INVITATION TO BID
City and Borough of Wrangell
Ozone Generator Procurement

SCOPE OF WORK. The City and Borough of Wrangell, hereinafter referred to as the OWNER, invites sealed bids for the supply of an OZONE GENERATOR, on a one-time basis. The successful Bidder shall furnish and deliver the product to Wrangell, Alaska.

PROJECT LOCATION. Materials shall be shipped to Wrangell Alaska. The Project is located in Wrangell, Alaska at the Wrangell Water Treatment Plant.

COMPLETION TIME FOR THE WORK. Materials shall be delivered to Wrangell by November 30, 2015.

DATE AND TIME FOR BID OPENING. Sealed bids will be received by the City and Borough of Wrangell, Post Office Box 531, Wrangell, Alaska 99929, or located at the Borough Clerk's Office, 205 Brueger Street, Wrangell, Alaska 99929, until **10:00 AM prevailing time on August 20, 2015**. The Bids will be publicly opened and read aloud at this time in the City and Borough of Wrangell's Assembly Chambers. All bids must be submitted in sealed envelopes bearing on the outside the name of the project for which the bid is submitted. It is the sole responsibility of the Bidder to see that his bid is received in proper time. Any bids received after the scheduled closing time for receipt of bids will be returned to the Bidder unopened.

BIDDING. The Contract Documents, may be obtained at the Borough Clerks Office, 205 Brueger Street, Wrangell, Alaska 99929 (Ph. 907-874-2381). A non-refundable fee of $25.00 made payable to the City and Borough of Wrangell is required for each set of contract documents. Additional charges will be required for special handling or delivery of the documents by means other than first class mail. The Contract Documents may also be downloaded free of charge on the City & Borough of Wrangell website (www.wrangell.com) under the "Bids and RFPs" section. Downloading Contract Documents from the City & Borough of Wrangell's website requires registration with the Borough Clerk in order to be placed on the Plan Holders List and to ensure receipt of subsequent Addenda. Failure to register may adversely affect your proposal. It is the Offeror's responsibility to insure that they have received all Addenda affecting this Solicitation. To be registered, contact the Borough Clerk at 907-874-2381.

FIRM OFFER. For the purpose of award, offers made in accordance with this Invitation for Bid must be held firm for a period of sixty (60) calendar days from the date of the bid opening.

REJECTION OF BID. The City & Borough of Wrangell (Wrangell) reserves the right to reject any and all bids and to waive any informality or irregularity in the bids received whenever such rejection or waiver is in the best interest of Wrangell. The award of the Contract, if made by the OWNER, will be made to the qualified and responsible Bidder submitting the lowest responsive bid, but the OWNER shall determine at its own discretion whether a Bidder is responsible and qualified to perform the Contract, and what bid is the lowest or in the best interest of the

OWNER. The City and Borough of Wrangell reserves the right to modify the contract after its award.

QUALITY OF WORK. All materials shall conform to the drawings and specifications, industry standards and practices, and the manufacturer's requirements.

LIQUIDATED DAMAGES. Liquidated damages are $250.00 per calendar day for each day past the scheduled contract delivery dates.

WARRANTY. The material warranties shall be as listed in the technical specification.

"OR APPROVED EQUAL" CLAUSE. In order to establish a basis of quality, certain processes, types of equipment, or kinds of materials may be specified, either by description of process or by designating a manufacturer by name and referring to his brand or product designation, or by specifying a kind of material. It is not the intent of these specifications to exclude other processes, equipment, or materials of equal value, utility or merit.

Whenever a process is designated or a manufacturer's name, brand, or product is described, it shall be understood that the words, "or approved equal" follow such name, designation, or description, whether in fact they do so or not.

If a Bidder proposes to furnish an item, process or material which it claims to be of equal utility to the one designated, then:

1. Bidder shall deliver to aal-haddad@wrangell.com referencing the Invitation to Bid by title, at least five (5) business days prior to the Bid opening date and time, a written statement describing it together with supporting data and details sufficient to permit a full evaluation of the same.
2. Owner may require demonstration, additional tests, and additional data, all to be supplied at the expense of the Bidder.
3. Owner shall in its sole discretion determine if an item submitted as an alternate or approved equal is “equal” or “equivalent”.

