J. The graphic interface shall be user friendly and have the capability without modification or setup to allow personnel with large fingers to use generic touch screens without a mouse or keyboard.
- K. The Supervisory system shall start and stop engines, reset alarms, change demand levels and have a confirm action dialog box for critical functions, as well as maintain separate alarm logs for Type 1 and other alarms (refer to 3.3.H – Alarm History Screens).
- L. The Developer shall maintain a secure FTP or web site with custom project files and other files to be readily downloaded and installed.
- M. The Developer shall provide comments in the code for ease of future maintenance and changes.

- N. The SCADA system installation and setup shall be capable of being performed remotely via low bandwidth internet access.
- O. Secure encryption shall be provided.

2.2 TRENDING

- A. The Developer shall provide, configure, test and implement a historical database on the switchgear data storage server for historical data archiving, analysis, reporting, trending and system back-up of all data presented by the SCADA system. All historical data shall be fully synchronized and time-stamped, using a single time series (clock), so that historical data from all monitored devices may be compared to a single time series.
- B. The SCADA system shall include features for the management of historical data. The SCADA system shall record historical values of analog variables on a periodic basis and values of digital variables on an event basis (change of state). The historical database must be capable of storing a minimum of one (1) year of historical data. All historical data shall be recorded on the switchgear data storage server. Historical files more than one (1) year old shall be automatically deleted.
- C. Trending data shall be exportable from the historical database, and the section of the trend to be exported shall be selectable by clicking and dragging the mouse across the trend. Any portion of the historical database shall be exportable. Data shall be exported to CSV or TXT formatted files, or similar file system as approved by the Authority. Exported files shall be of a manageable size compatible with the internet requirements of Paragraph 2.1. Exported trend data shall be readily capable of being printed or plotted to Adobe pdf format or to a designated printer.
- D. Refer to Paragraph 3.5, Trending Application Tags, for representative example of historical data to be archived and available for trending.

2.3 SECURITY

- A. Password Protection. Provide the following access password protection:
 - 1. Viewing only. In this level of access the viewer will be able to view the SCADA system but will not be able to modify any file or setpoint.
 - 2. Administrator. In this level of access, the viewer will be able to change the demand levels and timers, change the lead generators, remote start and stop engines, and perform other functions as directed by the Authority.
- B. The Developer shall provide a description of the SCADA system security encryption and authentication protocol for review and approval.

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. Prior to factory testing of the switchgear, the SCADA system shall be fully functional as specified in Section 26 23 00.10 - Prime Power Low-Voltage Switchgear.
- B. The switchgear control system shall be fully tested using the SCADA system as specified herein.
- C. The OIU shall be fully functional and the switchgear shall be fully tested using the OIU. All alarm, indication, and control functions specified shall be available and indicated on the OIU.
- D. The GC Interface Screens shall be fully functional and the switchgear shall be fully tested using each generator section GC Interface Screen. All alarm, indication, and control functions specified shall be available and indicated on each GC Interface Screen.
- E. The Trending application shall be fully functional and tested, and all Trending application functions fully operational, as indicated herein.

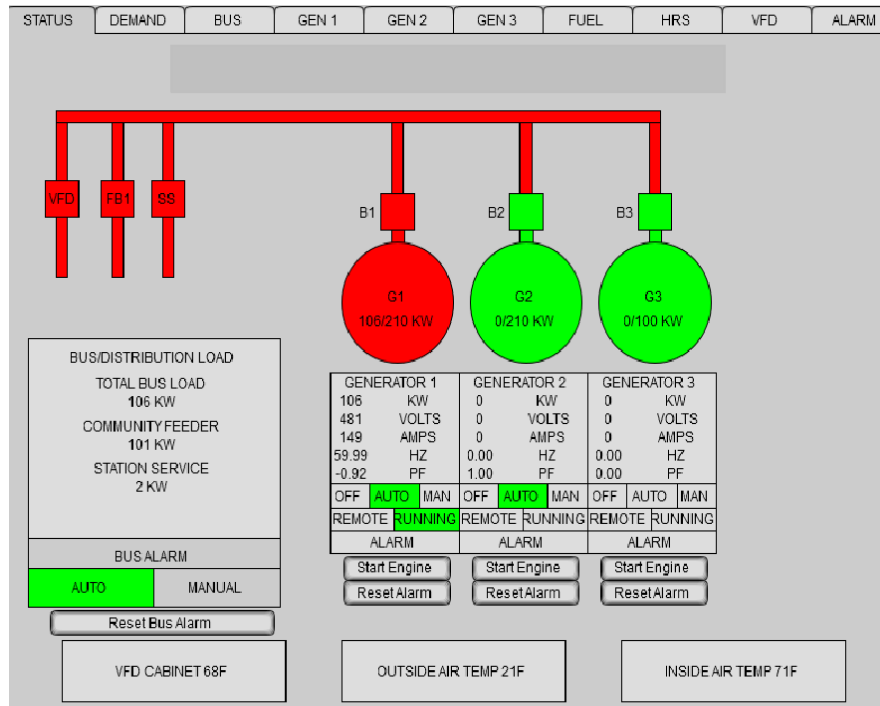
3.2 CUSTOMER TRAINING

- A. The Developer shall provide a minimum of 8 hours of training for the Authority and Utility personnel. Training shall be provided separately for each Utility.
- B. Training shall occur after substantial completion of the project using the actual power plant equipment. Coordinate with the Authority and Utilities to ensure that the appropriate individuals are available.
- C. During training, make modifications to the SCADA system programming as directed by the Authority to incorporate any system control modifications identified during testing, startup, or commissioning.
- D. Training shall be provided using the manuals as specified herein.

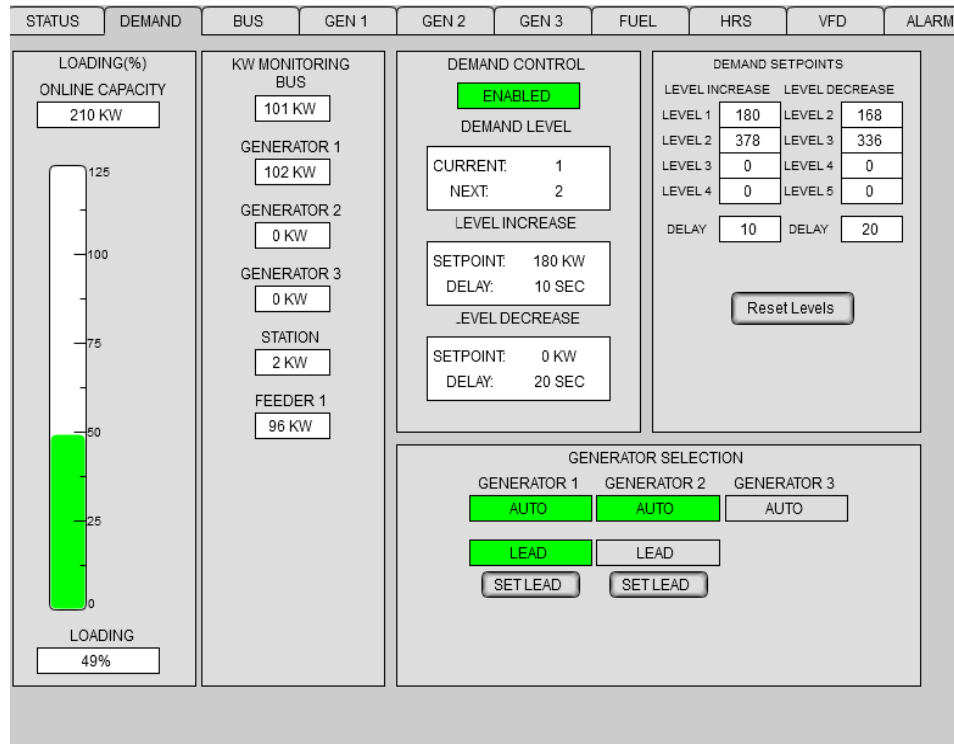
3.3 OIU SCREEN IMAGES

The SCADA system screens shall display all data as specified in Section 26 23 00.10 - Prime Power Low-Voltage Switchgear. At a minimum, the Developer shall provide screens similar to the images shown in following paragraphs. The screen images are representative of the minimum data required and desired format. Each screen image shall be provided on the switchgear Operator Interface Unit (OIU), local PC's connected to the LAN, and available via the remote SCADA system over the internet.

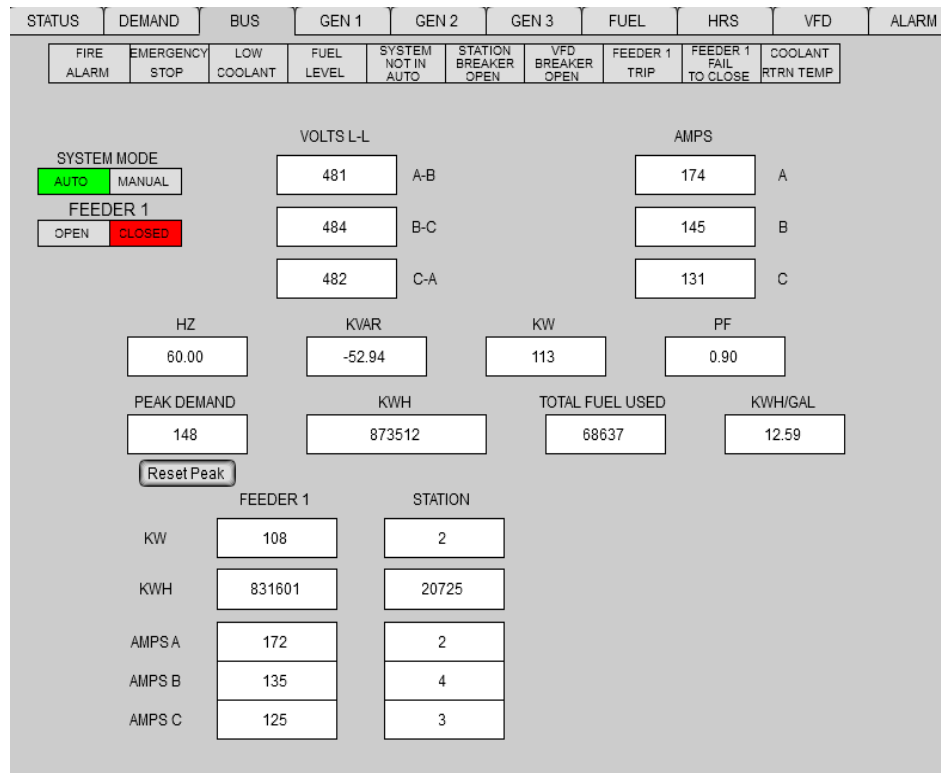
A. Home Screen – Overall Plant Status:



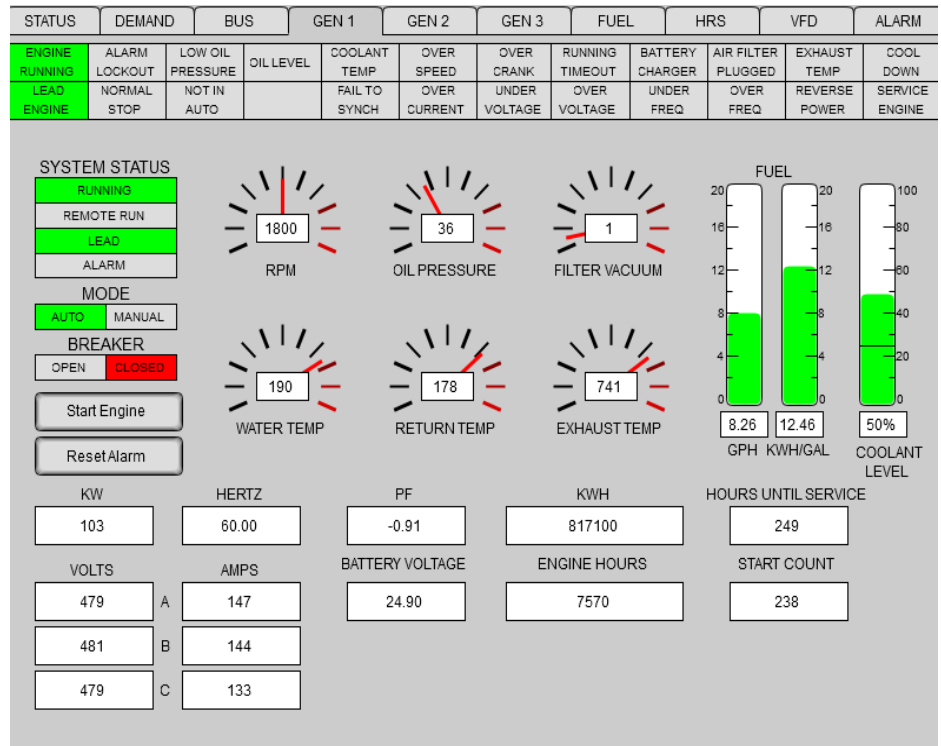
B. Demand Control Screen:



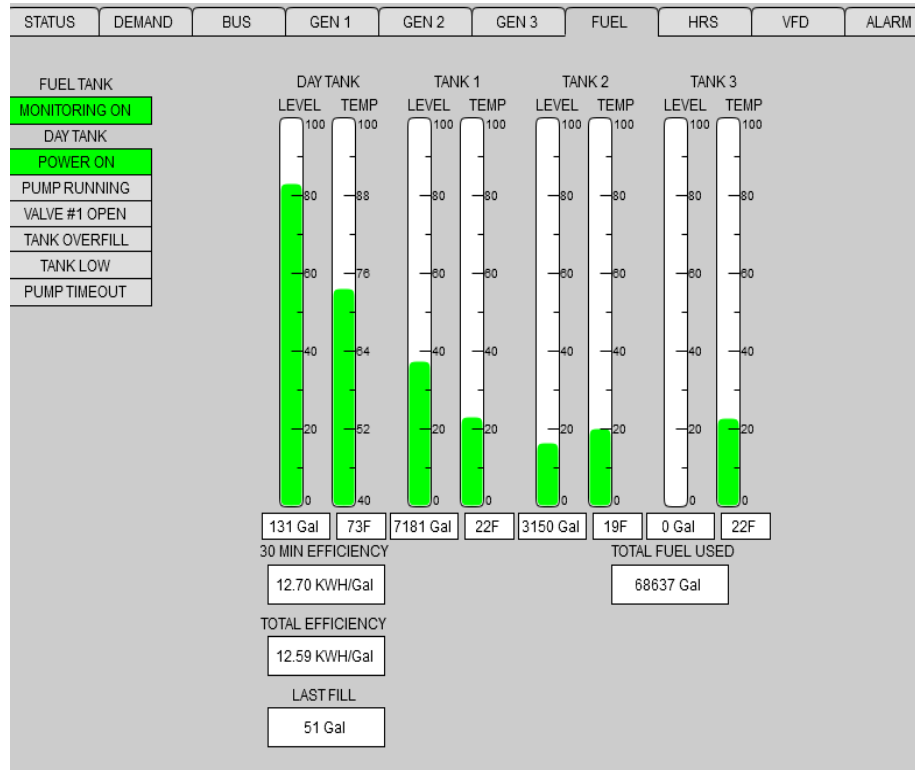
C. Bus Monitoring & Metering Screen:



