***SERVICE CONTRACT***

***Specification No. J-135B***

**Engine and Generator Overhauls at Plant No. 1 and 2**

***THIS CONTRACT*** is made and entered into as of the date fully executed below, by and between Orange County Sanitation District, with a principal place of business at 10844 Ellis Avenue, Fountain Valley, CA 92708 (hereinafter referred to as "OC San") and Cooper Machinery Services LLC with a principal place of business at 16250 Port Northwest Drive, Houston, Texas 77041 (hereinafter referred to as "Contractor") collectively referred to as the “Parties”.

***W I T N E S S E T H***

***WHEREAS,*** OC San desires to temporarily retain the services of Contractor for Engine and Generator Overhauls at Plant No. 1 and 2, “Services” as described in Exhibit “A”; and

***WHEREAS***, OC San has chosen Contractor to conduct Services in accordance with Ordinance No. OC SAN-56; and

***WHEREAS***, on July 27, 2022 the Board of Directors of OC San, by minute order,authorized execution of this Contract between OC San and Contractor; and

***WHEREAS,*** Contractor is qualified by virtue of experience, training, and expertise to accomplish such Services.

***NOW, THEREFORE***, in consideration of the mutual promises and mutual benefits exchanged between the Parties, the Parties mutually agree as follows:

***1. Introduction.***

1.1 This Contract and all exhibits hereto (called the "Contract") is made by OC San and the Contractor. The terms and conditions herein exclusively govern the purchase of Services as described in Exhibit “A”.

1.2 Exhibits to this Contract are incorporated by reference and made a part of this Contract as though fully set forth at length herein.

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| Exhibit “A” | Includes Exhibit A-1”, Scope of Work for Engine Overhauls, and Exhibit “A-2”, Generator Overhauls |
| Exhibit “B” | Proposal |
| Exhibit “C” | Determined Insurance Requirements Form |
| Exhibit “D” | Contractor Safety Standards |
| Exhibit “E” | Human Resources Policies |
| Exhibit “F” | Performance and Payment Bonds |

1.3 In the event of any conflict or inconsistency between the provisions of this Contract and any of the provisions of the exhibits hereto, the provisions of this Contract shall in all respects govern and control.

1.4 The provisions of this Contract may be amended or waived only by a writing executed by authorized representatives of both Parties hereto.

1.5 The various headings in this Contract are inserted for convenience only and shall not affect the meaning or interpretation of this Contract or any paragraph or provision hereof.

1.6 The term “days”, when used in the Contract, shall mean calendar days, unless otherwise noted as business days.

1.7 OC San holidays (non-working days) are as follows: New Year’s Day, Lincoln’s Birthday, Presidents’ Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, and Christmas Day.

1.8 The term “hours”, when used in this Contract, shall be as defined in Exhibit “A”.

1.9 Contractor shall provide OC San with all required premiums and/or overtime work, as specified in this Contract, at no charge beyond the price provided under “Compensation” below.

1.10 Except as expressly provided otherwise, OC San accepts no liability for any expenses, losses, or action incurred or undertaken by Contractor as a result of work performed in anticipation of purchases of said services by OC San.

***2. Compensation.*** Compensation to be paid by OC San to Contractor for the Services provided under this Contract shall be a total amount not to exceed Twenty Nine Million Three Hundred Sixty-One Thousand Twenty-Eight 71/100 Dollars $29,361,028.71**.**

***3. California Department of Industrial Relations (DIR) Registration and Record of Wages*.**

3.1 Pursuant to Labor Code sections 1720 et seq., and as specified in Title 8, California Code of Regulations section 16000, prevailing wages are required to be paid for all work under this Contract. It is Contractor’s responsibility to interpret and implement any prevailing wage requirements and Contractor agrees to pay any penalty or civil damages resulting from a violation of the prevailing wage laws.

3.2 Contractor and its subcontractors shall comply with the registration requirements of Labor Code section 1725.5. Pursuant to Labor Code section 1771.4(a)(1), the work is subject to compliance monitoring and enforcement by the California Department of Industrial Relations (DIR).

3.3 Pursuant to Labor Code section 1773.2, a copy of the prevailing rate of per diem wages is available upon request at OC San’s principal office. The prevailing rate of per diem wages may also be found at the DIR website for prevailing wage determinations at http://www.dir.ca.gov/DLSR/PWD.

3.4 Contractor and its subcontractors shall comply with the job site notices posting requirements established by the Labor Commissioner per Title 8, California Code of Regulations section 16461(e). Pursuant to Labor Code sections 1773.2 and 1771.4(a)(2), Contractor shall post a copy of the prevailing rate of per diem wages at the job site.

3.5 Contractor and its subcontractors shall maintain accurate payroll records and shall comply with all the provisions of Labor Code section 1776. Contractor and its subcontractors shall submit payroll records to the Labor Commissioner pursuant to Labor Code section 1771.4(a)(3). Pursuant to Labor Code section 1776, the Contractor and its subcontractors shall furnish a copy of all certified payroll records to OC San and/or the general public upon request, provided the public request is made through OC San, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement of the Department of Industrial Relations. Pursuant to Labor Code section 1776(h), penalties for non-compliance with a request for payroll records may be deducted from progress payments.

- As a condition to receiving payments, Contractor agrees to present to OC San, along with any request for payment, all applicable and necessary certified payrolls and other required documents for the period covering such payment request. Pursuant to Title 8, California Code of Regulations section 16463, OC San shall withhold any portion of a payment, up to and including the entire payment amount, until certified payroll forms and any other required documents are properly submitted. In the event certified payroll forms do not comply with the requirements of Labor Code section 1776, OC San may continue to withhold sufficient funds to cover estimated wages and penalties under the Contract.

3.6 The Contractor and its subcontractors shall comply with Labor Code section 1774 and section 1775. Pursuant to Labor Code section 1775, the Contractor and any of its subcontractors shall forfeit to OC San a penalty of not more than two hundred dollars ($200) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the DIR for the work or craft in which the worker is employed for any work.

- In addition to the penalty and pursuant to Labor Code section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or its subcontractor.