IMMATERIAL DIFFERENCES. The City & Borough of Wrangell reserves the right to determine whether equipment that complies substantially in quality and performance with the specifications are acceptable, and whether any variance listed by the Bidder in a bid is material or immaterial.

AWARD OF CONTRACT AND AGREEMENT. The City and Borough of Wrangell reserves the sole right to cancel the Contract, in whole or in part, immediately, in the event of the contractor's failure to perform the work in conformance with the Contract Documents. The form of Agreement which the Contractor shall be required to execute shall be a Purchase Order and

the terms of the Invitation to Bid, including any issued Addenda, shall become a part of the contract documents.

PAYMENT SCHEDULE. Payment will be made within thirty (30) days upon receipt of invoice, for materials delivered to Wrangell or for percentage of completion of the contract work. Material receipts shall accompany invoices for materials received.

LIABILITY. The Contractor shall hold and save the City and Borough of Wrangell, its officers, agents, and employees harmless from liability of any nature. This includes any costs, expenses, suits or damages of any kind sustained by any person(s) or property by any virtue of performance resulting from the Project.

BONDS. The successful Bidder shall provide a Performance Bond in an amount equal to 100 percent of the contract price, on the City & Borough of Wrangell's standard bond form attached hereto and made a part of the contract. The successful Bidder will be required to furnish the Performance Bond at the time of execution of the Agreement.

DISPUTES and LIEN RELEASE: Any disputes shall be handled in accordance with Wrangell's procurement policy. The contractor warrants that they waive any right to lien against the subject property, and that they shall save harmless the property owner from any liens or claims arising out of this construction contract.

QUESTIONS CONCERNING THIS BID. Contact Amber Al-Haddad, Public Works Director at (907) 874-3904.

SUBMISSION OF BIDS.

1. Bid Proposal. Bids shall be a lump sum for all materials and equipment listed in the specifications made a part hereto. All prices should be FOB Destination, Wrangell, Alaska. The lump sum price bid shall also include submittals of product data, material certifications and all other requirements listed in the specifications.
2. The Bid Schedule shall acknowledge any and all Addenda.
3. Bids must be typewritten or completed with pen and ink, signed by the vendor or their authorized representative, with all erasures or corrections initialed and dated by the official signing the bid schedule. Bidders are encouraged to review carefully all provisions of this document prior to completion. Each bid constitutes an offer and may not be withdrawn except as provided herein. Prices are to remain firm for the period stated herein.
4. Submit bids plainly marked with "Bid for Ozone Generator, City and Borough of Wrangell." Bids shall be delivered to:

    a. Mailing Address: City & Borough of Wrangell, P.O. Box 531, Wrangell, AK 99929

b. Hand Delivery Address: City & Borough of Wrangell, 205 Brueger St., Wrangell, AK 99929

5. The Bidder must have a valid business license prior to receiving a contract award.

DUE DATE AND TIME. Sealed bids shall be mailed or hand delivered as follows, in sufficient time to ensure receipt by the City & Borough of Wrangell on or before August 20th, 10:00 a.m. Prevailing Time.

No bids will be received or accepted after the bid deadline. Bids submitted after the designated date and time will be deemed invalid and returned unopened to the Bidder. The City & Borough of Wrangell is not responsible for lost or misdirected mail. It is the Bidder's responsibility to ensure no late bid is submitted. No bid may be withdrawn within sixty (60) days after the proposal opening and bids shall remain firm through the period. Any Bidder may modify his bid by submitting a written modification signed by the Bidder, or by telegraph or by a signed facsimile communication at Fax No. (907) 874-3952 at any time prior to the scheduled bid closing time for receipt of bids, provided such communication is received by the OWNER prior to the bid closing time.

ADDENDA. Each bid shall include specific acknowledgment in the space provided of receipt of all addenda issued during the bidding period. Failure to so acknowledge may result in the proposal being rejected as not responsive.