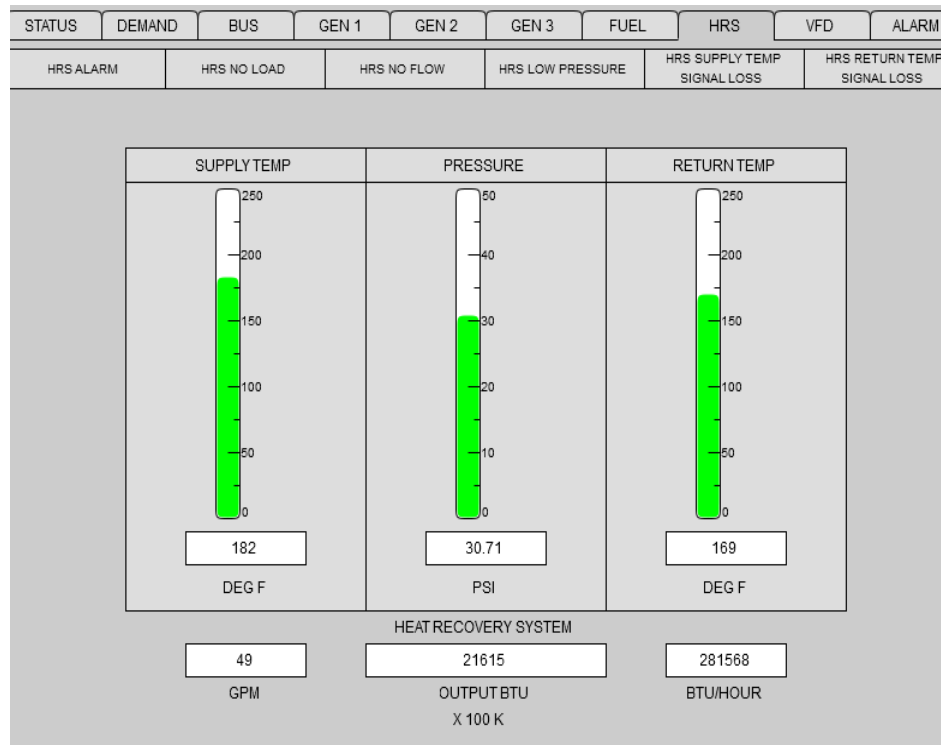
D. Engine-Generator Screen (1 for each genset, 3 total):



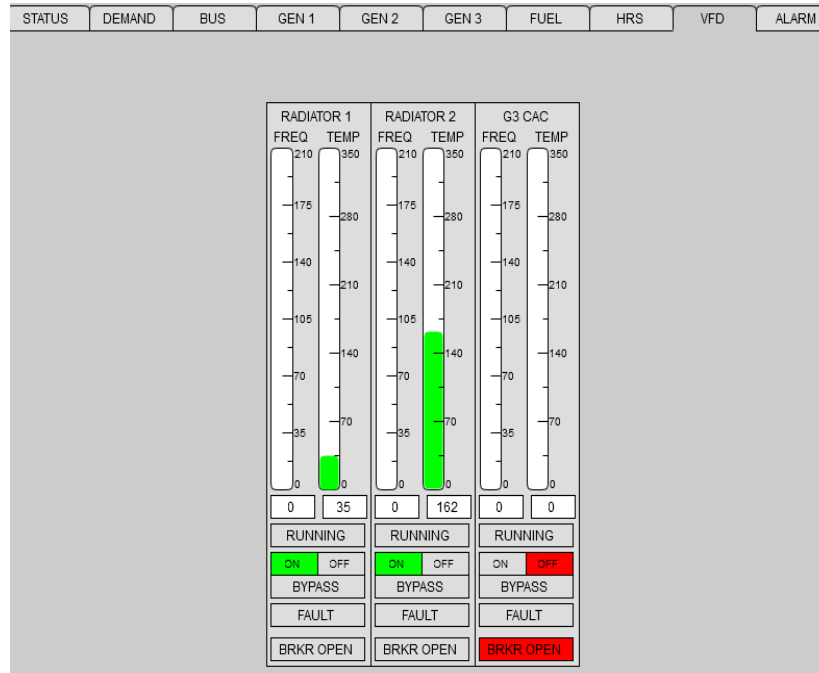
E. Fuel System Monitoring & Alarm Screen:



F. Heat Recovery Monitoring & Metering Screen:



G. Variable Frequency Drive (VFD) Monitoring Screen:



H. Alarm History Screens:

Provide two separate Alarm History Screens, one for Type 1 Soft Shutdown alarms and a second screen for Master Section, Type 2 and Type 3 Alarms. The Type 1 Alarm screen shall use alternating yellow and white lines, as indicated below. The second screen shall use alternating red and white lines.

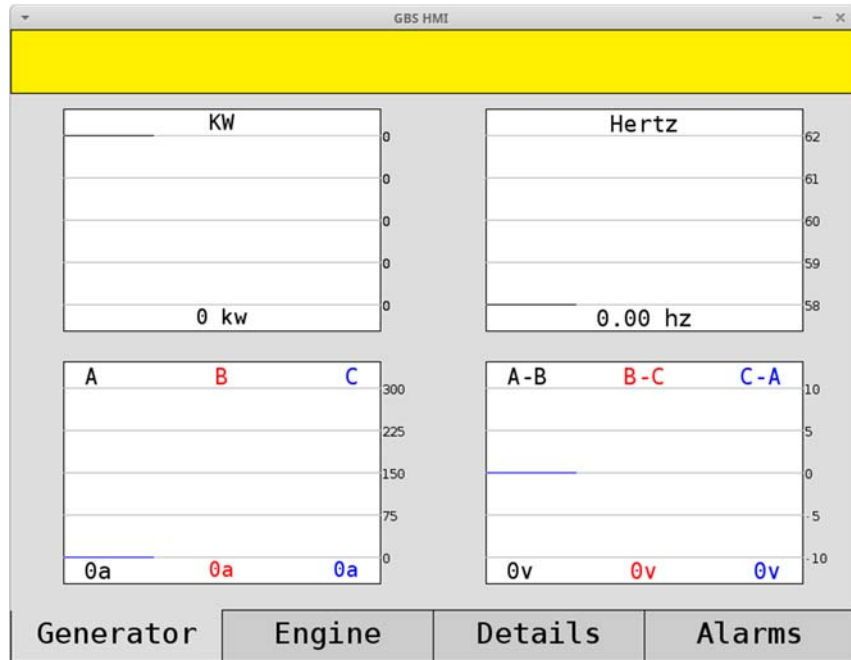
ALARM NAME	START TIME	STOP TIME
Generator 2/General Alarm	09:04:06 04/27/18	09:18:31 04/27/18
Generator 1/Oil Level Alarm	08:39:02 04/27/18	08:56:41 04/27/18
Generator 1/General Alarm	08:35:21 04/27/18	08:56:41 04/27/18
Generator 1/Oil Level Alarm	19:34:23 04/17/18	19:52:16 04/17/18
Generator 1/General Alarm	19:29:28 04/17/18	19:52:16 04/17/18
Generator 1/Oil Level Alarm	20:00:09 04/08/18	20:20:40 04/08/18
Generator 1/General Alarm	19:56:39 04/08/18	20:20:37 04/08/18
Generator 1/Oil Level Alarm	09:01:16 03/30/18	09:12:19 03/30/18
Generator 1/General Alarm	08:57:22 03/30/18	09:12:19 03/30/18
Generator 1/Oil Level Alarm	09:22:51 03/21/18	09:34:24 03/21/18
Generator 1/Service Engine Alarm	07:24:53 03/21/18	09:34:24 03/21/18
Generator 1/General Alarm	07:24:53 03/21/18	09:34:24 03/21/18
Generator 1/Oil Level Alarm	22:50:57 03/12/18	23:18:44 03/12/18
Generator 1/Service Engine Alarm	05:32:33 03/12/18	23:24:33 03/12/18
Generator 1/General Alarm	05:32:30 03/12/18	23:24:33 03/12/18

◀ 6/6 ▶

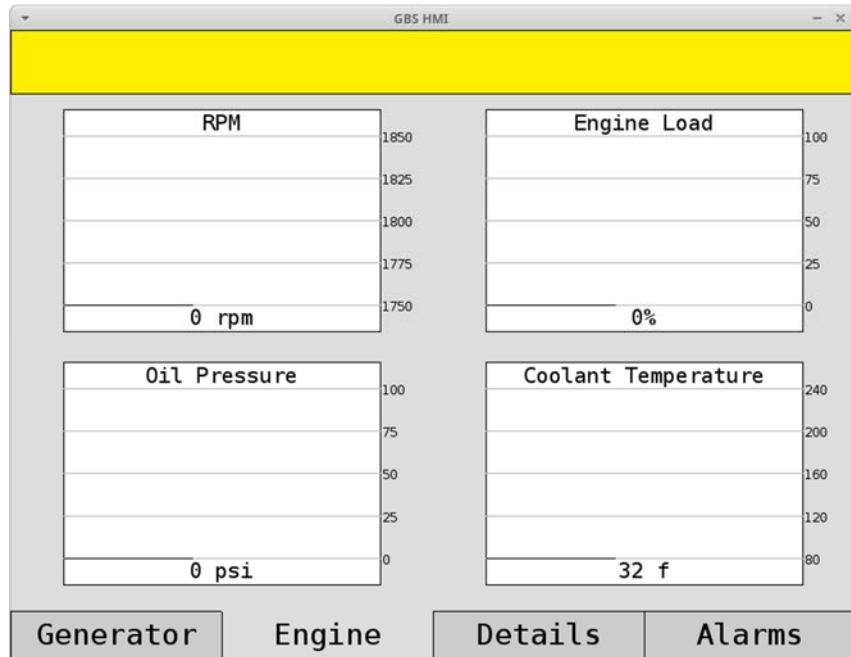
3.4 GC INTERFACE SCREEN IMAGES

At a minimum, the Developer shall provide the following screen images for each Utility provided under this contract. Each screen image shall be provided on the switchgear generator control panel interface screen. Note: the following Generator and Engine screen images are line graphs with time as the horizontal axis, and shall toggle between the 4-graph display to a single graph full screen display when a graph is touched.

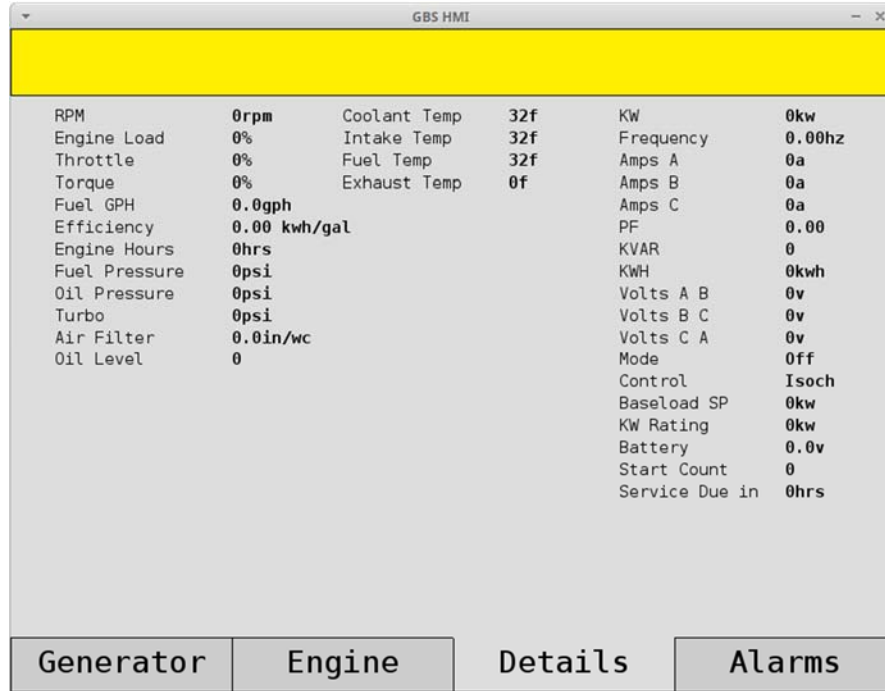
A. Generator Screen:



B. Engine Screen:

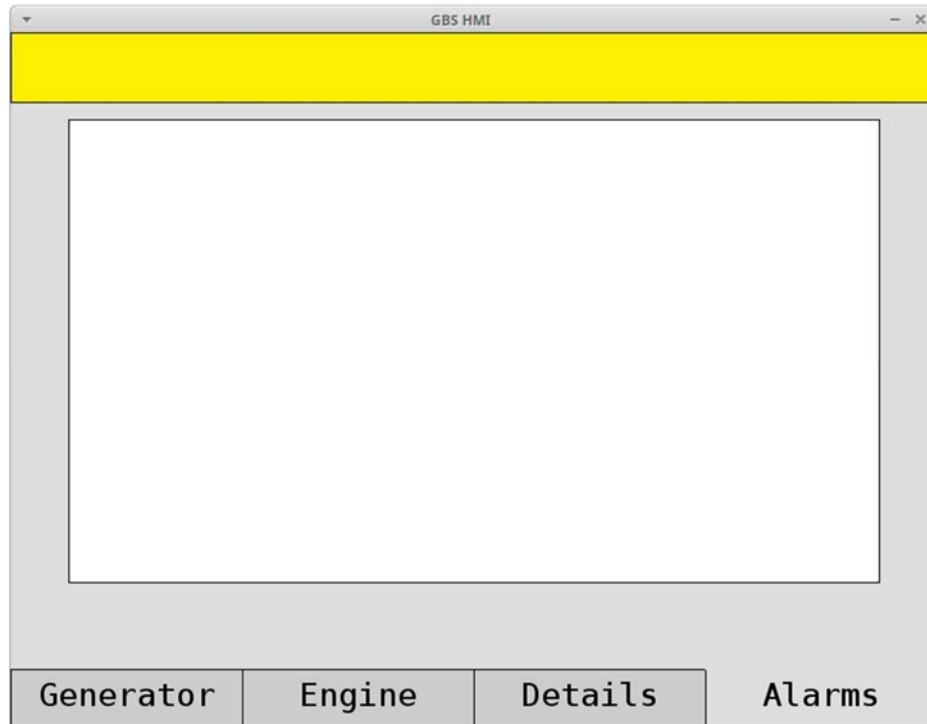


C. Details Screen:



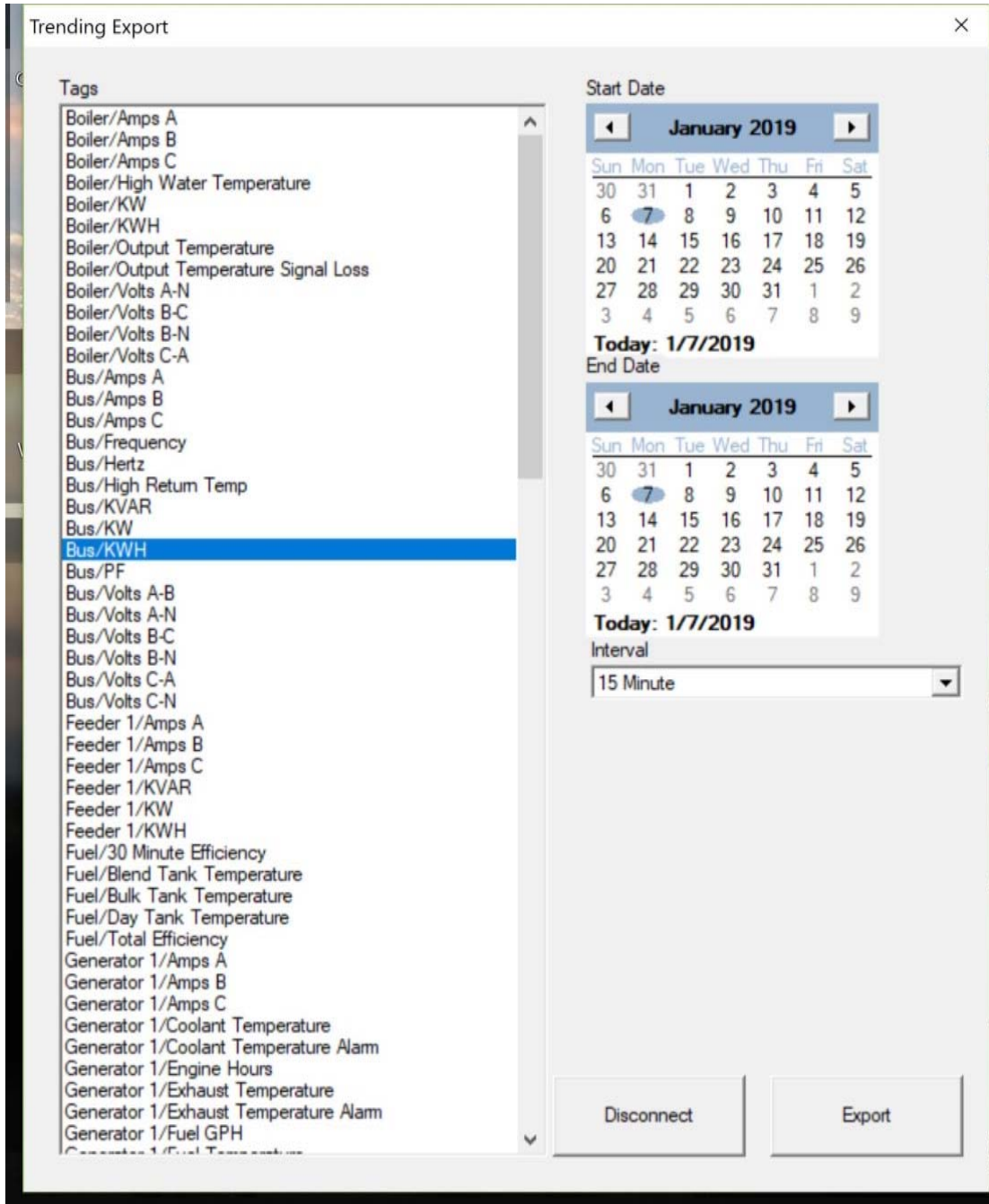
D. Alarms Screen:

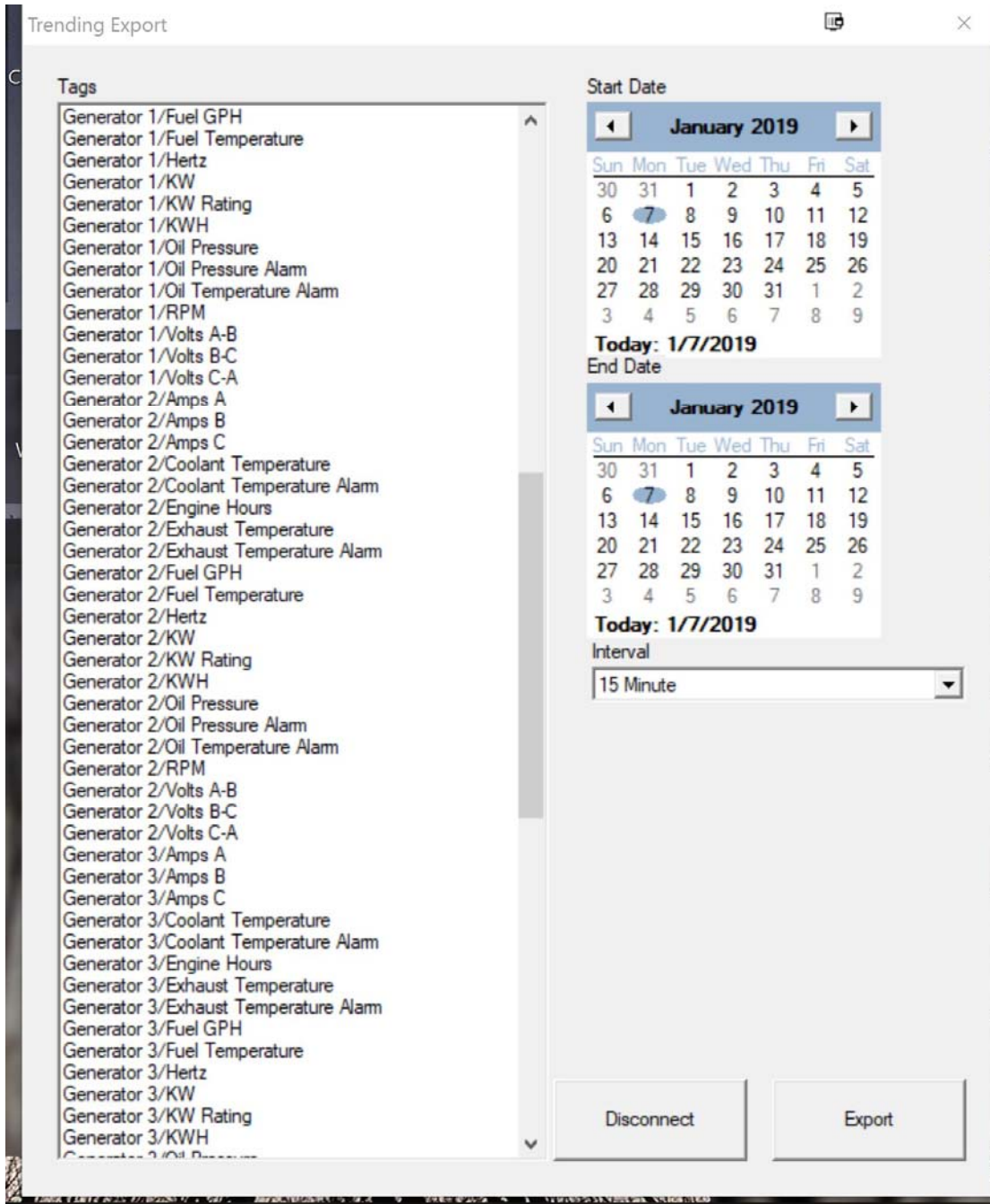
The Alarms screen shall indicate all easYgen alarm functions

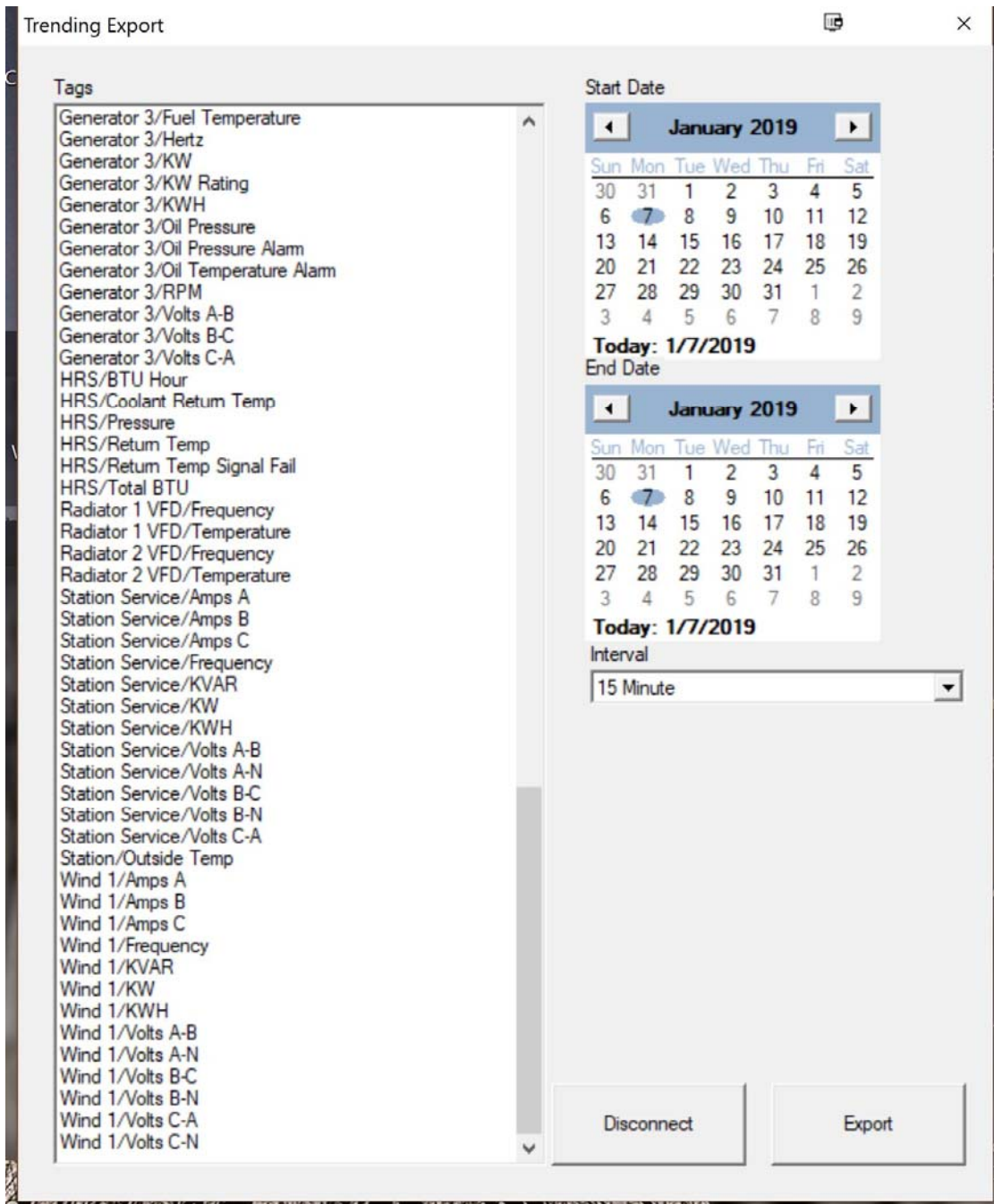


3.5 TRENDING APPLICATION TAGS

The following Trending Export screens show a representative example of historical data to be archived and available for trending:







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**SECTION 26 32 13.10
ENGINE GENERATORS**

PART 1 - GENERAL

1.1 SCOPE

- A. The Work included herein shall consist of providing, fabricating, and factory testing complete engine generator units as specified herein.
- B. Each unit shall be harmonically balanced and shall be delivered complete and ready for installation.
- C. Provide all accessories as specified for all engine generator units plus any additional components listed.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results for Electrical
- B. Section 26 05 02 Basic Electrical Materials and Methods
- C. Section 26 05 33 Raceway and Boxes for Electrical Systems
- D. Section 26 32 13.20 Rebuilt Diesel Engines
- E. Section 26 32 13.50 Owner Furnished Diesel Engines

1.3 SUBMITTALS

- A. Provide in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.
- B. Provide complete and accurate drawings of the equipment, including outline drawings and dimensional data which fully describe the height, width, and depth of the equipment; skid construction; schematics; wiring diagrams; and other relevant details.
- C. Provide mechanical and electrical performance data including intake and exhaust air flow; charge air cooling requirements (if applicable); heat rejection; engine coolant pump curve at rated speed; fuel flow rate; fuel consumption at 100%, 75%, 50%, and 25% of rated prime power; and other relevant data.
- D. A torsional vibration analysis (TVA) has been prepared and accepted for the following engine generator combinations:
 - 1. John Deere 4045TFM75 with Newage/Stamford UCI274C.
 - 2. John Deere 4045AFM85 with Newage/Stamford UCI274F.
 - 3. John Deere 6090AFM75 with Newage/Stamford HCI434D.For any engine-generator combinations not specifically listed above, a TVA shall be provided for the proposed engine generator combination within 14-days of contract award.
- E. Provide manufacturer's catalog literature for all accessories and equipment.