3.7 Contractor and its subcontractors shall comply with Labor Code sections 1810 through 1815. Contractor and its subcontractors shall restrict working hours to eight (8) hours per day and forty (40) hours per week, except that work performed in excess of those limits shall be permitted upon compensation for all excess hours worked at not less than one and one-half (1.5) times the basic rate of pay, as provided in Labor Code section 1815. The Contractor shall forfeit, as a penalty to OC San, twenty-five dollars ($25) per worker per calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of Labor Code sections 1810 through 1815.

3.8 Contractor and its subcontractors shall comply with Labor Code sections 1777.5, 1777.6, and 1777.7 concerning the employment of apprentices by Contractor or any subcontractor.

3.9 Contractor shall include, at a minimum, a copy of the following provisions in any contract it enters into with any subcontractor: Labor Code sections 1771, 1771.1, 1775, 1776, 1777.5, 1810, 1813, 1815, 1860, and 1861.

3.10 Pursuant to Labor Code sections 1860 and 3700, the Contractor and its subcontractors will be required to secure the payment of compensation to employees. Pursuant to Labor Code section 1861, Contractor, by accepting this contract, certifies that:

> "I am aware of the provisions of section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

Contractor shall ensure that all its contracts with its subcontractors provide the provision above.

## *4. Payments and Invoicing.*

4.1 OC San shall pay, net 30 days, upon receipt, by OC San's Engineer ("Engineer") or designee, of itemized invoices submitted for Milestones completed in accordance with Exhibit B.

4.2 OC San shall approve or reject invoices within 14 days of receipt. Any invoice not rejected in writing within 14 days of receipt shall be deemed approved by OC San. OC San, at its sole discretion, shall be the determining party as to whether the Services have been satisfactorily completed. In the event OC San disputes an invoice or has a reasonable basis for determining Services have not been satisfactorily completed, OC San agrees to pay the undisputed portion of any invoice in a timely manner while both parties agree to discuss in good faith to resolve the disputed portions of an invoice. If OC San fails to pay an undisputed invoice after receiving 30 days written notice of non-payment, Contractor shall have the right to suspend performance and Contract Term shall be extended for a time equal to the suspension for non-payment. Should suspension for non-payment last 30 days, Contractor shall have the right to terminate and OC San agrees to pay termination fees in accordance with Section 12.1.

4.3 Invoices shall be submitted through OC San's PMWeb system (or current electronic system) and a copy emailed by Contractor to OC San Accounts Payable at APStaff@OCSD.com and "INVOICE" with the Purchase Order Number and Specification No. J-135B shall be referenced in the subject line.

***5. Audit Rights.*** Contractor agrees that, during the term of this Contract and for a period of three years after its termination, OC San shall have access to and the right to examine any directly pertinent books, documents, and records of Contractor relating to the invoices submitted by Contractor pursuant to this Contract. OC San agrees all audits are subject to confidentiality and non-disclosure provisions and are limited to the purpose of OC San verification of payment and invoicing records, except to the extent required by a government agency.

***6. Scope of Work.*** Subject to the terms of this Contract, Contractor shall perform the Services identified in Exhibit "A". Contractor shall perform said Services in accordance with generally accepted industry and professional standards.

***7. Modifications to Scope of Work.*** Requests for modifications to the Scope of Work or due to delays solely attributable to OC San hereunder can be made by either party at any time. All modifications must be made in writing, approved and signed by both Parties before any Work on the modification shall begin. In theevent of a modification, time of performance and payment for work shall be alteredaccordingly.

***8. Contract Term.*** The Services provided under this Contract shall be completed within 1,249 calendar days from the effective date of the Notice to Proceed.

***9. Renewals.*** Not Used

***10. Extensions.*** The term of this Contract may be extended only by written instrument signed by both Parties.

***11. Performance.*** Time is of the essence in the performance of the provisions hereof.

***12. Termination.***

12.1 OC San reserves the right to terminate this Contract for its convenience, with or without cause, in whole or in part, at any time, by written notice from OC San of intent to terminate. OC San also reserves the right to terminate this Contract for default in accordance with section 12.2 and 12.3. Upon receipt of a termination notice for convenience or terminate notice under 12.3, Contractor shall immediately discontinue all work underthis Contract (unless the

notice directs otherwise). In all cases of termination whether for convenience or default, OC San shall thereafter, within thirty 30days, pay Contractor for work performed (cost and fee) to the date of termination, including any reasonable costs and expenses incurred by Contractor as a direct result of such termination for any goods or services in progress prior to the effective date of termination. Contractor expressly waives any claim to receive anticipated profits to be earned during the uncompleted portion of this Contract. Such notice of termination shall terminate this Contract and Contractor shall release OC San from any further fee, cost or claim relating to the terminated portion of the Contract, hereunder by Contractor.

12.2 OC San reserves the right to terminate this Contract upon determination that Contractor has materially breached any of the terms of this Contract and failed to commence to cure within 10 days with continual diligent efforts following receipt of written notice of such breach. In the event of termination under this section, Contractor total liability shall not exceed the actual and reasonable documented costs and expenses to complete the terminated Scope of Work.

12.3 OC San may also immediately cancel for default of this Contract in whole or in part by written notice to Contractor:

- if Contractor becomes insolvent or files a petition under the Bankruptcy Act; or

12.4 All OC San property in the possession or control of Contractor shall be returned by Contractor to OC San upon demand, or at the termination of this Contract, whichever occurs first.

***13. Insurance.*** Contractor and all subcontractors shall purchase and maintain, throughout the life of this Contract and any periods of warranty or extensions, insurance in amounts equalto the requirements set forth in the signed Acknowledgement of Insurance Requirements (attached hereto and incorporated herein as Exhibit "C"). Contractor shall not commence work under this Contract until all required insurance is obtained in a form acceptable to OC San, nor shall Contractor allow any subcontractor to commence service pursuant to a subcontract until all insurance required of the subcontractor has been obtained. Failure to maintain required insurance coverage shall result in termination of this Contract. Any requirements for additional insured, waiver of rights of subrogation or recognition of Contractor's insurance as primary shall apply only to the extent of the legally-binding indemnities agreed to by Contractor in the Contract.