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS that:

We, _____ (Name of Contractor), a _____ (Corporation, Partnership, Individual) hereinafter called **PRINCIPAL** and _____ (Surety) of the State of _____ hereinafter called **SURETY**, are held and firmly bound unto the **City and Borough of Wrangell, Alaska,** hereinafter called the **OWNER**, for the penal sum of _____ Dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Contractor has entered into a certain contract with the Owner, the effective date of which is _____, a copy of which is hereto attached and made a part hereof for the consideration of:

OZONE GENERATOR PROCUREMENT

NOW, THEREFORE, if the above bounden **PRINCIPAL** shall truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof, which may be granted by the Owner, with or without notice to the Surety, and if it shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expense which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that said **SURETY**, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract, or contract documents, or the Work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligations on this bond, and said **SURETY** does hereby waive notice of any such change, extension of time, alteration, modification, or addition to the terms of the contract, or contract documents, or the Work, or the Specifications.

As a part of the obligation secured hereby and in addition to the face amount specified therefor, there shall be included costs, expenses and fees, including attorney's fees, incurred by **OWNER** in enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

PROVIDED FURTHER, that no final settlement between Owner and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF this instrument has been duly executed by the Principal and Surety above named, on the _____ day of _____, 20_____.

_____

PRINCIPAL

By: _____

Title: _____

Address: _____

Corporate Seal

_____

SURETY

By: _____

Title: _____

Address: _____

Corporate Seal

ATTORNEY-IN-FACT ACKNOWLEDGMENT OF SURETY

STATE OF ALASKA)
) ss.
_____ JUDICIAL DISTRICT)

On this _____ day of _____, 20_____, before me, _____, a notary public in and for said district and State personally appeared _____ known to me to be the person whose name is subscribed to the within instrument as the attorney-in-fact of, _____, the corporation named as Surety in said instrument, and acknowledged to me that he subscribed the name of said corporation thereto as Surety, and his own name as attorney-in-fact.

_____
NOTARY PUBLIC FOR ALASKA
My Commission Expires: _____

(Seal)

NOTE: (a) Signature of those executing for Surety must be properly acknowledged.

(b) The Attorney-in-fact must attach a certified copy of the Power of Attorney.

BID

Bid To: City and Borough of Wrangell, Alaska

1. The undersigned Bidder offers and agrees, if this Bid is accepted, to enter into an Agreement with the Owner to perform the work as described in the contract documents entitled ***Invitation to Bid, City and Borough of Wrangell, Ozone Generator Procurement.***
2. Bidder accepts all of the terms and conditions of the contract documents, including without limitations those in the Request for Bid.
3. The Bid will remain open for 60 days, as stipulated in the Invitation to Bid.
4. The Bidder agrees to complete the work required under the contract documents within the time stipulated and accepts payment in full based on the contract price named in the Bid.
5. Bidder has examined the contract documents in full, including the following Addenda, receipt of which is hereby acknowledged by the undersigned:

ADDENDUM NUMBER	DATE OF RECEIPT OF ADDENDUM	SIGNED ACKNOWLEDGMENT
1	_____	_____
2	_____	_____

(Note: Failure to acknowledge receipt of any addenda may be considered an irregularity in the proposal and grounds for rejection of the bid.)

6. The Bidder has read this Bid and agrees to the conditions as stated herein by providing their signature in the space provided below.

Quantity	**Item**	**Extended Price**
1 each	Ozone Generator (FOB Wrangell, Alaska)	$_____

Bid Amount in writing (_____)

Bidder's Name: _____

Bidder's Representative's Signature: _____

Bidder's Address: _____

Bidder's Telephone/Fax Numbers: _____

Bidder's Business License No.: _____

Date: _____

SPECIFICATION SECTION 170720 - OZONATION EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

The City & Borough of Wrangell is requesting bids for the replacement of one Ozone Generation unit. This unit shall work in conjunction with Wrangell's existing ozonation system without the need for ancillary equipment, unless provided for herein. The manufacturer shall provide all engineering, labor and materials, shipping, operation instruction and training necessary to provide equipment for a fully operational system. The Ozone generator's manufacturer shall provide all shop drawings, schematics and diagrams necessary to provide explicit direction to electrical and mechanical tradesmen for installation resulting in a complete, safe and functional system. The new ozone generator shall have the capacity to function with the water treatment plant's existing system with minor modifications.

1.2 SUMMARY

A. Submit technical information, build, test, deliver and warranty the equipment as described herein. The ozone generators, and all equipment specified within, interlocks, and appurtenances, including labor, shall be furnished by a single ozone equipment vendor as a complete system. The ozone equipment vendor shall provide all engineering, design, drawings, operation instruction and training for construction of a complete and fully functional system.