1.4 REGULATORY COMPLIANCE

The Environmental Protection Agency (EPA) has issued New Source Performance Standards (NSPS) regulations governing use of stationary diesel engines in remote areas of Alaska. The following provisions of 40 CFR Subpart IIII apply to this solicitation:

- A. 40 CFR 60.4201(f) permits manufacturers to produce stationary, non-emergency engines certified to 40 CFR 94 and 40 CFR 1042 (Tier 2 and Tier 3 Marine) if used solely in remote areas of Alaska.
- B. 40 CFR 60.4208(d) prohibits owners and operators from installing a new engine greater than or equal to 75 HP and less than 175 HP after December 31, 2013 unless it meets applicable 2012 model year emissions requirements. A new/unused Tier 2 Marine certified engine in this horsepower category complies with this requirement because the Tier 2 Marine emissions standard was in effect through the 2012 model year.
- C. 40 CFR 60.4208(e) prohibits owners and operators from installing a new engine greater than or equal to 175 HP after December 31, 2012 unless it meets applicable 2011 model year emissions requirements. A new/unused Tier 2 Marine certified engine in this horsepower category complies with this requirement because the Tier 2 Marine emissions standard was in effect through:
 - 1. Model year 2012 for engines with displacements from 0.9 to less than 1.2 liters/cylinder.
 - 2. Model year 2013 for engines with displacements from 1.2 to less than 2.5 liters/cylinder.
- D. 40 CFR 60.4216(b) permits manufacturers, owners and operators to install engines in remote areas of Alaska certified to 40 CFR 94 and 40 CFR 1042 (Tier 2 and Tier 3 Marine).

In order to comply with EPA emissions requirements and also be compatible with the intended service applications, the diesel engines furnished under this solicitation shall be Tier 2 or Tier 3 Marine certified engines, with a manufacture date in accordance with the requirements previously listed. If the engine is rebuilt it shall be rebuilt in accordance with Section 26 32 13.20 Rebuilt Diesel Engines and the requirements of 40 CFR 1068 and applicable NSPS standards.

1.5 QUALITY ASSURANCE

- A. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practices. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Except where specific allowance is made in this specification for rebuilt or remanufactured engines, Equipment shall not have been in service at any time prior to delivery, except as required by tests.
- B. Equipment and components furnished under these specifications shall be in accordance with the requirements of applicable UL, NEC, IEEE, NEMA, and ANSI standards.

1.6 FABRICATOR QUALIFICATIONS

The engine generators shall be supplied, coordinated, and assembled by a qualified fabricator (Fabricator) who is regularly engaged in the business of providing diesel engine driven generator equipment.

- A. The Fabricator must have staff with extensive experience in packaging diesel engine driven electrical generators. A list of five successful installations that key staff have worked on may be requested by the Authority after the bid opening and prior to award in order to verify Fabricator qualifications. The list must include installation date, description of installation, and a reference contact for each installation.
- B. The Fabricator must maintain a competent service organization that is available for field service calls. A description of the organization including resumes of key personnel may be requested by the Authority after the bid opening and prior to award in order to verify Fabricator qualifications.
- C. The Fabricator must have a fabrication facility with adequate space and appropriate equipment as required to perform the work. The Authority may inspect the Fabricator's shop after the bid opening and prior to award in order to verify Fabricator qualifications.

1.7 CONTRACTOR WARRANTIES

- A. The Contractor shall warrant the work for a period of not less than one-year after energization of the equipment or 18 months after delivery to the F.O.B. point, whichever comes first. In the event of equipment or component failure during the warranty period, the Contractor shall replace such defective equipment or components and bear all associated costs. Costs shall include material, parts, and labor. The Contractor will be allowed to charge for travel and per diem expenses related to warranty service at actual cost plus 10%. The Contractor shall pursue manufacturer's warranties to the extent necessary to obtain replacement equipment and provide proof of action taken upon request. Assist Authority as directed in determining cause of failure.
- B. The warranty shall state in clear terms exactly what warranty coverage the seller provides, for each unit and attachments. This shall include the terms, length of coverage, reporting responsibilities, how the warranty applies to accessory equipment, restrictions, locations of local facilities for handling warranty and other repairs (including contact names), and any other available information pertaining to warranty.
- C. Provide a nametag on each piece of equipment that clearly identifies the party responsible for the warranty. Nametag shall include the name, address, and phone number, and shop order or Contractor's serial number.

1.8 OPERATION AND MAINTENANCE MANUALS.

- A. Provide one (1) complete bound set of operation and maintenance (O&M) manuals for each unique engine generator unit. Identification symbols for all

replaceable parts and assemblies shall be included. Provide manuals for the following equipment:

1. Engine.
 2. Generator.
 3. Voltage Regulator.
 4. All accessories.
- B. For each engine provide all available factory service publications including parts manuals, service manuals, component technical manuals, etc.
- C. For all other components of each engine generator unit provide:
1. Equipment function, normal operating characteristics, and limiting conditions.
 2. Assembly, installation, alignment, adjustment, and checking instructions.
 3. Operating instructions for start-up, routine and normal operation, regulation and control, shutdown, and emergency conditions.
 4. Lubrication and maintenance instructions.
 5. Guide to "troubleshooting."
 6. Parts list and predicted life of parts subject to wear.
 7. Outline, cross section, elevation, and assembly drawings
 8. Engineering data including all mechanical and electrical performance characteristics.
 9. Complete AC connection and three-line diagrams.
 10. Complete DC schematics including voltage regulator, fuel injector pump, sensors, switches, fuses, and all other devices.
- D. The operation and maintenance manuals shall be in addition to any instructions or parts list packed with or attached to the equipment when delivered, or any information submitted for review.
- E. Each copy of the final O&M manual shall be provided with original copies of the manufacturer's instruction books. Copies of manufacturer's instruction books shall not be inserted in any of the final O&M manuals.
- F. Bind materials in locking three ring "D" style binders. Binder capacities shall not exceed 3 inches, nor shall material included exceed the designed binder capacity. If material to be bound exceeds capacity rating, multiple volumes shall be furnished. Binder capacity shall not be less than approximately 1/2 inch greater than the thickness of the material within the binder. Permanently label with project information on the front cover and edge.
- G. Where reduction is not practical, larger drawings shall be folded separately and placed in envelopes, which are bound into the manuals. Each envelope shall bear suitable identification on the outside.
- H. All information in the O&M manuals shall be new and original publications.
- I. All as-built drawings shall be provided in Adobe PDF format on CD.

PART 2 - PRODUCTS

2.1 GENERAL CONFIGURATION AND MANUFACTURERS

- A. All units shall be complete skid mounted engine generators utilizing all new components except where specific allowance is made for rebuilt engines.
- B. All units shall be configured as specified herein and shall include all accessories as indicated.
- C. Engines shall have a manufacture date prior to Model Year 2014. The engines shall be new or shall be rebuilt in accordance with Section 26 32 13.20.
- D. Engines shall be rated for prime power duty at the horsepower (shaft) and electrical kilowatt (generator) ratings indicated for each unit. All engines shall be 1800 RPM unless specifically indicated otherwise. All starting and control systems shall be 24 VDC, as indicated in Paragraph 2.2 - Specific Configuration.
- E. Provide engines of the manufacturer and model indicated in Paragraph 2.2 - Specific Configuration, no other substitutes except as specifically noted below.
- F. Approved equal substitutions of engines will be allowed only by Engineer's approval. To obtain approval, submittals must clearly demonstrate the following:
 - 1. The substitute engine must meet all of the requirements of Paragraph 2.3
 - 2. The substitute engine manufacturer must have at least one factory authorized service representative with a permanent shop in Southcentral Alaska.
 - 3. The size and weight of the substitute engine must not exceed that of the specified engine by more than 10%.
 - 4. The physical layout, piping connections, and service access area of the substitute engine must be sufficiently similar to that of the specified engine so that no major changes will be required to the power plant design. The engine must not be equipped, or require to be equipped, with any exhaust emissions equipment including Exhaust Gas Recirculation, Diesel Oxidation Catalyst, Diesel Particulate Filter, or Selective Catalytic Reduction.
 - 5. The substitute engine must meet or exceed the fuel efficiency rate of the specified engine. Provide fuel curve showing fuel consumption (kWh/gallon) at 25%, 50%, 75% and 100% of prime rated capacity.
 - 6. The substitute engine must be provided with a single jacket water cooling circuit without a separate aftercooler circuit.
 - 7. The substitute engine must meet or exceed the heat rejection to the jacket water circuit of the specified engine.
- G. Provide Newage/Stamford generators as indicated in the Specific Configuration requirements that follow or Kato equal, no other substitutes except as specifically noted below. The generator shall be rated for continuous output at the value and temperature rise indicated at 0.8 power factor. The generator shall be 2/3 pitch winding, 3 phase, 277/480 volt, 12 lead reconnectable, with PMG excitation.

- H. If a Marathon or other generator of equivalent or greater capacity is provided it shall be modified and upgraded prior to installation. Upon receipt of the generator from the factory it shall be taken to a manufacturer's authorized warranty service shop and the following tasks shall be performed:
1. Remove rotor assembly, bearing, exciter, diode plate and inspect for defects.
 2. If any defects are encountered immediately file a warranty claim with the manufacturer.
 3. Electrically test all windings.
 4. Encapsulate exciter rotor winding with epoxy.
 5. Replace bearing prior to reinstalling exciter. Bearing shall meet the minimum requirements of these specifications.
 6. Replace diode plate mounting bolts with grade 8 bolts and use Loctite.
 7. Insulate main rotor leads with phase paper. Secure leads with heat shrinkable polyester tape using epoxy on all knots.
 8. Spray coat all windings with epoxy.
 9. Dynamically balance and re-assemble.
 10. Test at rated RPM.

2.2 SPECIFIC CONFIGURATION

- A. **Clark's Point Engine-Generator Capacities and Configurations.**
Note that the engines for Clark's Point shall be furnished by the contractor and shall be new or shall be rebuilt in accordance with Section 26 32 13.20 Rebuilt Diesel Engines.
- No. 1: **Engine** - 223 hp, 150 ekW prime, John Deere 6068AFM75, Tier 2 Marine or 6068AFM85, Tier 3 Marine.
Starting and Control Voltage = 24 VDC (convert as required).
Generator - Minimum 170kW continuous at 105°C rise, Newage/Stamford UCI274G or Kato equal.
Voltage Regulator Cross Current Transformer Ratio = 300:5
- No. 2: **Engine** - 98 hp, 65 ekW prime, John Deere 4045TFM75, Tier 2 Marine.
Starting and Control Voltage = 24 VDC (convert as required).
Generator - Minimum 90kW continuous at 105°C rise, Newage/Stamford UCI274C or Kato equal.
Voltage Regulator Cross Current Transformer Ratio = 150:5
- No. 3: **Engine** - 98 hp, 65 ekW prime, John Deere 4045TFM75, Tier 2 Marine.
Starting and Control Voltage = 24 VDC (convert as required).
Generator - Minimum 90kW continuous at 105°C rise, Newage/Stamford UCI274C or Kato equal.
Voltage Regulator Cross Current Transformer Ratio = 150:5

- B. Port Heiden Engine-Generator capacities and configurations.**
Note that the engines for Port Heiden shall be Owner furnished in accordance with Section 26 32 13.50 Owner Furnished Diesel Engines.
- No. 1: **Engine** - 297 hp, 210 ekW prime, John Deere 6090AFM75, Tier 2 Marine.
Starting and Control Voltage = 24 VDC.
Generator - Minimum 260kW continuous at 105°C rise, Newage/Stamford HCI434D or Kato equal.
Voltage Regulator Cross Current Transformer Ratio = 400:5
- No. 2: **Engine** - 297 hp, 210 ekW prime, John Deere 6090AFM75, Tier 2 Marine.
Starting and Control Voltage = 24 VDC.
Generator - Minimum 260kW continuous at 105°C rise, Newage/Stamford HCI434D or Kato equal.
Voltage Regulator Cross Current Transformer Ratio = 400:5
- No. 3: **Engine** - 148 hp, 100 ekW prime, John Deere 4045AFM85, Tier 3 Marine.
Starting and Control Voltage = 24 VDC (convert from 12 VDC).
Generator - Minimum 140kW continuous at 105°C rise, Newage/Stamford UCI274F or Kato equal.
Voltage Regulator Cross Current Transformer Ratio = 200:5

2.3 ENGINE

- A. Provide a skid mounted, 1800 RPM, diesel engine complete with generator/alternator and ready for service. Except where specific allowance is made in this specification for rebuilt or remanufactured engines, the unit shall be of newest design and of recent manufacture.
- B. Marine engines shall be furnished without a charging alternator, heat exchanger, coolant expansion tank, or accessory reduction gear drive. Factory installed components shall be removed as required.
- C. The engine shall be a four-cycle, water-cooled, direct injection diesel engine of 4 or 6 cylinder in-line configuration as indicated by model number and shall be provided with a gear driven coolant pump where offered by manufacturer.
- D. Cylinder Liners: The engines shall be provided with removable cylinder liners to facilitate field rebuilding.
- E. Horsepower: Certified engine power curves and fuel consumption at 25%, 50%, 75%, and 100% loading, shall be submitted showing the manufacturer's approval of the engine rating for engine generator prime power application. Special ratings or "continuous standby" ratings will not be acceptable.
- F. Engine Control: All engine control functions will be performed by remote switchgear which will perform all start/stop, speed, paralleling, and load sharing control functions in addition to all engine function monitoring and safety shut downs. Engine manufacturer's electronic control panels shall not be provided.
- G. ECU and Isochronous Governor: The engine speed shall be 1800 RPM over the entire load range. The frequency at any constant load, including no load, shall remain within +/- 0.5% isochronous control for rated frequency operation. Provide an Engine Control Unit (ECU) for interface with the switchgear.