***14. Bonds.*** Contractor shall, before entering upon the performance of this Contract, furnish bonds (attached hereto in Exhibit "F") approved by OC San's General Counsel - one in the amount of one hundred percent (100%) of the total Contract Phase as listed in Exhibit "B", to guarantee the faithful performance of the work, and the other in the amount of one hundred percent (100%) of the total Contract Phase as listed in Exhibit "B", to guarantee payment of all claims for labor and materials furnished. This Contract shall not become effective until the first bond is supplied to and accepted by OC San. Work may not begin on any next Contract Phase until its bond has been received and accepted by OC San. Bonds must be issued by a California admitted surety and must be maintained throughout the life of the Contract and during the warranty period.

***15. Indemnification and Hold Harmless Provision.*** Contractor shall assume responsibility for direct damages to property and/or injuries to persons, including accidental death, to the extent such damages arise out of or are caused by the negligence of Contractor under thisContract, or by the negligence of its subcontractor(s) or by anyone directly or indirectly employed by Contractor, and whether such damage or injury shall accrue or be discoveredbefore or after the termination of the Contract. Contractor shall indemnify, protect, defend and hold harmless OC San, its elected and appointed officials, officers, agents and employees, from and against

any and all claims, liabilities, damages or expenses of any nature, including attorneys' fees: (a) for injury to or death of any person or damage to property , to the extent arising out of or in connection with Contractor's negligent performance under the Contract, and/or (b) to the extent on account of use of any copyrighted or uncopyrighted material, composition, or process, or any patented or unpatented invention, article or appliance, furnished or used directly by Contractor or its subcontractor(s) under the Contract. This indemnification provision shall apply to any acts or omissions, willful misconduct, or negligent misconduct, whether active or passive, on the part of Contractor of or anyone employed by or working under Contractor. Notwithstanding the foregoing, Contractor has no responsibility to and will not indemnify OC San, or its elected and appointed officials, officers, agents and employees, for claims, liabilities, expenses, or damages of any nature to the extent arising from, caused by or in connection with OC San's negligence (sole, joint, or concurrent), gross negligence, willful misconduct or any other fault on the part of OC San.

***16. Contractor Safety Standards.*** OC San requires Contractor and its subcontractor(s) to follow and ensure their employees follow all Federal, State, and local regulations as well asthe Contractor Safety Standards while working at OC San locations. If during the course ofthe Contract it is discovered that the Contractor Safety Standards do not comply with Federal, State, or local regulations, then the Contractor is required to follow the most stringent regulatory requirement at no additional cost to OC San. Contractor and all of its employees and subcontractors, shall adhere to all applicable Contractor Safety Standards attached hereto in Exhibit "D" and the Human Resources Policies (Exhibit "E").

***17. Warranties.*** In addition to the warranties stated in Exhibit "A", the following shall apply:

17.1 Where applicable, Contractor supplier's standard warranty shall apply. To the extent possible, Contractor shall transfer its supplier's warranties to OC San for the work as complete.

Contractor's Warranty (Guarantee): Contractor warrants that any goods, parts, repairs, or upgrades supplied by Contractor under this Contract shall (i) be free from any materials and workmanship for the specified warranty period, (ii) conform to the specifications mutually agreed in Exhibit "A" (herein incorporated by reference), and (iii) all Services will be performed in a competent and diligent manner in accordance with generally accepted standards for such services. If within a one-year period of completion of all work as specified in Exhibit "A", OC San informs Contractor in writing that any portion of the Services providedfails to meet the standards required under this section 17 of the Contract, Contractor shall, within the time agreed to by OC San and Contractor, repair, replace, or re-perform the noted non-conforming deficiency(ies) in goods or Services at Contractor's sole option and expense. If the good or Service cannot be made to conform to the warranty in this section by repair, replace, or re-performance, Contractor's responsibility shall be to refund the portion of the purchase price allocated to the non-conforming goods or Services. The remedies set forth in this section constitute the sole and exclusive remedies for all claims arising out of or related to any defect or non-conformity in the products, parts, goods, or services regardless when the defect or non-conformity arises. Contractor shall have no responsibility to repair or replace defective equipment or component parts resulting from theuse of repair or replacement parts not of Contractor's manufacture or approved by Contractor or from OC San's failure to store, install, maintain, and operate the equipment according to Contractor's written instructions and drawings and standard industry practice. Deterioration and wear occasioned by chemical and abrasive action or excessive heat shallnot constitute defects. Transportation of products to and from Contractor's service facility shall be borne to OC San when a repair is not covered by warranty. Warranty work providedunder this Contract does not assure uninterrupted operation of the products. Equipment and accessories furnished by third parties which are not incorporated in the equipment manufactured by Contractor are warranted only to the extent of the original manufacturer'swarranty to Contractor. THE WARRANTIES SET FORTH IN

THIS SECTION 17 ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, CONDITIONS, AND GUARANTEES, WHETHER WRITTEN OR ORAL. NO IMPLED WARRANTY OR CONDITION, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.

***Liquidated Damages.*** In the event the Contractor fails to achieve completion of the work within the term of this Contract or achievement of any designated Milestones due to delays solely caused by and attributable to Contractor, which are not otherwise excusable under the terms of the Contract, and, after due allowance for extensions of time made in accordance with the Contract, if any, OC San will sustain damage which would be extremely difficult and impracticable to ascertain. The Parties therefore agree that in each such event, Contractor will pay to OC San the sum of five hundred ($500.00) per day, as Liquidated Damages, and not as a penalty, for each and every calendar day during which Substantial Completion (1,232 calendar days from Notice to Proceed), as defined below, is so delayed. In addition, Contractor will pay to OC San the sum of one hundred ($100.00) per day, as Liquidated Damages, and not as a penalty, for each and every calendar day during which Final Completion (1,249 calendar days from Notice to Proceed), as defined below, is so delayed. The parties agree that such Liquidated Damages represent a fair and reasonable estimate of the damages OC San may suffer as a result of Contractor's delay in delivery. Contractor agrees to pay such Liquidated Damages and further agrees that OC San may offset the amount of Liquidated Damages from any monies due or that may become due Contractor under this Contract. Contractor also agrees that to the extent the amount of Liquidated Damages exceeds any monies due to the Contractor under this Contract, Contractor shall pay all such amounts to OC San upon demand. If this provision is found for any reason to be void, invalid, or otherwise inoperative so as to disentitle OC San from claiming Liquidated Damages, OC San is entitled to claim against the Contractor damages at law for the Contractor's failure to complete the work during the term of this Contract. In no event shall Contractor's maximum Liquidated Damages exceed five percent (5%) of the Contract Price allocated to the delayed portion of the work. Such Liquidated Damages shall be in lieu of all actual damages, solely resulting from the delay in the delivery of the goods, services, or work under this Contract, and shall be OC San's sole and exclusive remedy and Contractor's sole and exclusive responsibility for such delay.