B. Ozone gas generators and related equipment shall be supplied as specified herein. The size and location shall be as indicated on the drawings. The General Conditions shall apply to this Section as fully as if repeated herein.

C. The ozone equipment vendor shall provide assistance for meeting the requirements in the National Fire Protection Association (NFPA) code as related specifically to the design of the specified ozone equipment. However, the ozone equipment vendor shall not be responsible for obtaining permits, or code compliance, with elements of the building including, but not limited to, existing equipment, building materials, ventilation, automated controls, and transmission pipes through the building envelope to the outdoors.

1. This specification assumes that NFPA 1 - Uniform Fire Code - 2003 Edition, Annex G Ozone Gas-Generating Equipment, has been adopted by

the regulating officials in jurisdiction where the equipment is being installed.

2. This specification assumes that the ozone generators will be installed in an enclosed dedicated "Ozone Generator Room."

D. Testing laboratory requirements:

All equipment shall be in conformance with all local, state and federal codes, statutes and ordinances where they apply, including required Underwriter Laboratory (U.L.) approvals. The manufacturer shall be fully responsible for compliance with these requirements. If field U.L. (or other approved testing agency) approval is necessary to meet these requirements, it shall be completed without delay to the project and at no additional cost to the Owner.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: New equipment of current design and backed by practical testing and successful installations. The manufacturer shall have at least five years' experience in the manufacturer of ozone gas generators.

B. All the equipment specified within shall be furnished as a package from a single source. Manufacturer shall pre-package all of the equipment to the maximum extent allowed by access restrictions. Factory-mount subassemblies on skids in order to minimize the number of field interconnections required.

C. Standard 250 for Enclosures for Electrical Equipment shall be used as a guide for fabrication of the ozone generator cabinets: National Electric Manufacturers Association, 2101 L Street, N.W., Suite 300, Washington, DC 20037.

D. Unless superseded by another governing Code, the complete package of equipment, including automated controls, shall comply with requirements for Ozone Gas-Generating Equipment of the Uniform Fire Code.

1.4 SUBMITTAL INFORMATION

A. Catalog cuts and sufficient data including capacities, flow rates, pressures, name of sub-component manufacturers and model numbers and dimensional drawings of packaged equipment. Dimensional drawings shall include accurate scale drawings of the equipment being supplied with detailing of locations of the components, all major dimensions including overall width, length, height, bolt hole locations for mounting, electrical connections, total weight and nozzle sizes and connections.

B. Provide complete schematics, complete description of operation, control schematics including coordination with other electrical control devices.

SUBMITTALS:

A. Shop Drawing Submittal. The Contractor shall provide two sets of a full submittal and shop drawings to the owner, for review and approval. Shop drawings shall include detail design calculations, shop drawings, fabrication and installation drawings (including those for review and coordination with other trades), erection drawings, operating instructions, catalogue sheets, data sheets, and other such similar items.

B. Technical Manual Submittal. The Contractor shall provide two sets of technical manuals for each item of mechanical, electrical, and instrumentation equipment, which should include the following:

1. Complete operating instructions
2. Maintenance schedules, including the frequency required.
3. Preventive maintenance procedures and schedules.
4. Parts lists, complete with exploded views of each assembly.
5. Disassembly and reassembly instructions.
6. Name and location of nearest supplier and spare parts warehouse.
7. Reproducible prints of record drawings, including diagrams and schematics, as required under the electrical and instrumentation portions of the product.

C. Spare Parts List Submittal. The Contractor shall provide two sets of spare parts information for all mechanical, electrical, and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall be limited to those spare parts which the manufacturer recommends be maintained by the Owner in inventory on site.

D. Submit performance guarantee for generator and warranty on dielectrics.

E. Submit description of Start-Up Services.

1.5 MAINTENANCE AND OPERATIONAL DATA

A. Include pertinent information in a bound project Operations & Maintenance Data Manual per Submittal requirements.

1.6 COORDINATION

A. Coordinate work with installation of automated controls. The automated controls will proportion the rate of ozone production based on the site dissolved ozone analyzers.

B. The entire ozone gas supply line, interconnecting piping, and off-gas ducting supplied by the Contractor.

C. Coordinate provision of equipment with facility modifications for meeting requirements of the National Fire Protection Association.