- H. Fuel: The engine shall be capable of satisfactory performance on No. 1 Arctic Grade Fuel or No. 2 Domestic Burner Oil.
- I. Fuel System: The engine shall have manufacturer's engine mounted fuel filters with replaceable elements. Fuel supply and return lines shall be routed to the front of generator skid for field connection to the plant piping. See Drawings for detailed configuration.
- J. Lubrication: The engine shall have a gear type lubricating oil pump for supplying oil under pressure to the main bearings, crankshaft bearings, pistons, piston pins, timing gears, camshaft bearings and valve rocker mechanism. Threaded spin-on type, full flow lubricating oil filters shall be provided. The oil drain line shall be connected to the front of generator skid for field connection to the plant piping. See Drawings for detailed configuration.
- K. Oil Level: The engine shall have a combination visual oil level site gauge with adjustable high and low level switches, Murphy L129CK1 or approved equal. Mount on rubber isolators and connect to engine with minimum #8 hoses. Carefully route upper vent hose to avoid any low point traps and connect directly into crankcase. Route lower hose to a connection directly on the oil pan. Do not tee lower hose into oil drain line. See Drawings for installation detail.
- L. Fuel and Oil Hoses: All hoses for fuel, lube oil, vents, mechanical gauges, etc., shall be Aeroquip type FC300, Eaton Weatherhead H569 or approved equal. Minimum hose size shall be 5/16" (#6). Provide with re-useable JIC swivel type fittings. Push-on or barb type hose connections will not be allowed. Route hoses to avoid wear points and to ensure access to normal service points on the engine. Securely support hoses from engine and skid.
- M. Glycol Hoses: All hoses for glycol shall be Teflon hose with stainless steel outer braid, Eaton Weatherhead H243 or approved equal. Provide with re-useable plated steel straight JIC swivel ends with NPT adapters. Route hoses to avoid wear points and to ensure access to normal service points on the engine. Securely support hoses from engine and skid.
- N. Wire Loom: All wiring for control and instrumentation shall be routed in plastic loom. Provide tee fittings for all branch connections. Route loom to avoid wear points and to ensure access to normal service points on the engine. Securely support loom from engine and skid.
- O. Protective Guards: All moving parts and hot surfaces shall be provided with protective guards in accordance with U.L Standard 2200.
- P. Air Cleaners: The engine shall be provided with a dry-type, replaceable element air cleaner with a metal canister, Donaldson or approved equal. Open disposable type air filters or plastic canisters will not be accepted. Provide visual air restriction indicator, 20" water column limit, manual reset, Donaldson X002251 or approved equal.
- Q. Starting: The engine shall be equipped with a 24 VDC electric starting system, as indicated in Paragraph 2.2 - Specific Configuration. The starting system shall be of sufficient capacity to crank the engine at a speed which will allow full diesel

starting. A starter auxiliary relay shall be remote mounted in control wiring junction box, Caterpillar 9X-8124 or approved equal.

- R. Control Power: To provide 24VDC power to the control wiring junction box, a 30A circuit breaker with switch shall be mounted on the engine in the vicinity of the starter, Cooper 187-030-F-00 or approved equal.
- S. Sensors and Safety Controls: The engine shall be equipped with the following:
1. Exhaust Gas Temperature. High temperature (650°C) 2 wire 100 ohm RTD with 2' high temperature lead wire, Deutz DT06-2S-E008 male connector, Deutz DT04-2P-E008 female connector, and compression fitting with 1/4" MPT adapter. Eustis RGB7B203B02WT with NS44 adapter or approved equal. See note 2 below.
 2. Air Filter Vacuum Sensor. 4-20mA, -30"Hg to 0 PSIG, 1/4" MPT. Noshok 100-30V-1-1-2-7 or approved equal.

Note 1. The above listed sensors shall be independent from engine gauges and all other devices and sensors. Where standard factory furnished sensors for the above listed functions are required for operation of the ECU, provide additional duplicate sensors as specified. All sensors shall be installed on the engine and wired to terminal blocks as indicated in the Drawings.

Note 2. Upon completion of shop testing, if exhaust gas temperature sensor is installed in flex remove sensor and tywrap to engine in a secure location for shipping.

- T. Safety Controls: The automatic switchgear provided by others shall be equipped with automatic safety controls which will shut down the engine in the event of high jacket water temperature (primary), high lubricating oil temperature, low lubricating oil pressure, high or low lubricating oil level, high air filter restriction, and engine overspeed based on J1939 CANbus and engine mounted sensors. Note that a single low water shut down switch will be installed on the external cooling system.

2.4 EXHAUST FLEX

- A. A flexible, continuous, 18 inch long stainless steel exhaust flex connector with welded connections shall be furnished for each engine, Alaska Rubber or approved equal. Provide an appropriate engine mating connection at one end and an ASA 125 lb. flange sized to match silencer at the opposite end. Slotted cuff connections are not acceptable. Provide gasket, bolts, v-clamp, or any other components required for connection to the engine. Provide a 90° elbow where required for the flex to be installed vertically. Note that if the exhaust temperature sensor cannot be installed directly in the outlet connection, a 1/4" FPT stainless steel thread-o-let shall be welded into the flex between the engine connection and the corrugated hose.

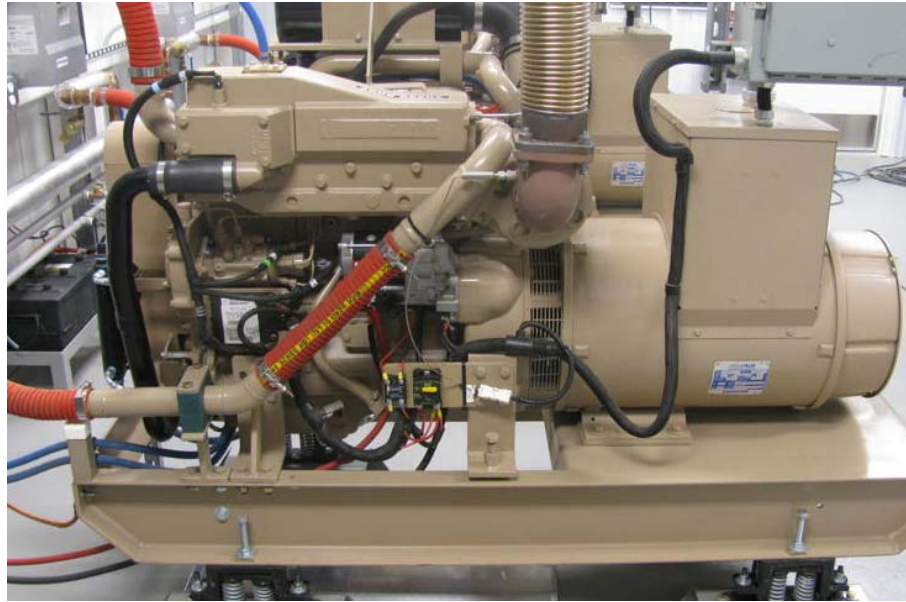
2.5 ACCESSORIES

Provide the following accessories for each generating unit (unless otherwise indicated):

- A. Spring vibration isolators complete with mounting hardware, four (4) per each unit, sized for the complete engine generator unit weight. Caldyn or approved equal.
- B. Drip pan, 16-gauge galvanized sheet metal, liquid tight joints, 20" wide by 50" long by 1" high.
- C. Provide two each minimum 800 cold crank amp 12-volt starting batteries, two for each engine. Batteries shall be sealed maintenance free, Optima Red Top NAPA Part Number BAT N993478RED or approved equal. Each battery shall be installed in a battery rack sized to securely hold the battery and shall include a minimum 5/8" plywood base.
- D. Each engine shall be provided with two each #2/0 AWG arctic flex battery cables, length as required, plus one each #2/0 AWG by 12-inch long jumper. All cables shall include compression type terminal ends. One battery cable shall be red for the positive lead and the other shall be black for the negative lead. The jumper shall be black with red heat shrink one end.

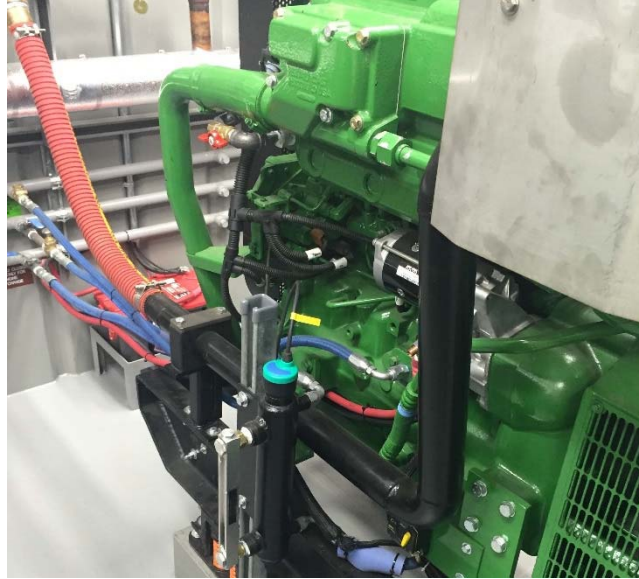
2.6 COOLING SYSTEM

- A. Engine cooling shall be by remote radiators with coolant circulation driven by the engine coolant pump.
- B. Glycol Filter: Provide screw-on canister style filter element with 3/8" NPT connections on head, Wix #24019 head with #24069 element or approved equal. Mount head on steel bracket fixed to front or side of engine. Connect to engine with glycol hoses with 3/8" NPT quarter turn gauge cock isolation valves. Connect inlet to thermostat housing and connect outlet to water pump inlet. On thermostat housing connection provide 3/8" NPT tee fitting with plug for field connection of pre-heat line by others. When filters are provided as part of engine manufacturer's assembly the standard factory filters may be substituted for the above specified parts; however, equivalent mounting, connections, and isolation valves shall be included.
- C. On marine engines provide modifications as follows:
 1. John Deere 4045TFM - Remove coolant tank and other accessories that are not required. Install a bent or welded section of 2 inch steel tube routed to the front of the left skid and supported from the skid. Provide hose barbs on each end and connect to engine suction fitting with short section of silicone hose as required. See photograph below for representative installation.

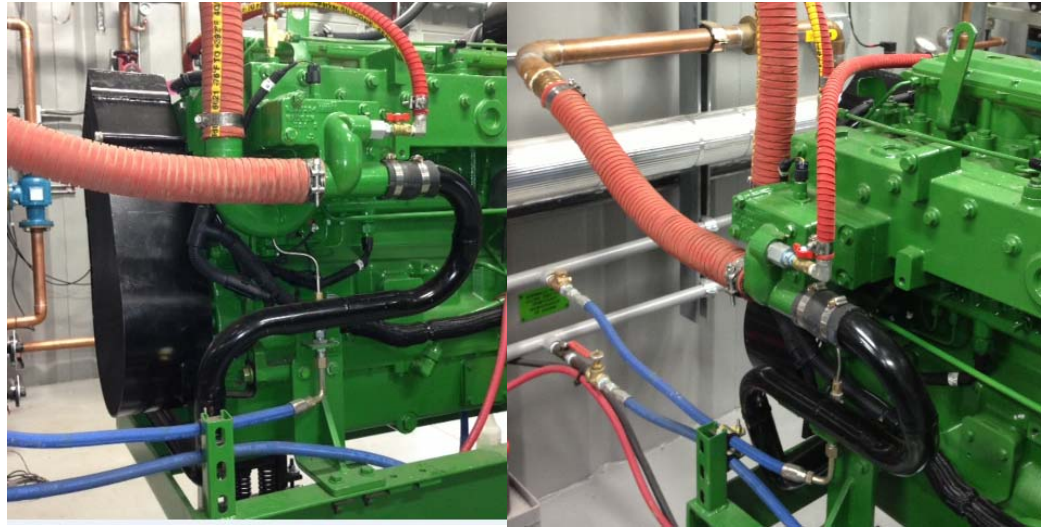


2. John Deere 4045AFM - Remove coolant tank and other accessories that are not required. Note that the 4045AFM85 engines have small ports in the coolant hose connection fittings that are overly restrictive. To provide adequate flow for prime power application remove the coolant discharge and suction connection fittings. Cut off hose ends and drill or bore out a 2.5 inch hole. Furnish new 2 inch aluminum king nipples, cut off threads, and weld to housings. Reinstall connection fittings with discharge oriented vertically and suction oriented horizontally. Install a bent or welded section of 2 inch steel tube routed to the front of the left skid and supported from the skid. Provide hose barbs on each end and connect to engine suction fitting with short section of silicone hose as required. See photographs below for representative installation.





3. John Deere 6068AFM - Remove coolant tank and other accessories that are not required. Modify coolant discharge connection to face vertically at the front of the engine. Modify coolant suction connection to face horizontally at the front of the engine. See photographs below for representative installation.



4. John Deere 6090AFM - Remove coolant expansion tank and other accessories that are not required. Manifold vent lines into a single connection near the front with a 3/8" NPT quarter turn gauge cock isolation valve. See photograph below for representative installation.



2.7 INSTRUMENT PANEL

- A. Provide a J1939 multi-function monitoring panel, Murphy PV101-C or approved equal. The panel shall be mounted on the side of the control wiring junction box. Provide with wiring harness as required for connection to ECU and battery power.

2.8 GENERATOR/ALTERNATOR

- A. Generator shall be a single bearing, four pole, synchronous type. Generator shall be directly connected to the engine flywheel housing and driven through a flexible coupling to ensure permanent alignment. The generator shall be rated three phase, 277/480V, 60 Hz, 1800 RPM, brushless, 12 lead reconnectable, and winding pitch of 2/3 design. Windings shall be random wound and lashed at the end turns to provide superior mechanical strength.
- B. The rotating assembly shall be dynamically balanced to less than 2 mils peak to peak displacement and shall be designed to have an over speed withstand of 125% of rated speed for 3 minutes when operating at stable rated operating temperature.
- C. Cast iron end brackets with bearing bores machined for an O-Ring to retard bearing outer race rotation and fabricated steel frames shall be used. Bearings shall be pre-lubricated, double shielded, ball type, single row Conrad, C3 fit. Minimum B-10 bearing life shall be 30,000 hours for single bearing units.
- D. Generator wiring diagram shall be permanently installed on the inside of the terminal enclosure cover.
- E. The insulation system of both the rotor and stator shall be of NEMA Class H materials or better and shall be synthetic and non-hygrosopic. The stator winding shall be given multiple dips of resin, plus a final coating of epoxy for extra moisture and abrasion resistance. The rotor shall be layer wound with thermosetting 100% solids epoxy between each layer, plus a final coating of epoxy for moisture and abrasion resistance. The shaft exposed metal surfaces and rectifier assembly shall be coated with an epoxy varnish.