SUBSTANTIAL COMPLETION

Substantial Completion of the work means all Gen-Sets, as defined in Exhibit "A", have been completed and OC SAN can beneficially occupy or utilize them all for the purpose for which they are intended, and the work complies with applicable codes and regulations, including if required, issuance of certificates of occupancy, or certificate of suitability for use from the appropriate governmental agencies, as determined by the Engineer at his/her sole discretion.

FINAL COMPLETION

After the Engineer has made the final inspection and is satisfied that the work has been completed in accordance with the Contract, including all punchlist items, and is satisfied that all submittals have been made and accepted, including, but not limited to all materials required by the Contract and all As-Builts, Record Drawings by the Contractor, if required by the Contract, and any other required record documents have been completed and accepted, all change order work has been completed and accepted by the Engineer, and all other requirements of the Contract, except for any unexecuted change orders, possible future warranty and guarantee work have been accomplished, the Contractor shall obtain, in writing, the acceptance by the Engineer of the full completion of the Work and the date thereon.

***18.*** **AQMD Pass-Through Fees and Fines. In the event the Contractor fails to reach final**

**completion of any one Gen-Set within the 275 calendar days (9 months) as required under in Exhibit "A" OC San may be subject to fees and fines imposed by the Air Quality Management District (AQMD). The cost of these AQMD fees and fines as validated by OC San shall be passed through to the Contractor.** Contractor agrees to pay such fees and fines and further agrees that OC San may offset the amount of these fees and fines from any monies due or that may become due Contractor under this Contract. Contractor also agrees that to the extent the amount of these fees and fines exceeds any monies due to the Contractor under this Contract, Contractor shall pay all such amounts to OC San upon demand.

19. ***Damages.*** Contractor's total responsibility for any claims, including but not limited to indemnity claims under Section 15, damages, losses or liabilities arising out of or related to its performance of this Contract or the products and Services coveredhereunder shall not exceed two times the Contract price. EXCLUDING CLAIMS RESULTING FROM GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, IN NO EVENT SHALL CONTRACTOR OR OC San BE LIABLE FOR PUNITIVE, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND AS DEFINED BY THE LAW GOVERNING THIS CONTRACT RESULTING FROM OR ARISING OUT OF THIS CONTRACT, INCLUDING WITHOUT LIMITATION, LOSS OF PROFIT, REVENUE, PRODUCTION OR USE HOWSOEVER SAME MAY BE CAUSED.

20. ***Force Majeure.*** Neither party shall be liable for delays caused by accident, flood, acts of God, fire, labor trouble, war, acts of government or any other cause beyond its control, but said party shall use reasonable efforts to minimize the extent of the delay. Work affected bya Force Majeure condition may be rescheduled by mutual consent or may be eliminated from the Contract.

21. ***Freight (F.O.B. Destination).*** Contractor assumes full responsibility for all transportation, transportation scheduling, packing, handling, insurance, and other services associated with delivery of all products deemed necessary under this Contract.

22. ***Familiarity with Work.*** By executing this Contract, Contractor warrants that: 1) it has investigated the work to be performed; 2) it has investigated the site of the work and is awareof all conditions there; and 3) it understands the facilities, difficulties and restrictions of the work under this Contract. Should Contractor discover any latent or unknown conditions materially differing from those inherent in the work or as represented by OC San, it shall immediately inform OC San of this and shall not proceed, except at Contractor's risk, until written instructions are received from OC San.

23. ***Regulatory Requirements.*** Contractor shall perform all work under this Contract in strict conformance with applicable Federal, State, and local regulatory requirements including, but not limited to, 40 CFR 122, 123, 124, 257, 258, 260, 261, and 503, Title 22, 23, and California Water Codes Division 2.

24. ***Environmental Compliance.*** Contractor shall, at its own cost and expense, comply with all Federal, State, and local environmental laws, regulations, and policies which apply to the Contractor, its subcontractors, and the Services, including, but not limited to, all applicable Federal, State, and local air pollution control laws and regulations.

25. ***Licenses, Permits, Ordinances and Regulations.*** Contractor represents and warrants to OC San that it has obtained all licenses, permits, qualifications, and approvals of whatever nature that are legally required to engage in this work. Any and all fees required by Federal, State, County, City and/or municipal laws, codes and/or tariffs that pertain to the work

performed under the terms of this Contract will be paid by Contractor.

***26. Applicable Laws and Regulations.*** Contractor shall comply with all applicable Federal, State, and local laws, rules, and regulations. Contractor also agrees to indemnify and hold harmless from any and all damages and liabilities assessed against OC San as a result of Contractor's noncompliance therewith. Any permission required by law to be included herein shall be deemed included as a part of this Contract whether or not specifically referenced.

***27. Contractor's Employees Compensation.***

27.1 Davis-Bacon Act – Contractor will pay and will require all subcontractors to pay all employees on said project a salary or wage at least equal to the prevailing rate of per diemwages as determined by the Secretary of Labor in accordance with the Davis-Bacon Act foreach craft or type of worker needed to perform the Contract. The provisions of the Davis- Bacon Act shall apply only if the Contract is in excess of $2,000.00 and when 25% or moreof the Contract is funded by Federal assistance. If the aforesaid conditions are met, a copyof the provisions of the Davis-Bacon Act to be complied with are incorporated herein as a part of this Contract and referred to by reference.