1.7 GUARANTEE & WARRANTY

A. Prior to the Owner's acceptance of work, the ozone equipment vendor shall furnish a written warranty of all specified components, start up work, and other specified services.

B. The ozone equipment vendor shall guarantee all equipment to be free from defects in manufacturing, workmanship or materials.

1. Shall repair or replace defective equipment within one (1) year of the date of commissioning. (Dielectrics shall have extended warranty.)
2. The dielectrics shall have a non-prorated 100% warranty for three (3) year life, for any failure of any dielectric, for any reason other than breakage by mischievous physical tampering.

1.1 FACTORY START-UP ASSISTANCE AND TRAINING

A. Technical Start-Up: Supplier shall provide a minimum of two working days of a factory-trained technician to assist in the installation and start-up, and to inspect, calibrate and start-up the equipment.

B. Training Seminar: Manufacturer's factory senior personnel to give complete formal seminar on the fundamentals, routine operation, standard maintenance, and rebuilding instruction demonstrations for the ozone generator. This seminar shall be in addition to the Technical Start-Up assistance. Seminar shall be no less than 10-hours of instruction over a two-day period. Include educational material for

up to six trainees, demonstration of actual components and visual aids. Supplier to contact and the Owner prior to arranging dates and times of this seminar.

PART 2 - PRODUCTS

2.1 OZONE GENERATOR(S)

A. The ozone generators shall be water cooled corona discharge type and capable of operating continuously for one year minimum without major cleaning or disassembly and consist of U.L. rated components.

B. Products and Manufacturers: Subject to compliance with requirements of the contract documents, provide products by the following manufacturer:

1. Primozone Production Ab, GM Series: GM-48, or approved equal.
2. Ozone concentration of 10-%-20% by weight.
3. Production: Minimum capacity shall be 72 lbs/day at 20% wt concentration. Feed gas shall be oxygen from an oxygen concentration (PSA) type system.
4. Output of 144 lbs/day @ 10% Weight and 72 lb/day @ 20% Weight.
5. Cooling Water capacity: 24 GPM at 10 degrees Celsius
6. Connectivity to Existing Power Supply: 480V, 3 Phase
7. Location: The equipment will all be installed in a climate controlled room.

C. Features:

1. All components used in the construction of the ozone generator shall be UL, ETL, CSA or NSF approved where applicable. All materials, piping, tubing, fittings and components related to the installation of the ozone generator shall equally carry the UL, ETL, CSA or NSF labels where applicable.
2. All components used within the ozone generators shall be constructed of ozone-resistant materials.
3. Housing: The ozone generators shall be housed in a NEMA 12 rated corrosion-resistant enclosure designed for floor mounting. Cabinet material shall be of stainless steel.
4. Internal Piping: No internal piping shall be allowed. Cooling water and feed and product gas shall only flow through an aluminum block.
5. External Piping: All external ozone gas piping shall be Type 316 stainless steel piping.

6. Electrical Power: Power as shown on schedule. Equipped with a main fuse; separately circuit breaker protected transformer; and separately circuit breaker or fuse protected cooling fans; permanent external labeling of proper fuse sizes where fuses are used. All insulated internal electrical wiring jacketed with ozone resistant materials to prevent deterioration.
7. Required Options:
    a. Gas Flow Switch: The switch shall allow for on/off control at adjustable set points for gas flow to each ozone generator. Variable area float meter with flow switch by KOBLOD Instruments Inc., or substitute.
    b. Automatic Pressure Regulator: Equipped with a device to automatically control pressure required in the ozone generator with changes in point of use gas flow conditions.
    c. Oxygen analyzer with visual display showing oxygen concentration. Fault condition with purity less than 85% purity.
    d. Internal safety ambient ozone monitor with interface and fault ozone shut down condition. This sensor shall be in the air flow path of the cooling fan. This allows internal leak and external monitoring of the room condition.
    e. Interlocks:
        i. 4-20 mA interlock to control panel for modulation of ozone production.
        ii. Output to control panel for Power On, Ozone On, and Fault conditions.
        iii. Interlock Ambient Ozone Monitor for shutdown on open dry contact switch.
    f. Monitor Sample Port: Include optional fitting at internal ozone gas pressure piping with tubing routed for external connection to high concentration ozone monitor.