- F. The generator shall be equipped with a permanent magnet generator (PMG) excitation system. Both the PMG and the rotating brushless exciter shall be mounted outboard of the bearing. The system shall supply a minimum short circuit support current of 300% of the rating for 10 seconds. The rotating exciter shall use a three-phase full wave rectifier assembly with hermetically sealed silicon diodes protected against abnormal transient conditions by a multi-plate selenium surge protector. The diodes shall be designed for safety factors of 5 times voltage and 3 times current.
- G. Voltage Regulator: The voltage regulator shall be compatible with the PMG excitation and shall control the output of the brushless AC generator by regulating the current into the exciter field. The regulator shall include electromagnetic interference (EMI) filtering and under frequency roll-off protection. The voltage regulation shall be 0.25% from no load to full load and 4% frequency variation. Caterpillar CDVR, Basler BE2000E, or approved equal.
1. The voltage regulator shall be mounted inside of the control wiring junction box as indicated in the Drawings.
 2. The voltage regulator shall be furnished complete with a cross current transformer (CT) for paralleling operation. Install the CT on Phase B generator lead with H1 facing towards the generator. The CT ratio shall be as indicated in Paragraph 2.2 - Specific Configuration.
 3. Provide a wiring harness and terminal strips for connecting the voltage regulator to the cross current transformer, 3 phase voltage sensing, field, and PMG blocks as indicated in the Drawings.
- H. Nameplate: On the side of the generator housing, provide a nameplate that provides the following information. The nameplate shall be located in a clearly visible location and shall not be obscured by the terminal enclosure or located such that the nameplate is behind any part of the generator or housing.
1. Rated kW as specified.
 2. Full load amps.
 3. Rated voltage, phase, and power factor.
 4. Rated voltage and current of the field exciter.
- I. Each generator shall be provided with a standard sized terminal compartment. The terminal compartment shall be provided with a load connection block to allow easy field termination of the load, neutral, and ground conductors. The generator neutral connection shall not be connected to the mounting skid or the generator frame. The neutral shall be isolated for field grounding at the switchgear or transformer.
- J. The generator shall be self-ventilated with a direct drive one-piece, cast aluminum alloy, unidirectional internal fan for high volume, low noise air delivery. Airflow shall be from opposite drive end through generator to drive end. The exciter shall be in the airflow.
- K. Replace the standard factory hardware used for attachment of the generator coupling disc to the engine flywheel with Grade 8 hex head bolts. Install heavy

gauge washers, tighten and torque bolts in accordance with manufacturer's specifications, and paint pen mark.

2.9 MOUNTING SKID

- A. The engine and generator shall be equipped with a suitable full length base frame (skid) for mounting the engine and generator. The skid shall be constructed from structural steel channel with ends beveled and plated for short term skidding and rolling of unit. **No formed or stamped steel base frame designs will be accepted.** Provisions shall be made so that the generator can slide back a minimum of 12" to access the rear main seal on the engine without removing the generator end off of the skid or requiring the use of blocking to support it. See the Drawings for skid design and layout.
- B. Provisions shall be made in the skid for the mounting of vibration isolators at locations as indicated on the Drawings. Wedge washers shall be welded in place on the skid to provide a flat surface for the vibration isolator lock nuts.
- C. Each engine generator shall be placed on the skid at the location indicated on the Drawings.

2.10 WIRING INTERFACE WITH REMOTE SWITCHGEAR

- A. A control wiring junction box shall be furnished for each generator as follows:
 - 1. The junction box shall be steel, NEMA 4, with hinged door and screw down latches. Hoffman or approved equal. See Drawings for size.
 - 2. The junction box orientation, device layout, terminal block layout, and labeling shall be as indicated on the Drawings.
 - 3. Install the voltage regulator and the instrument panel as previously specified in the junction box as shown on the Drawings.
 - 4. All wiring for control, monitoring, and safety shall be terminated on terminal blocks within the control wiring junction. The terminals shall be IDEC or approved equal, BNH15LW except where indicated 50A provide BNH50W. Terminals shall be mounted on DIN rail with heavy duty end anchors. Each terminal block and all wire terminations shall be individually numbered as indicated.
 - 5. The engine and generator mounted control wiring shall be provided with a maintenance loop of sufficient length to allow the generator to be slid back 12" minimum for maintenance of the engine without disconnecting any control wiring.
- B. The DC power supply for the switchgear shall be provided from the engine starting batteries through the engine-mounted circuit breaker. Terminals shall be provided as indicated on the Drawings for supplying 24 VDC to the switchgear. The engine start and run systems shall be 24 VDC as indicated in Paragraph 2.2 - Specific Configuration. All remote indication will be 24VDC, 4-20mA, or as otherwise indicated. All switches used for remote indication shall be rated for operation at 24 VDC.

2.11 PAINTING

Each unit shall be painted John Deere green including engine, skid, and generator.

2.12 SPARE FILTERS

In addition to the filters installed on the engines, provide the following quantities of replacement filters for each engine plus break in oil. Package spare filters and oil in boxes and label each box with the community name.

- A. Twelve (12) oil filters.
- B. Four (4) fuel filters.
- C. Three (3) air filters
- D. Four (4) glycol filters.
- E. Break in oil identical to oil installed in engine. Two (2) gallons for 6 cylinder engines and one (1) gallon for 4 cylinder engines.

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. Prior to shipment, the engine generator Fabricator shall perform factory tests on each unit at the shop where the engine generator is assembled. Supply sufficient notice to the Authority prior to performing tests. The Authority reserves the right to witness all tests. Test procedures shall conform to ASME, IEEE, and ANSI standards, and NEMA standard practices section on testing, as appropriate and applicable.
- B. The Fabricator shall provide all required mechanical and electrical equipment including but not limited to fuel supply, radiator, air cooler, voltage regulator, and load bank.
- C. The Fabricator shall provide all required measuring and indicating devices. All devices shall be certified correct or correction data furnished for the device.
- D. Prior to performing test, the engine generator Fabricator shall verify that engine is filled with break in oil. The break in oil shall be approved by the engine manufacturer for 100 to 500 hour run time, John Deere Break-In Plus or approved equal. Note that if the engine is used or Owner-furnished, the existing oil shall be drained and replaced with specified oil. Pull a sample of the clean lube oil installed in the engine.
- E. Engine Tests: Shop test each engine generator with the associated control wiring junction box permanently connected. Perform customary commercial factory tests on each engine generator including, but not limited to, the following:
 - 1. Perform hydrostatic test on water jackets to assure that water seals and water jackets are watertight. Test report shall indicate pressure at which test was made and the results.
 - 2. Place engine in continuous operation without stoppage for a period of not less than eight hours. Operate not less than one hour at each load point (1/2, 3/4, and full load) and 1 hour at 110 percent of rated load. If

stoppage becomes necessary during this period, repeat the 8-hour run. Also record the following data at the start, at 15-minute intervals, and at the end of each load run: Hz, kW load, fuel consumption, exhaust temperature, intake air temperature, jacket water temperature, lube oil temperature, lube oil pressure, manifold (boost) pressure, and crankcase vacuum.

3. Pull a sample of the lube oil after performing test.
- F. Tests shall indicate satisfactory operation and attainment of guarantees and specified performance. Provide test reports including certified copies of all Fabricators' test data and results. Include laboratory analysis for the clean lube oil sample and the sample pulled after the test. Contractor shall not install equipment without approval by the Authority of the shop test reports.

3.2 SHIPPING

- A. After testing, and immediately prior to shutdown for shipping perform the following steps:
1. Remove any dirt from the air cleaner; check all seals and gaskets. Put lubricant on all points given in the lubrication chart of the engine operation guide.
 2. Turn the engine at cranking speed with governor control in full off position and use a sprayer to add a mixture of 50% VCI (volatile corrosion inhibitor) oil and 50% 30 weight oil into the air intake or turbocharger inlet.
 3. Continue spraying the mixture of 50% VCI oil and 50% 30-weight engine oil into the air intake or turbocharger inlet to ensure the cylinders and exhaust ports are coated with the oily mixture.
 4. Clean the outside of the engine and inspect and ensure that the engine and generator are covered by good quality paint. Correct any deficiencies.
 5. Spray a thin amount of 50% VCI oil and 50% 30-weight engine oil on the flywheel, ring gear teeth, and starter pinion. Install the covers to keep the vapors in.
 6. Put a heavy layer of multipurpose grease on all outside parts that move, i.e. threaded rod, ball joints, linkage, etc.
 7. Flush the cooling system with extended life 50/50 ethylene glycol mix, Shell Rotella ELC or approved equal. Install covers over the connections. Note that if testing was performed with extended life ethylene glycol solution the engine does not need to be flushed.
 8. Install a positive mechanical seal consisting of a fitting plate and gasket on exhaust opening. Then install all covers and/or tape on openings, air intake, exhaust openings, flywheel housing, etc. Ensure all covers are air tight and weatherproof. Use waterproof, weather resistant type tape. Do not install tape in such a manner as will damage paint when the tape is

removed. Install a mechanical protective device over any protruding items, which may be vulnerable to damage during transportation.

- B. After preparing the equipment for shipping, package each engine generator separately as follows:
 - 1. Coil wiring harnesses and secure control wiring junction box to generator.
 - 2. Put a waterproof cover over the entire engine generator unit. Make the cover tight, but loose enough to let air circulate around the unit to prevent damage to exposed metal parts from condensation.
 - 3. All other included components (spare parts, loose items, etc.) shall be packaged individually in waterproof wrapping. Each individual component package shall then be packed in a box or crate, and each box/crate wrapped in waterproof wrapping to prevent corrosion to the components during extended periods of outside storage. All boxes or crates shall be palletized onto the minimum number of pallets, as required for the quantity and size of the boxes/crates.

3.3 INSTALLATION AND COMMISSIONING

- A. Install the engine generators as indicated on the Drawings.
- B. Adjust spring vibration isolators as indicated on the Drawings.
- C. Ensure correct fit and alignment of all connections to not cause stress on engine connections or wear on piping, hoses, conduit, wiring, etc.
- D. During functional testing and commissioning, perform final inspection and testing as required to ensure full authorization of factory warranty. John Deere Application review AG04-A or equivalent.

END OF SECTION

SECTION 26 32 13.20
REBUILT DIESEL ENGINES

PART 1 - GENERAL

1.1 SCOPE

- A. The Work included herein shall consist of furnishing diesel engines as specified herein.
- B. The purpose of this solicitation is to procure used diesel engine(s), rebuilt to original equipment manufacturer (OEM) tolerances, durability, and quality. The diesel engine(s) will be used in a prime power, 1800 rpm, genset application. Rebuilt engines shall be delivered complete, tested, and ready for installation.
- C. The Authority will not be furnishing cores. The Rebuilder shall furnish cores in compliance with Section 26 32 13.10 Engine Generators, Paragraph 1.4, Regulatory Compliance.
- D. The engines shall be rebuilt in accordance with the requirements of 40 CFR 1068 and applicable NSPS standards.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results for Electrical
- B. Section 26 32 13.10 Engine Generators

1.3 SUBMITTALS

- A. Provide in accordance with Section 26 05 00 Common Work Results for Electrical and Division 1.
- B. See Section 26 32 13.10 Engine Generators for additional requirements.
- C. Provide the following a minimum of seven days prior to beginning final engine assembly:
 - 1. An action plan specifying all work to be performed on existing engine components and a complete list of all new and remanufactured parts to be installed on each engine, with indication of new/remanufactured status.
 - 2. All NDT inspection reports, existing component and original OEM dimensions and clearances, recorded by engine serial number for each engine. Note that if the contractor is furnishing OEM factory remanufactured engines the above information may not be available prior to final assembly. The information shall be provided as soon as available. If the results of the above inspections do not meet the requirements of these specifications for any engine that engine will be rejected.

1.4 REGULATORY COMPLIANCE

See Section 26 32 13.10 Engine Generators, Paragraph 1.4, Regulatory Compliance

1.5 QUALITY ASSURANCE

- A. Engines shall not have been in service at any time after rebuilding and prior to delivery except as required to comply with Section 26 32 13.10 requirements for Factory Tests.

- B. All new and refurbished parts, castings, assemblies and components furnished under these specifications shall meet original OEM specifications and be provided with contractor's warranty.
- C. All work shall be performed by certified and experienced technicians trained and authorized to work on the engines being rebuilt and furnished.
- D. All nondestructive testing (NDT) of castings and parts provided under these specifications to be performed to ASTM standards. All NDT inspections shall be performed by a Level II or Level III certified NDT inspector using a certified Quality System.
- E. Where items are described as factory rebuilt or remanufactured, the term factory shall mean a machine shop that is regularly engaged in the practice of remanufacturing the type of items required.

1.6 REBUILDER QUALIFICATIONS

Engines shall be rebuilt by a qualified rebuilder (Rebuilder) who is regularly engaged in the business of rebuilding diesel engines.

- A. The Rebuilder must have staff with extensive experience in rebuilding diesel engines. A list of five prior projects that key staff have worked on may be requested by the Authority after the bid opening and prior to award in order to verify Rebuilder qualifications. The list must include installation date, description of work, and a reference contact for each project.
- B. The Rebuilder must have a fabrication facility with adequate space and appropriate equipment as required to perform the work. The Authority may inspect the Rebuilder's shop after the bid opening and prior to award in order to verify Rebuilder qualifications.

1.7 CONTRACTOR WARRANTIES

See Section 26 32 13.10 Engine Generators

1.8 OPERATION AND MAINTENANCE MANUALS

See Section 26 32 13.10 Engine Generators

PART 2 - PRODUCTS

2.1 ENGINE MANUFACTURER, MODEL, CONFIGURATION, AND MODEL YEAR

See Section 26 32 13.10 Engine Generators

2.2 ENGINE REBUILD STANDARDS AND PROCEDURES

- A. Replacement Parts: These specifications require that some existing engine components be reconditioned and reused. Other components are required to be replaced with either new or factory remanufactured parts. For the remaining components, the Rebuilder may recondition the existing part, or replace it with either a new or factory remanufactured part. All parts and components, whether new, remanufactured, or reconditioned, shall meet or exceed original OEM

specifications, tolerances, durability and quality. Refer to the specific components listed below in this section.