27.2 General Prevailing Rate – OC San has been advised by the State of California Director of Industrial Relations of its determination of the general prevailing rate of per diem wages and the general prevailing rate for legal holiday and overtime work in the locality in which the work is to be performed for each craft or type of work needed to execute this Contract, andcopies of same are on file in the Engineering Department. The Contractor agrees that not less than said prevailing rates shall be paid to workers employed on this Contract as requiredby Labor Code Section 1774 of the State of California. Per California Labor Code 1773.2, OC San will have on file copies of the prevailing rate of per diem wages at its principal officeand at each project site, which shall be made available to any interested party upon request.

27.3 Forfeiture For Violation – Contractor shall, as a penalty to OC San, forfeit $50.00 for each calendar day or portion thereof for each worker paid (either by the Contractor or any subcontractor under it) less than the prevailing rate of per diem wages as set by the Directorof Industrial Relations, in accordance with Sections 1770-1780 of the California Labor Codefor the work provided for in this Contract, all in accordance with Section 1775 of the Labor Code of the State of California.

27.4 Apprentices – Sections 1777.5, 1777.6, 1777.7 of the Labor Code of the State of California, regarding the employment of apprentices are applicable to this Contract and the Contractor shall comply therewith if the prime contract involves $30,000.00 or more or 20 working daysor more; or if contracts of specialty contractors not bidding for work through the general or prime Contractor are $2,000.00 or more or five working days or more.

27.5 Workday – In the performance of this Contract, not more than eight hours shall constitute a day's work, and the Contractor shall not require more than eight hours of labor in a day from any person employed by it hereunder. Contractor shall conform to Article 3, Chapter 1, Part7 (Section 1810 et seq.) of the Labor Code of the State of California and shall forfeit to OC San as a penalty, the sum of $25.00 for each worker employed in the execution of this Contract by Contractor or any subcontractor for each calendar day during which any workeris required or permitted to labor more than eight hours in any one calendar day and 40 hoursin any one week in violation of said Article. Contractor shall keep an accurate record showingthe name and actual hours worked each calendar day and each calendar week by each worker employed by Contractor in connection with the project.

Record of Wages; Inspection – Contractor agrees to maintain accurate payroll records

showing the name, address, social security number, work classification, straight-time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by it in connection with the project and agrees to require that each of its subcontractors do the same. All payroll records shall be certified as accurate by the applicable Contractor or subcontractor or its agent having authority over such matters. Subject to the audit provisions herein, Contractor furtheragrees that its payroll records and those of its subcontractors shall be available to the employee or employee's representative, the Division of Labor Standards Enforcement, andthe Division of Apprenticeship Standards and shall comply with all of the provisions of Labor Code Section 1776, in general. Penalties for non-compliance with the requirements of Section 1776 charged to OC San may be deducted from project payments per the requirements of Section 1776.

***28. South Coast Air Quality Management District's (SCAQMD) Requirements.*** It is Contractor's responsibility that all equipment furnished and installed be in accordance with the latest rules and regulations of the South Coast Air Quality Management District (SCAQMD). All Contract work practices, which may have associated emissions such as sandblasting, open field spray painting or demolition of asbestos containing components or structures, shall comply with the appropriate rules and regulations of the SCAQMD.

***29. Governing Law.*** This Contract shall be governed by and interpreted under the laws of the State of California and the Parties submit to jurisdiction in the County of Orange, in the event any action is brought in connection with this Contract or the performance thereof.

***30. Breach.*** The waiver of either party of any breach or violation of, or default under, any provision of this Contract, shall not be deemed a continuing waiver by such party of any other provision or of any subsequent breach or violation of this Contract or default thereunder. Any breach by Contractor to which OC San does not object shall not operate as a waiver of OC San's rights to seek remedies available to it for any subsequent breach.

***31. Remedies.*** With respect to that subject matter and/or circumstances or events for which specific remedies are set forth in this Contract, including, without limitation, those remedies with respect to the Services performed by Contractor hereunder, then such remedies shall be the exclusive remedies of the parties. If no such specific remedy is provided, then the parties shall have available to them any remedy available under applicable law or in equity.

***32. Dispute Resolution.***

32.1 In the event of a dispute as to the construction or interpretation of this Contract, or any rightsor obligations hereunder, the Parties shall first attempt, in good faith, to resolve the disputeby mediation. The Parties shall mutually select a mediator to facilitate the resolution of the dispute. If the Parties are unable to agree on a mediator, the mediation shall be conductedin accordance with the Commercial Mediation Rules of the American Arbitration Agreement, through the alternate dispute resolution procedures of Judicial Arbitration through Mediation Services of Orange County ("JAMS"), or any similar organization or entity conducting an alternate dispute resolution process.

32.2 In the event the Parties are unable to timely resolve the dispute through mediation, the issues in dispute shall be submitted to arbitration pursuant to California Code of Civil Procedure, Part 3, Title 9, Sections 1280 et seq. For such purpose, an agreed arbitrator shall be selected, or in the absence of agreement, each party shall select an arbitrator, andthose two arbitrators shall select a third. Discovery may be conducted in connection with thearbitration proceeding pursuant to California Code of Civil Procedure Section 1283.05. The arbitrator, or three arbitrators acting as a board, shall take such evidence and make such investigation as

deemed appropriate and shall render a written decision on the matter in question. The arbitrator shall decide each and every dispute in accordance with the laws ofthe State of California. The arbitrator's decision and award shall be subject to review for errors of fact or law in the Superior Court for the County of Orange, with a right of appeal from any judgment issued therein.

33. ***Attorney's Fees.*** If any action at law or inequity or if any proceeding in the form of an Alternative Dispute Resolution (ADR) is necessary to enforce or interpret the terms of this Contract, the prevailing party shall be entitled to reasonable attorney's fees, costs and necessary disbursements in addition to any other relief to which he may be entitled.

34. ***Survival.*** The provisions of this Contract dealing with Payment, Warranty, Indemnity, and Forum for Enforcement, shall survive termination or expiration of this Contract.