D. Output Adjustment: Capacity adjustable by way of a manual output control dial, and adjusted fully automatically on signal from the ORP Analyzer and PID Controller Panel and capable of a 10:1 minimum turndown ratio.

E. Soft Shut Down: A “Soft Shut Down” shall curtail power to the dielectrics while maintaining power to diagnostic components, power to ancillary equipment, and maintain operation of the air preparation equipment.

F. Local Monitoring Features. The ozone generator/control cabinet shall be equipped with the following data display and monitoring features:

1. Display of dielectric power consumption.
2. Display of faults such as high temperature, electrical shorts, voltage out of limit, set points out of limit, et cetera.
3. Service hour counter.
4. Gas pressure gauge.
5. Feed-gas flow meter (rotameter) mounted in/on the generator cabinet.
6. Cooling water flow meter (rotameter) on the generator's cooling line.

G. Manual Control Devices. The ozone generator/control cabinet shall be equipped with the following devices for manual control:

1. Power supply on switch.
2. Emergency stop button (oversized and "red" in color).
3. Local / Remote switch. Remote selection shall allow automatic control of ozone output based on 4-20 mA control adjustment by the LSS ACS.
4. Manual set point control.
5. Gas pressure control valve.

H. External Control Connections to site ACS (as desired): The ozone generator shall be equipped for the following external control connections to the site ACS:

1. (a) On/off on signal from the ACS. (b) Ozone production on 4-20 mA signal from the ACS. *Note, on/off and ozone production may be separate of combined termination points depending on standard ozone generator model features.*
2. On/Off status *or* ozone output power (watt or ampmeter).
3. Collective alarm condition status.

I. Termination Hardware: The above wire terminations on the ozone generator shall be standard dry-contact screw-tightened wire terminals. If a modification to the ozone generator is required, the supplier shall modify the manufacturer's standard equipment for standard wire terminals.

J. Electrical: Powered per electrical requirements scheduled on the Drawings, and installed field conditions, as verified by the Contractor. Equipped with a main fuse; separately fused transformer; and separately fused cooling fans where applicable; labeling of proper fuse sizes. All insulated internal electrical wiring jacketed with ozone resistant materials to prevent deterioration.

2.1 FEED GAS FLOW SWITCH(ES)

A. Equip the ozone generator with a feed gas flow switch. Selected by ozone equipment supplier.

2.2 EXTERNAL INTERLOCK PANEL

A. External Interlocks: The ozone equipment supplier shall provide an External Interlock Panel (EIP), UL Rated and Listed, with automated controls and features supporting external interlocks. Upon occurrence, an indicator lamp or display shall signal the interlock status.

No.	Item	Requirement	Ozone Equipment Supplier Controls	Life Support ACS Controls
1.	High Dew Point	Upon detection of high dew point in the feed gas, controller shall signal a Soft Shut Down to occur. System may restart automatically, upon acceptable dew point temperature.	Supplier shall provide wiring from Dew Point Monitor to the EIP and control logic.	No connection.
2.	Ambient Ozone Monitor	Upon closed contact switch on the ambient ozone monitor, the "External Warning Alarm" shall be activated and a signal shall be relayed to the LSS ACS.	Provide wiring from Ambient Monitor to the External Warning Alarm.	Status signal from monitor to ACS to signal high ambient alarm condition and send shut off the ozone production at each ozone generator.

No.	Item	Requirement	Ozone Equipment Supplier Controls	Life Support ACS Controls
3.	Ozone Injector Pump (001)	If the contactor pump is not powered, the LSS ACS shall not allow the production of ozone.	No status at EIP or wiring required.	Monitor status at ozone contactor pump and provide signal to the EIP for turndown of power for ozone production.
4a.	Offgas Decomposer Status	Offgas Decomposer to be equipped with run status switch. The ACS shall be interlocked with the offgas decomposer to prevent production of ozone without power applied to off-gas ozone decomposer.	No status at EIP or wiring required.	Monitor status at offgas decomposer and provide signal to the EIP for turndown of power for ozone production.
5.	Water Flow Switch 001	Ozone generator's dielectric cells not to be powered unless cooling water flow is detected.	Provide wiring from water flow switch to EIP and required programming.	No connection.
6.	Backflow Prevention Device 001	Shutdown power to ozone generator 001 if backflow condition is detected.	Provide wiring from backflow prevention device to EIP and required programming.	No connection.