- B. Disassembly & Cleaning: The used engine furnished for rebuilding shall be fully disassembled for cleaning, part inspection, qualification and reconditioning. All cylinder liners, core plugs, passage plugs and other fittings shall be removed from all castings, including the cylinder block, cylinder head, oil cooler/filter housing, exhaust manifold, intake manifold, flywheel housing, front cover, etc., to enable complete and thorough cleaning. All bearings and bushings shall be removed. All castings and other parts to be inspected shall be cleaned in a caustic cleaning solution to remove all grease, oil, loose paint, surface corrosion, carbon deposits and any other foreign material. All oil passages shall be mechanically cleaned where possible and confirmed to be free of any obstructions. After cleaning, all parts subject to corrosion shall be lightly oiled and wrapped.
- C. Inspection and Measurement: After disassembly and cleaning, the following castings shall be visually and magnetic particle NDT inspected for defects: cylinder block external surfaces, cylinder block main bearing housing bore, cylinder head, crankshaft and camshaft (remove galley plugs, counterweights and gears), flywheel housing, timing gear cover, intake manifold and exhaust manifold. All components that are to be reused in engine assembly shall be inspected and measured to confirm tolerances are within OEM specifications.
- D. Corrective Action Plan: After cleaning, inspecting, and measuring all engine components to be reused in the engine assembly, provide a corrective action plan, including a complete parts list with measured dimensions and OEM specified tolerances, for each engine serial number and submit to the Engineer for approval prior to proceeding with engine assembly. All engine components shall be upgraded to include the latest factory design improvements and shall be included in the corrective action plan.
- E. Threaded Connections, Hardware and Fasteners: All threaded holes shall be inspected and tapped. Fasteners and hardware that are corroded, damaged, or do not meet original OEM specifications shall be replaced with new. All head bolts, flywheel bolts and any other torque-to-yield bolts shall be replaced with new. Any locking devices (such as lock washers and lock nuts) shall be replaced with new. During reassembly all fasteners shall be paint pen marked at the conclusion of final torque tightening.
- F. Cylinder Block: After cleaning and inspection, the existing cylinder block shall be reconditioned.
 - 1. The cylinder block shall be measured for deck height and deck surface flatness. The condition of all gasket and sealing faces as well as all O-ring lands and bolt holes shall also be inspected. All block surfaces shall be machined as necessary to meet OEM specifications. Furnish all new expansion plugs.
 - 2. The cylinder block main bearing housing bore shall be checked for proper fit of caps to block, bore roundness, diameters and alignment. If fit, dimensions, and alignment meet OEM specifications, hone existing caps. If fit, dimensions and alignment meet do not meet OEM specifications, replace caps and perform line bore.

3. After resurfacing block, recut cylinder counter bores to proper dimensions. Note that upper and lower bore inserts are permitted as long as they meet or exceed factory repair procedures and factory new counter bore depth is maintained. Ensure that all cylinder parent bores meet OEM specifications and check O-ring and crevice ring liner sealing areas for pitting prior to installing new cylinder liners.
 4. If the reconditioned block does not meet all original OEM specifications, the block shall be replaced with a used block that meets all original OEM specifications and has a manufacture date prior to Model Year 2014.
- G. Crankshaft: The crankshaft shall be either reconditioned or replaced with a factory remanufactured crankshaft. Undersized journals and repair sleeves shall not be allowed. As a minimum, reconditioning shall include confirmation that dimensional, hardness, alignment, wear surface finish, and seal surface finish conditions meet OEM specifications. If the crankshaft has passed all other inspections, the journals shall be polished and checked with a surface profilometer to meet or exceed OEM smoothness requirements.
- H. Connecting Rods: The connecting rods shall be reconditioned or replaced with new. If reconditioned only the castings shall be reused. After magnetic particle NDT inspection and checking for straightness, connecting rod big end shall be machined to OEM specifications using new bolts. Connecting rod small end shall receive a new bushing and be machined to OEM specifications.
- I. Pistons, Rings, and Sleeves: The pistons, piston rings, and cylinder liners shall be new OEM parts. Aftermarket parts shall not be used.
- J. Camshaft: The camshaft shall be either reconditioned or replaced with new. As a minimum reconditioning shall include confirmation that dimensional, hardness, alignment, wear surface finish, and seal surface finish conditions meet OEM specifications. If the camshaft has passed all other inspections, the lobes shall be ground to meet or exceed OEM specifications.
- K. Rocker Arms and Push Rods: The rocker arms and push rods shall be new OEM parts. Aftermarket parts shall not be used.
- L. Cylinder Head: The cylinder head shall be either reconditioned or replaced with a factory remanufactured complete assembly that meets or exceeds OEM specifications. If reconditioned, only the casting shall be reused with all parts replaced new. Welded, spray welded or otherwise repaired cylinder head castings shall not be allowed. Following are the minimum requirements for reconditioning the existing cylinder head:
1. After inspection, the cylinder head shall be measured for surface flatness and resurfaced as necessary to meet OEM specifications. Ensure that no pitted or corroded areas remain outside of the gasket sealing area.
 2. The overhead camshaft bores shall be measured for size and checked to ensure that roundness, taper, and alignment meet OEM specifications. Machining, line boring and straightening are acceptable practices for restoration of camshaft alignment. Fitting of replacement bearing shells, installing oversize components or performing metal build up are not acceptable practices for restoration of camshaft alignment.

3. All fuel injector sleeves, valves, seats, guides, springs, rotators and keepers shall be replaced new. Grind valves and seats to meet OEM specifications. After assembly, test valves and seats using a vacuum pump maintaining a minimum of 25in HG.
- M. Electrical and Controls: Furnish a new or remanufactured ECU, flashed to the service and emissions certification specified under Section 26 32 13.10 Engine Generators, Paragraph 1.4, Regulatory Compliance. Furnish new engine sensors and new wiring harnesses. Furnish new or remanufactured starter.
- N. Fuel System: Furnish new or remanufactured fuel injection pump, fuel transfer (lift) pump, injectors, and metering valves, Furnish new governor springs, filters, screens, gaskets, seals, O-rings, and fuel hoses. See Section 26 32 13.10 Engine Generators for hose type and installation. Inspect all metallic fuel tubing and replace with new if corroded, pitted, damaged, or otherwise not in compliance with OEM original specifications.
- O. Lubrication System: Furnish new or remanufactured oil pump and pressure valve. Furnish new oil cooler, thermetic regulating valve, filters, screens, gaskets, seals, O-rings and hoses. See Section 26 32 13.10 Engine Generators for hose type and installation. Inspect all metallic lubrication tubing and replace with new if corroded, pitted, damaged, or otherwise do not meet OEM original specifications.
- P. Cooling System: Furnish new or remanufactured water pump. Furnish new thermostat, filters, gaskets and hoses. See Section 26 32 13.10 Engine Generators for hose type and installation. Inspect all metallic coolant tubing and replace with new if corroded, pitted, damaged, or otherwise do not meet OEM original specifications.
- Q. Air Intake and Exhaust Systems: The existing intake and exhaust manifolds shall be reconditioned and reinstalled if deemed suitable for reuse after NDT and visual inspections. If either casting is deemed unsuitable for reuse, replace with new OEM casting. Furnish a new or remanufactured turbocharger. Furnish all new gaskets, clamps and seals.
- R. Painting: See Section 26 32 13.10 Engine Generators for painting

PART 3 - EXECUTION

3.1 FACTORY TESTS

See Section 26 32 13.10 Engine Generators

3.2 SHIPPING

See Section 26 32 13.10 Engine Generators

END OF SECTION

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SECTION 26 32 13.50
OWNER FURNISHED DIESEL ENGINES

PART 1 - GENERAL

1.1 SCOPE

- A. The Authority will furnish three (3) engines for the Port Heiden project as indicated in Section 26 32 13.10 - Engine Generators.
- B. The Work included herein shall consist of receiving Authority furnished diesel engines. All work required for modification, packaging into gensets, and testing is listed in Section 26 32 13.10 - Engine Generators.
- C. The engines have been determined to be in compliance with the requirements of Section 26 32 13.10 - Engine Generators, Paragraph 1.4, Regulatory Compliance.
- D. The engines are new and have not been in prior service. The details of the specific engines being furnished are described herein.

1.2 RELATED REQUIREMENTS

- A. Section 26 05 00 Common Work Results
- B. Section 26 32 13.10 Engine Generators

1.3 SUBMITTALS

See Section 26 32 13.10 Engine Generators

1.4 REGULATORY COMPLIANCE

See Section 26 32 13.10 Engine Generators

1.5 CONTRACTOR WARRANTIES –

See Section 26 32 13.10 Engine Generators

1.6 OPERATION AND MAINTENANCE MANUALS

See Section 26 32 13.10 Engine Generators

PART 2 - PRODUCTS

2.1 ENGINE #1 DETAILS – SERIAL # RG6090G014614

The following pages show pictures, build code sheets, and certificates of conformity.



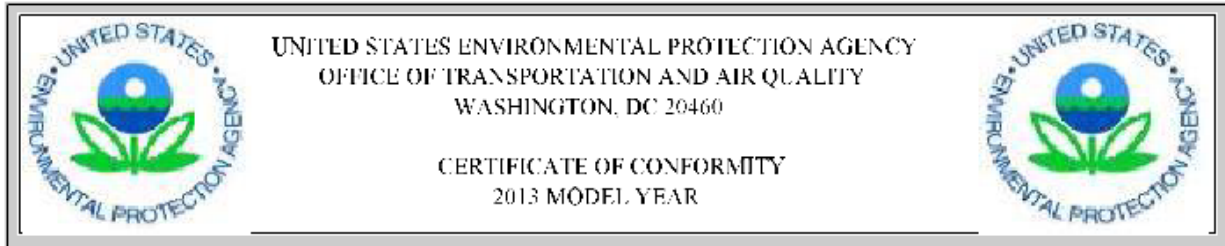
Search Results for RG6090G014614 :

Serial Number	Base Code	Model	Material	Manufactured Date	Parts Catalog No.
RG6090G014614	3071F	6090AFM75	6090AFM75	2013-11-06	PC10763

Rating	EPA Family	EUR Family	Emissions Label Part No.	EPA Certificate	CARB Certificate
6090AFM75E	DJDXN09.0136	N/A*	R539488	JDJ-MCI-13-07	

Option Name	Ordered	Factory	Distributor
<i>Description Not Available</i>	1099	*	*
Rocker Arm Cover, with John Deere Logo, Front Oil Fill	1108	1108	1108
Oil Filler Cover	1299	*	*
Crank Pulley, 8-rib Poly Vee, Viscous Damper	1350	1350	1350
Flywheel Housing, SAE #1, Gray Iron, with Front Access Plate, Not Sealed, with Provision for Electronic Tach Drive	1435	1435	1435
Flywheel, 355.6mm (14 in.) Over Center Clutch, 129 tooth 8/10 Pitch Ring Gear	1550	1550	1550
Fuel System, Nippondenso, HPCR, 12V or 24V, 1600cc Injectors, Propulsion/Genset	1601	1601	1601
Air Inlet, Propulsion & Genset, No Air Heater	1712	1712	1712
Air Cleaner, Propulsion/Genset	1802	1802	1802
Oil Pan, Aluminum, Shallow Sump, Side Drain, 30 Degree Off-Level Capability with Drain Valve, 31L	1932	1932	1932
Water Pump	2001	2001	2001
Thermostat Cover, Dual Thermostats	2113	2113	2113
Thermostats (2), 82C (180F)	2201	2201	2201
Fan Drive, None	23GA	23GA	23GA
Fan Belt, Composite Belt Guard, for use with Small Frame Alternator	2446	2446	2446
Block Heater, None	2699	2699	2699
Expansion Tank, Keel Cooled	2702	2702	2702
Exhaust Manifold, Watercooled, Propulsion/Genset	2821	2821	2821
Closed Crankcase Ventilation System with Replaceable Filter	2910	2910	2910
Starter, Denso, 24V, 7.8kW (10.5hp), LH 3-Bolt Type 1 Mount, Gear Reduction, Sealed for Wet Clutch	3005	3005	3005
Alternator, none (TVP not included)	3199	3199	3199
Fuel Filter, 24V, RH Side, Engine Mounted, Primary Filter, 10 Micron, with Water Separator and Secondary Filter, 2 Micron, Water-In-Fuel Sensor, Low Pressure Fuel Sensor, Electric Fuel Transfer Pump	3515	3515	3515
Thermostat Housing	3922	3922	3922
Dipstick, Integrated Dipstick & Tube, RH Side Block Mounted	4029	4029	4029
Belt-Driven Front Auxiliary Drive	4199	*	*

Option Name	Ordered	Factory	Distributor
Starting Aid, None	4399	4399	4399
Cylinder Block and Cam	4609	4609	4609
Tapered Nose Crankshaft and Main Bearings	4705	4705	4705
Connecting Rods and Pistons	4804	4804	4804
VALVE ACTUATING MECHANISM, OPT	4903	4903	4903
Oil Pump	5003	5003	5003
Cylinder Head with Valves	5101	5101	5101
Gear Driven Auxiliary Drive, None	5204	5204	5204
Air Intake Hose, None	5498	5498	5498
Shipping Stand, for use with #1 or #2 Flywheel Housing	5514	5514	5514
Paint, Agriculture Green (Finish Coat)	5603	5603	5603
Water Pump Cover	5711	5711	5711
Oil Filter & Cooler, RH Side, Engine Mounted, Propulsion/Genset	5937	5937	5937
Alternator Mounting, Small Frame Alternator	6220	6220	6220
Exhaust Elbow, Dry	6410	6410	6410
Turbocharger, Genset 1800 RPM	6565	6565	6565
Crankshaft Damper	6899	*	*
Engine Serial Number Plate	6902	6902	6902
Power Rating, 24V, 222kW (297hp) @ 1800 RPM, Gen Set (200kWe)	72L3	72L3	72L3
Air Compressor Mounting Bracket, None	7499	7499	7499
Timing Gear Cover	7706	7706	7706
Air Compressor, None (for use w/ other than 5201 LH Aux Drive Base Unit)	7899	7899	7899
Sea Water Pump, None	8099	8099	8099
Software, Genset	8366	8366	8366
Wiring Harness, RH Service	8425	8425	8425
Starter Relay, 24V	9102	9102	9102
Emission Label, 1800 RPM Genset, MARPOL Annex VI compliant, EPA Marine Tier 2	93BY	93BY	93BY
Lift Straps	9806	9806	9806
SERVICE ONLY PARTS, FOR 6090AFM75 OPTION	9901	*	*



Manufacturer: **JOHN DEERE POWER SYSTEMS**
Engine Family: **DJDXN09.0136**
Certificate Number: **JDX-MCI-13-07**
Intended Service: **AUXILIARY**
Intended Service Fuel: **DIESEL**
FEI.s: **NOx: N/A THC+NOx: N/A PM: N/A**
Effective Date: **8/15/2012**
Date Issued: **8/15/2012**

A handwritten signature in black ink, appearing to read "Byron J. Bunker", is written over a horizontal line.

Byron J. Bunker, Director
Compliance Division
Office of Transportation and Air Quality

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. § 7547) and 40 CFR Part 94, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following marine engines, by engine family, more fully described in the documentation required by 40 CFR Part 94 and produced in the stated model year.