35. ***Severability.*** If any section, subsection, or provision of this Contract, or any agreement or instrument contemplated hereby, or the application of such section, subsection, or provisionis held invalid, the remainder of this Contract or instrument in the application of such section, subsection or provision to persons or circumstances other than those to which it is held invalid, shall not be affected thereby, unless the effect of such invalidity shall be to substantially frustrate the expectations of the Parties.

36. ***Damage to OC San's Property.*** To the extent any of OC San's property is damaged by the negligence of Contractor, any subcontractors or by the personnel of either will be subjectto repair or replacement by Contractor at no cost to OC San, except for that portion, if any,OC San's actions contributed to the damage.

37. ***Disclosure.*** Contractor agrees not to disclose, to any third party, data or information generated from this project without the prior written consent from OC San. OC San agrees not to disclose, to any third party, Contractor data or information related this project without the prior written consent from Contractor, except to the extent required by a government agency.

38. ***Independent Contractor.*** The legal relationship between the parties hereto is that of an independent contractor, and nothing herein shall be deemed to make Contractor an OC San employee. During the performance of this Contract, Contractor and its officers,employees, and agents shall act in an independent capacity and shall not act as OC San'sofficers, employees, or agents. Contractor and its officers, employees, and agents shall obtain no rights to any benefits which accrue to OC San's employees.

39. ***Limitations upon Subcontracting and Assignment.*** Contractor shall not delegate any duties nor assign any rights under this Contract without the prior written consent of OC San. Any such attempted delegation or assignment shall be void.

40. ***Third Party Rights.*** Nothing in this Contract shall be construed to give any rights or benefits to anyone other than OC San and Contractor.

41. ***Non-Liability of OC San Officers and Employees.*** No officer or employee of OC San shall be personally liable to Contractor, or any successor-in-interest, in the event of any default or breach by OC San or for any amount which may become due to Contractor or toits successor, or for breach of any obligation for the terms of this Contract.

42. ***Read and Understood.*** By signing this Contract, Contractor represents that he has read and understood the terms and conditions of the Contract.

43. ***Authority to Execute.*** The persons executing this Contract on behalf of the Parties warrant that they are duly authorized to execute this Contract and that by executing this Contract, the Parties are formally bound.

44. ***Entire Contract.*** This Contract constitutes the entire agreement of the Parties and supersedes all prior written or oral and all contemporaneous oral agreements, understandings, and negotiations between the Parties with respect to the subject matter hereof.

45. ***Notices.*** All notices under this Contract must be in writing. Written notice shall be delivered by personal service or sent by registered or certified mail, postage prepaid, return receipt requested, or by any other overnight delivery service which delivers to the noticed destination and provides proof of delivery to the sender. Rejection or other refusal to acceptor the inability to deliver because of changed address for which no notice was given as provided hereunder shall be deemed to be receipt of the notice, demand or request sent. All notices shall be effective when first received at the following addresses:

| | |
|---|---|
| OC San: | Jackie Lagade<br>Principal Buyer<br>Orange County Sanitation District<br>10844 Ellis Avenue<br>Fountain Valley, CA 92708 |
| Contractor: | John B. Sargent<br>Chief Executive Officer<br>Cooper Machinery Services LLC<br>16250 Porth Northwest Drive<br>Houston, Texas 77041 |

Each party shall provide the other party written notice of any change in address as soon as practicable.

[Intentionally left blank. Signatures follow on the next page.]

***IN WITNESS WHEREOF***, intending to be legally bound, the Parties hereto have caused this Contract to be signed by the duly authorized representatives.

**ORANGE COUNTY SANITATION DISTRICT**

Dated: _____ By: _____
Chad P. Wanke
Chair, Board of Directors

Dated: _____ By: _____
Kelly A. Lore
Clerk of the Board

Dated: _____ By: _____
Ruth Zintzun
Purchasing & Contracts Manager

**COOPER MACHINERY SERVICES LLC**

Dated: _____ By: _____

_____
Print Name and Title of Officer

JL

# EXHIBIT A

# SCOPE OF WORK

# For

# Engine and Generator Overhauls at Plant No. 1 and 2

# EXHIBIT A-1
# ENGINE OVERHAULS

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## 1. BACKGROUND

The Central Generation (CENGEN) Facilities at OC San Plants No. 1 and 2 were completed in 1993 and 1990 respectively. Plant No. 1 consists of three (3) reciprocating engine-generator sets, Cooper-Bessemer LSVB-12 SCG 12-cylinder engines driving Ideal Electric SAMB 12.47-kV 2,500-kW synchronous generators at 400 RPM. Plant No. 2 consists of five (5) reciprocating engine-generator sets, Cooper-Bessemer LSVB-16 SCG 16-cylinder engines driving Ideal Electric SAMB 12.47-kV 3,000-kW synchronous generators at 360 RPM. These engine-generator sets have been in service for over 20 years and must be overhauled.

## 2. DEFINITIONS

A. Gen-Set – Engine and Generator combination

B. IEEE – Institute of Electrical and Electronics Engineers

C. LOTO – Lock Out Tag Out

D. P&ID – Process and Instrumentation Diagram

## 3. GENERAL PROJECT DESCRIPTION

A. The Contractor shall overhaul a total of one (1) Generator and four (4) Engine-Generator Sets in the following order:

1. Plant No. 1 Gen-Set 3
2. Plant No. 2 Gen-Set 5, 1, and 3

B. Overhaul work shall only occur on one engine at a time to keep the respective CENGEN building online. Additionally, the Contractor shall manage the contract for the Generator Overhaul for each engine to a Sub-Contractor for the work associated with the Generator Overhaul of the Contractor's choosing.

C. A Scope of Work for the Generator Overhaul has been included with this Scope of Work, as Exhibit A-2.

D. The Contractor shall perform the following services required to overhaul all engine-generator sets covered by this Scope of Work.