No.	Item	Requirement	Ozone Equipment Supplier Controls	Life Support ACS Controls
7.	Feed Gas Flow Switch 001	Ozone generator 001 dielectric cells not to be powered unless feed gas flow is detected.	Provide wiring from feed gas flow switch to EIP and required programming.	No connection.
8a.	Dissolved Ozone	Modulate ozone production of ozone generator 001 on 4-20 mA signal from Analyzer.	Provide termination for ACS and status lamp at EIP.	Twisted pair wiring from ACS to EIP. Coordinated with ORP monitors connections.
9.	System Run Status Lamp	Indication signal from LSS ACS to allow for run of ozone generators on signal from LSS ACS.	Provide termination for ACS, status lamp at EIP, and programming to bring all systems to a standby/run status.	Signal wiring from ACS to EIP for system to be activated.
10.	Hard Shut Down	Turns off power to ozone generators and air prep equipment on signal from LSS ACS.	Provide termination for ACS, programming for complete shut down, and status lamp.	Signal wiring from ACS to EIP for hard shut down.
11a.	Generator 001 Run Status	Signals the ACS that ozone generator 001 is in the run condition.	Provide termination for ACS and status lamp at EIP.	Signal wiring from EIP to ACS for indication of run status.

No.	Item	Requirement	Ozone Equipment Supplier Controls	Life Support ACS Controls
11b.	Generator 001 Run Status	Signals the ACS that ozone generator 001 is in the run condition.	Provide termination for ACS and status lamp at EIP.	Signal wiring from EIP to ACS for indication of run status.

B. The system shall include a low voltage source to power the interlock circuit where required for integration with other specified system components. Separate switches shall be provided for "soft" and "hard" shutdowns.

C. Status Indication: Provide status lights, or display, indicating tripped breakers, and interlocks.

D. Supplier shall provide and install all interlock control wiring between the EIP and all ozone equipment in the ozone generator room.

PART 3 - EXECUTION

3.1 EXECUTION COORDINATION WITH EQUIPMENT SUPPLIER

A. Mounting: Supplier to indicate special requirements for permanent housekeeping pad and accessories required for skid/base mounted equipment. Provide neoprene and cork waffle pads between the skid mounts and the concrete floor. Indicate mounting of additional equipment, if necessary.

B. Connections: Supplier to indicate all connections necessary to complete the installation process indicated on the contract drawings or otherwise required by the manufacturer. Primary connections may include, but are not limited to, the following:

1. Flexible conduits for all connections to equipment mounted on castor wheels, including those related to electrical power, control conduits and wiring, air-in and ozone-out lines, and cooling water connections.
2. Air Prep Equipment, including electrical power, interlock wiring.

3. Closed Loop Chiller, including electrical power, interlock wiring, and piping connections. Indicate any required power and relay wiring for remote condenser. Indicate any special requirements for refrigerant pipe charging and certification.
4. Ambient monitor, including electrical power (plug-in receptacle) and interlock connections.
5. Off-Gas Decomposer, including electrical power, interlock wiring, and piping (ducting) connections. Indicate any special requirements for drain piping related to the off-gas piping.
6. Auto Condensate Drains, including electrical power.
7. High Concentration Monitor and tubing connection to high concentration monitor, where applicable.

C. Cooling Water: Supplier to indicate special mechanical requirements related to cooling water.

D. Ducting for each air compressor related to waste heat.

E. Collection of discharge to Oil/Water Separation Device.

F. Transmission piping for off-gas duct-work.

G. Backflow Prevention: Supplier shall check to make sure the following water backflow prevention process coincides with their equipment:

1. Ozone generator equipped with normally closed valve on ozone out line.
2. Ozone generator equipped with check valve on ozone out line.
3. Existing active backflow prevention device is compatible with ozone equipment.
4. High loop in the ozone supply line, with drain plugs at low points.
5. Check valve(s) in ozone supply line near dosing end point
6. *Mazzei* injector equipped with manufacturer's standard check valve.

END OF CONTRACT DOCUMENT