This certificate of conformity covers only those new marine compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 94 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 94.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR Part 94 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 94. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void ab initio for other reasons specified in 40 CFR Part 94.

This certificate does not cover marine engines sold, offered for sale, introduced, or delivered for introduction into commerce in the U.S. prior to the effective date of the certificate.

2.2 ENGINE #2 DETAILS – SERIAL # RG6090G014597

The following pages show pictures, build code sheets, and certificates of conformity.



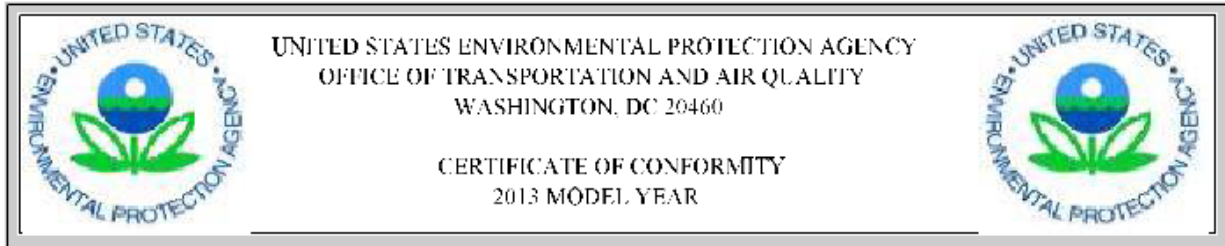
Search Results for RG6090G014597 :

Serial Number	Base Code	Model	Material	Manufactured Date	Parts Catalog No.
RG6090G014597	3071F	6090AFM75	6090AFM75	2013-11-06	PC10763

Rating	EPA Family	EUR Family	Emissions Label Part No.	EPA Certificate	CARB Certificate
6090AFM75E	DJDXN09.0136	N/A*	R539488	JDX-MCI-13-07	

Option Name	Ordered	Factory	Distributor
<i>Description Not Available</i>	1099	*	*
Rocker Arm Cover, with John Deere Logo, Front Oil Fill	1108	1108	1108
Oil Filler Cover	1299	*	*
Crank Pulley, 8-rib Poly Vee, Viscous Damper	1350	1350	1350
Flywheel Housing, SAE #1, Gray Iron, with Front Access Plate, Not Sealed, with Provision for Electronic Tach Drive	1435	1435	1435
Flywheel, 355.6mm (14 in.) Over Center Clutch, 129 tooth 8/10 Pitch Ring Gear	1550	1550	1550
Fuel System, Nippondenso, HPCR, 12V or 24V, 1600cc Injectors, Propulsion/Genset	1601	1601	1601
Air Inlet, Propulsion & Genset, No Air Heater	1712	1712	1712
Air Cleaner, Propulsion/Genset	1802	1802	1802
Oil Pan, Aluminum, Shallow Sump, Side Drain, 30 Degree Off-Level Capability with Drain Valve, 31L	1932	1932	1932
Water Pump	2001	2001	2001
Thermostat Cover, Dual Thermostats	2113	2113	2113
Thermostats (2), 82C (180F)	2201	2201	2201
Fan Drive, None	23GA	23GA	23GA
Fan Belt, Composite Belt Guard, for use with Small Frame Alternator	2446	2446	2446
Block Heater, None	2699	2699	2699
Expansion Tank, Keel Cooled	2702	2702	2702
Exhaust Manifold, Watercooled, Propulsion/Genset	2821	2821	2821
Closed Crankcase Ventilation System with Replaceable Filter	2910	2910	2910
Starter, Denso, 24V, 7.8kW (10.5hp), LH 3-Bolt Type 1 Mount, Gear Reduction, Sealed for Wet Clutch	3005	3005	3005
Alternator, none (TVP not included)	3199	3199	3199
Fuel Filter, 24V, RH Side, Engine Mounted, Primary Filter, 10 Micron, with Water Separator and Secondary Filter, 2 Micron, Water-In-Fuel Sensor, Low Pressure Fuel Sensor, Electric Fuel Transfer Pump	3515	3515	3515
Thermostat Housing	3922	3922	3922
Dipstick, Integrated Dipstick & Tube, RH Side Block Mounted	4029	4029	4029
Belt-Driven Front Auxiliary Drive	4199	*	*

Option Name	Ordered	Factory	Distributor
Starting Aid, None	4399	4399	4399
Cylinder Block and Cam	4609	4609	4609
Tapered Nose Crankshaft and Main Bearings	4705	4705	4705
Connecting Rods and Pistons	4804	4804	4804
VALVE ACTUATING MECHANISM, OPT	4903	4903	4903
Oil Pump	5003	5003	5003
Cylinder Head with Valves	5101	5101	5101
Gear Driven Auxiliary Drive, None	5204	5204	5204
Air Intake Hose, None	5498	5498	5498
Shipping Stand, for use with #1 or #2 Flywheel Housing	5514	5514	5514
Paint, Agriculture Green (Finish Coat)	5603	5603	5603
Water Pump Cover	5711	5711	5711
Oil Filter & Cooler, RH Side, Engine Mounted, Propulsion/Genset	5937	5937	5937
Alternator Mounting, Small Frame Alternator	6220	6220	6220
Exhaust Elbow, Dry	6410	6410	6410
Turbocharger, Genset 1800 RPM	6565	6565	6565
Crankshaft Damper	6899	*	*
Engine Serial Number Plate	6902	6902	6902
Power Rating, 24V, 222kW (297hp) @ 1800 RPM, Gen Set (200kWe)	72L3	72L3	72L3
Air Compressor Mounting Bracket, None	7499	7499	7499
Timing Gear Cover	7706	7706	7706
Air Compressor, None (for use w/ other than 5201 LH Aux Drive Base Unit)	7899	7899	7899
Sea Water Pump, None	8099	8099	8099
Software, Genset	8366	8366	8366
Wiring Harness, RH Service	8425	8425	8425
Starter Relay, 24V	9102	9102	9102
Emission Label, 1800 RPM Genset, MARPOL Annex VI compliant, EPA Marine Tier 2	93BY	93BY	93BY
Lift Straps	9806	9806	9806
SERVICE ONLY PARTS, FOR 6090AFM75 OPTION	9901	*	*



Manufacturer: **JOHN DEERE POWER SYSTEMS**
Engine Family: **DJDXN09.0136**
Certificate Number: **JDX-MCI-13-07**
Intended Service: **AUXILIARY**
Intended Service Fuel: **DIESEL**
FEI.s: **NOx: N/A THC+NOx: N/A PM: N/A**
Effective Date: **8/15/2012**
Date Issued: **8/15/2012**

Byron J. Bunker, Director
Compliance Division
Office of Transportation and Air Quality

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. § 7547) and 40 CFR Part 94, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following marine engines, by engine family, more fully described in the documentation required by 40 CFR Part 94 and produced in the stated model year.

This certificate of conformity covers only those new marine compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 94 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 94.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR Part 94 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 94. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void ab initio for other reasons specified in 40 CFR Part 94.

This certificate does not cover marine engines sold, offered for sale, introduced, or delivered for introduction into commerce in the U.S. prior to the effective date of the certificate.

2.3 ENGINE #3 DETAILS – SERIAL # PE4045L921702

The following pages show pictures, build code sheets, and certificates of conformity.



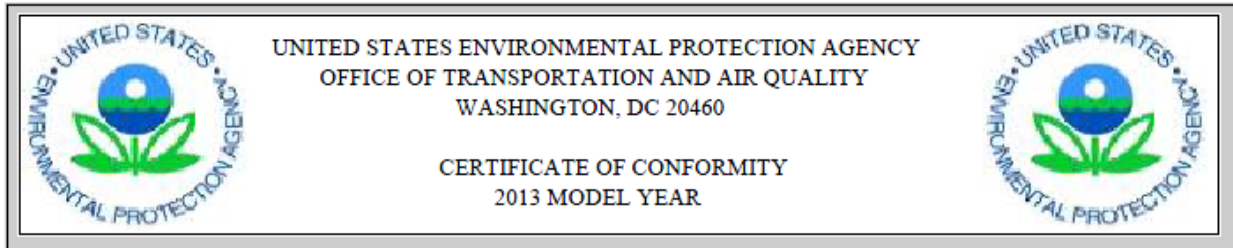
Search Results for PE4045L921702 :

Serial Number	Base Code	Model	Material	Manufactured Date	Parts Catalog No.
PE4045L921702	2841F	4045AFM85	4045AFM85	2013-07-05	PC11864

Rating	EPA Family	EUR Family	Emissions Label Part No.	EPA Certificate	CARB Certificate
4045AFM85E	DJDYN06.8148	N/A*	R540172	JDY-MCI-13-18	

Option Name	Ordered	Factory	Distributor
Rocker Arm Cover, Front Fill, w/ John Deere Nameplate	1143	1143	1143
Oil Fill, None	1299	1299	1299
Crankshaft Pulley, 168mm (6.6 in.), for Taper Nose Crank, For Front PTO	1333	1333	1333
Flywheel Housing, SAE #3, LH, 3-Bolt Type 1 Starter Mount with Rear Engine Oil Seal, Bottom Access Panel, Top Mag Pick-up Hole	1406	1406	1406
Flywheel, for SAE 292.1mm (11.5 in) Over-Center Clutch, 129 Tooth 8/10 Pitch Ring Gear	1597	1597	1597
Injection Pump, 1800 RPM & 1500 RPM, M1-M2 Propulsion	16GX	16GX	16GX
Air Intake, Includes CAC	17EM	17EM	17EM
Air Cleaner, 101.6mm (4.0 in.)	1857	1857	1857
Oil Pan	19CZ	19CZ	19CZ
Water Pump	2001	2001	2001
Thermostat Cover	2188	2188	2188
Thermostat, Dual, 160 Degree Blocking Thermostats	2229	2229	2229
Fan Drive, None	2399	2399	2399
Fan Belt, 1525 mm, for use with Small Frame Alternator, w/ Belt Guard	24KU	24KU	24KU
Fan, None	2599	2599	2599
Block Heater, None	2699	2699	2699
Heat Exchanger, None (Keel Cooled Application)	2765	2765	2766*
Exhaust Manifold	28BV	28BV	28BV
Vent System, Closed Crankcase	29BC	29BC	29BC
Starter, 12V Denso 4.5kW (6 hp), LH 3-Bolt Type 1 Mount, Gear Reduction	3006	3006	3006
Alternator, Small Frame, 12V, 75 Amp, Letrika, Case Ground	3138	3138	3138
Fuel Filter, None	3599	3599	3599
Front Plate	3614	3614	3614
Fuel Transfer Pump, None	3799	3799	3799
Thermostat Housing, None	3999	3999	3999
Dipstick & Fill, on Pan RH Side	40AL	40AL	40AL
Aux Drive, None	4199	4199	4199

Option Name	Ordered	Factory	Distributor
Starting Aid, Glow Plugs 12V	4357	4357	4357
Timing Gear Cover	4443	4443	4443
Balancer Shaft, Heavy Duty	4501	4501	4501
Cylinder Block w/ Liners	4634	4634	4634
Crankshaft, Taper Nose, Heavy Duty, Forged Steel	4722	4722	4722
Connecting Rods & Pistons	4866	4866	4866
Valve Actuating Mechanism	4906	4906	4906
Oil Pump	5001	5001	5001
Cylinder Head	5158	5158	5158
Gear Driven Auxiliary Drive Cover	5204	5204	5204
Fuel Heater, None	5399	5399	5399
Air Intake Turbo, None	5499	5499	5499
Shipping Stand	55BQ	55BQ	55BQ
Paint, Industrial Tan (Paintable)	5601	5601	5601
Water Pump Inlet, Wide Tube for use with engine harness option	5740	5740	5740
Oil Cooler, 9 Plate	5947	5947	5947
Accessory Drive Pulley, None	6099	6099	6099
Alternator Mounting, Small Frame Alternator	6257	6257	6257
Low Pressure Fuel Lines	63ES	63ES	63ES
Exhaust Elbow, 101.6mm (4 in.) Dry with Bolt-On Mounting Flange	6403	6403	6402*
Turbocharger, Gen Set	65J3	65J3	65J3
Temperature Switch, None	6698	6698	6698
Base Engine Sensors	6775	6775	6775
Engine Serial Number Plate & Option Code Label	6901	6901	6901
Air Conditioning Mounting, None	7499	7499	7499
Oil Switch, None	7699	7699	7699
Air Compressor Mount, None	7899	7899	7899
12V, 110kW (148hp) @ 1800 RPM (99kWe)	7A44	7A44	7A44
Sea Water Pump, None	8024	8024	8099*
Fuel Filters, Primary & Final, 12V Transfer Pump	81BN	81BN	81BN
Software, Genset	83VF	83VF	83VF
Wiring Harness, 12V	84DX	84DX	84DX
Fan Pulley, None	8699	8699	8699
Belt Tensioner, Automatic for Auxiliary Drive Engines	8701	8701	8701
Oil Filter, Standard & RH Service	8843	8843	8843
Starter Relay, LH 12V	917W	917W	917W
Constant Speed, Auxiliary, U.S. EPA 110 kW (148 hp) @ 1800 rpm (99 kwe), MARPOL Annex VI exempt, EPA Marine Tier 3	931G	931G	931G
Lift Straps	9801	9801	9801



Manufacturer: **JOHN DEERE POWER SYSTEMS**
Engine Family: **DJDXN06.8148**
Certificate Number: **JDX-MCI-13-18**
Intended Service: **AUXILIARY**
Intended Service Fuel: **DIESEL**
FELs: **NOx: N/A THC+NOx: N/A PM: N/A**
Effective Date: **2/5/2013**
Date Issued: **2/5/2013**

Byron J. Bunker, Director
Compliance Division
Office of Transportation and Air Quality

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. § 7547) and 40 CFR Part 1042, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following marine engines, by engine family, more fully described in the documentation required by 40 CFR Part 1042 and produced in the stated model year.

This certificate of conformity covers only those new marine compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 1042 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 1042.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR Part 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 1042. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void ab initio for other reasons specified in 40 CFR Part 1042.

This certificate does not cover marine engines sold, offered for sale, introduced, or delivered for introduction into commerce in the U.S. prior to the effective date of the certificate.

PART 3 - EXECUTION

3.1 FACTORY TESTS

See Section 26 32 13.10 Engine Generators

3.2 SHIPPING

See Section 26 32 13.10 Engine Generators

END OF SECTION