1. Disassembly, repair/refurbish/replacement of parts, and reassembly
2. Welding, as necessary
3. Alignment measurements, before and after overhaul, of the engine and generator
4. Testing, as described including, but not limited to, performance and measurements, before and after overhaul
5. Rigging and blocking
6. Transportation, as needed
7. Electrical Services
8. Instrumentation Services
9. Mechanical Services

## 3.1 GENERAL

A. All work performed by the Contractor on the engine-generator sets listed herein shall be completed in accordance with Industry best practices, OEM specifications, and as required by the latest applicable industry codes and regulations as stipulated under this contract, unless otherwise accepted by the OC San Engineer in writing prior to work execution. The most stringent requirement shall take precedence if a conflict arises between any of the aforementioned project requirements.

   1. Appendix A-1 contains pertinent fastener torque tightening and use specifications, as well as component level parts drawings.

B. The Contractor shall properly secure, block, and support engine and generator components to prevent damage and unintended movement, during storage or transportation, putting in place both passive and active controls to ensure safety of personnel at all times. The Contractor shall follow all OSHA and OC San Safety Standards during the entire duration of this project.

C. All required parts, unless noted otherwise, are to be supplied by the Contractor, and are listed in the Appendices A-2 and A-5. These parts and components shall be OEM parts in new and unused condition. The Contractor shall submit documentation to the Engineer to prove all parts are correct. Contractor will not provide documentation for each individual part, rather will supply one document to certify all parts meet OEM specifications. All documentation shall include, at a minimum, manufacture certification that part meets or exceeds Cooper-Bessemer's specifications, from Cooper-Bessemer. This documentation shall be provided to the OC San Engineer and accepted to them before part is procured and installed by the Contractor and shall also be included in the Final Report.

   1. All parts that are to be replaced shall be procured and staged on-site or at the appropriate location prior to the commencement of the work on each Engine-Generator Set.

   2. The Contractor shall provide the required documentation in a timely manner as to allow OC San 30 Days to review and accept and not incur any schedule delays.

D. No OC San owned materials, parts, or equipment shall be taken off the site, without OC San's written authorization. Before removing OC San owned property, the Contractor shall provide a list of materials, parts, or equipment being considered for removal and obtain acceptance of the OC San Engineer. When materials, parts, or equipment is returned to OC San premises, the OC San Engineer will signoff receipt of components accordingly.

   1. The Contractor shall provide the required documentation in a timely manner as to allow OC San 30 Days to review and accept and not incur any schedule delays.

E. The Contractor is responsible for the removal of all debris and trash and shall always keep the work area clean and tidy. The Contractor shall immediately clean up any spills and dispose of cleaning materials in accordance with local, state, and federal laws.

F. Except as specified elsewhere herein, the Contractor shall furnish field supervision, home office support, labor, permanent materials, construction equipment, tools, consumable supplies, transportation, testing, safety equipment, personnel protective equipment, temporary and support facilities, insurance, and any other items of expense required to perform all activities described herein. OC San will provide the

suitable laydown area required for this project, refer to Appendix A-9, Specification Section 01520 for details.

G. The Contractor shall be responsible for the proper care and storage of all parts, either onsite, during transport, or at the relevant offsite location accordingly. Proper care, protection, and storage includes protecting workpieces from the elements, contaminant ingress, condensation, weight, paint spray, cross contamination, and damage during all work activities. In some cases, heaters, wrapping, tarps, and desiccant will be necessary, which shall be solely supplied, designed, provided, and installed by the Contractor. Refer to Appendix A-9, Specification Section 1600.

H. The Contractor shall be responsible for blocking and cribbing of engine and generator related components, or as otherwise required. Under no situation, shall any components be rested upon one another. The final acceptance of said care and storage techniques and execution shall be by the OC San Engineer.

I. OC San will assign a Senior Mechanic as a Technical Witness and an Inspector for all Contractor's activities, including but not limited to all readings taken and tests performed by the Contractor. If any results of measurement or testing are deemed erroneous or unreliable, the Contractor shall retake all readings and redo testing at no additionally cost to OC San.

J. The Contractor shall be solely responsible for maintaining all items in accordance with the manufacturer instructions until OC San accepts the work as defined by this contract.

K. The Contractor shall be responsible for the repair or replacement of any item, in-kind, damaged by the Contractor or their Subcontractor(s) without any cost or schedule impact to OC San, until complete turnover and acceptance by OC San of the work entailed in this Scope of Work.

L. The main overhead crane in the CENGEN Engine Rooms at Plant No. 1 and 2 may be used for disassembly and removal of the engine-generator components. See Section 4.2 of this Scope of Work for details.

M. The Plant No. 1 and 2 CENGEN facilities will be in operation during the execution of the work, with other work possibly happening in close proximity, or at the same time, during execution of this contract. The Contractor shall coordinate all work to avoid any interference with normal plant operations, equipment maintenance, other projects or processes happening simultaneously. Downtime for piping, power interruptions, and other utility services requiring taps or connections shall be kept to a minimum, to not influence or impact normal OC San plant operations. Written shutdown requests shall be submitted to the OC San Engineer, at least 30 Days in advance of the planned activity. Requests shall include, at a minimum, a drawing and item list to identify the system or equipment included in the shutdown request. The OC San Engineer's written acceptance of shutdown requests shall be obtained 14 Days in advance of any planned work. Any work that blocks roadways, access to buildings, and parking lots shall require prior acceptance and written acceptance by the OC San Engineer. The Contractor shall always follow OC San's LOTO procedures for isolation of equipment. OC San will provide tags and the Contractor

shall provide lockout devices per the OC San LOTO procedure. If Work on energized electrical systems is required, refer to the section entitled “Working on Energized Systems” of the OC San Safety Standards.

N. The Contractor shall inspect all parts and components in the presence of OC San’s Engineer or designee as required, to determine their status as acceptable or needing to be replaced. All NDE inspections shall be performed by the Contractor qualified personnel per latest applicable ASME BPVC Section V-Non-Destructive Examination (NDE) procedures and calibrated instruments, as detailed herein. All inspected, repaired, and reconditioned parts and components shall comply with the latest ASME PCC2 code Repair of Pressure Equipment and Piping.

O. OC San must comply with all aspects of the AQMD Title V Permits, as shown in Appendix A-10. Additionally, OC San will test each Engine-Generator Set, including the Engine for Plant No. 1 Generator 1, for compliance with the Permits prior to the start of work on each Engine and Generator. The Contractor will be given each Gen-Set after successful completion of the AQMD testing, see Section 7 of this Scope of Work for details.

# 4. WORK ELEMENTS

## 4.1 FUNCTIONALITY TESTING AND MEASURMENTS

### 4.1.1 TESTING

A. The Contractor shall perform the following testing prior to any engine-generator set work and shall be included in the Final Report as “as-found” testing. Additionally, after the engine-generator work is completed, the following testing shall be performed and included in the Final Report as “as-left” testing. The “as-found” results shall be submitted to OC San prior to the commencement of work.

1. Record Crankcase Pressure
2. Compression and Leak-down Testing for each cylinder (complete “as-left” testing before commissioning)
3. Starting Air Valve Functionality
4. Instrumentation Functionality (See Appendix A-6)

B. Testing done by OC San that will be provided to the Contractor to be included in initial report to OC San Engineer and Final Report

1. Oil Health
    a. International Organization of Standardization (ISO) Cleanliness Level Measurement
    b. Additive Health Baseline Measurement
2. Vibration Testing of Engine, Generator, and Turbo

### 4.1.2 MEASURMENTS

A. The Contractor shall take measurements of the below listed components, as a minimum. The results of these measurements shall be included in the Final Report as “as-found” measurements. Measurements of the listed items shall also occur while the engine-generator set is being assembled, as-appropriate, and included in the Final Report as “as-left” inspection and measurements.

1. Outboard Pedestal Bearing Clearance between Engine and Generator
2. Engine-Generator Alignment
3. Crank Shaft Web Deflection and Connecting Rod run-out
4. Valve, Spring, and Rocker Arm clearances
5. Thrust Bearing Clearances
    a. Crank Shaft
    b. Cam Shafts
    c. Turbocharger
6. Radial Bearing Clearances
    a. Crank Shaft
    b. Cam Shafts
    c. Connecting Rods
7. Bushings Condition and Clearances
    a. Connecting Rod End
    b. Piston Pin
8. Piston and Piston Ring Condition and Clearances
9. Piston Ring Gaps
10. Cylinder Liner Condition and Measurements

## 4.2 MECHANICAL

### 4.2.1 GENERAL

A. The Contractor shall overhaul the Engine-Generator Sets in accordance with industry best practices and any information that can be obtained from the OEM.

B. During the overhaul, the Contractor shall apply any required lubricants, anti-seize, or other compounds to fasteners or contact surfaces to achieve the required fastener tightening specifications and to prevent galvanic corrosion.

### 4.2.2 CYLINDER HEADS

A. The Contractor shall remove all valve (rocker) covers and clean, inspect, and repair. Replace mounting bolts. Store so as safeguard from scratching, denting, and marring the sealing surfaces of the Head itself.

B. The Contractor shall perform dye penetrant testing to all cylinder head surfaces, to check for surface cracks and defects. Pre-cleaning, application of penetrant, excess penetrant removal, application of developer, inspection, and post cleaning to be followed per the dye penetrant's manufacture instructions.

    1. The Contractor shall overhaul all cylinder heads, as specified below.

C. The Contractor shall resurface all head sealing surfaces using appropriate methods to achieve, as a minimum, Ra 32-64 finish, with the flatness required for proper sealing. The Contractor shall use only new Head Gaskets when reinstalling the overhauled heads.

D. The Contractor shall inspect and replace the intake and exhaust valve springs with new OEM Parts. Measure and record free heights of all valve springs, old and new; test and record spring rates of new springs to ensure they are correct and report in Final Report.

E. The Contractor shall inspect and replace all intake, exhaust, starting air, and fuel gas isolation valves with new OEM Parts. The Contractor shall also include in the final report, any build-up, scoring, pitting, or other abnormal surface conditions of the valves, noting which vales specifically the condition occurred and include pictures.

F. The Contractor shall inspect and replace all valve guides and valve seat inserts. The Contractor shall also include in the final report, any build-up, scoring, pitting, or other abnormal surface conditions of the valves, noting which vales specifically the condition occurred and include pictures.

    1. Ensure proper fitment of the valve guide to cylinder head and valve stem to valve guide.

    2. Lap intake, exhaust, air, and gas valve seats, as required, to match new valves and obtain the required sealing and contact requirements and clean thoroughly.

G. Upon reassembly of each Cylinder Head, after making the necessary adjustments, the Contractor shall leak test all intake, exhaust, air, and gas valves. Measure and record sealing pressures and leak down rates for each valve, for OC San Engineer review and acceptance. Included this data in the Final Report as well.

H. The Contractor shall inspect and replace all seals and gaskets on the Cylinder Head with new.

I. The Contractor shall inspect and replace bushings and rocker arm shafts, on all rocker arm assemblies, with new, ensuring to properly orient, machine, and test them.

J. The Contractor shall inspect and replace all hydraulic lifters, tappets, locknuts, and adjusting screws, with new. Hone the tappet bores to remove any scuff or wear marks, maintaining required clearance and surface finish requirements. Adjust the hydraulic lifters per OEM specifications.

K. During reassembly of the engine, prior to start-up, the Contractor shall measure, adjust, and set the rocker arm to valve lash, as required.

L. OC San will provide the Contractor with new jet cells for each engine covered under this Scope of Work.

M. The Contractor shall disassemble, replace, and reassemble all breather hoses and filters on the cylinder heads ensuring suitable sealing performance is achieved with new gaskets.

N. The Contractor shall disassemble, replace, reassemble all water jumpers, connections, and accessories, rebuilding and resurfacing connections as necessary to achieve a minimum surface finish of Ra 125-250 and satisfactory sealing performance, including new gaskets.

O. The Contractor shall reassemble the Cylinder Heads and supporting systems, piping, and connections. Pressure test all systems individually, using process specific media per ASME PCC-2 for repaired systems; and ASME B31.1 for new or newly welded systems, for a duration of one (1) hour minimum, and correcting leaks or deficiencies as required per the applicable standard.

### 4.2.3 ENGINE FUEL SYSTEM

A. The Contractor shall disassemble, inspect, clean, repair, reassemble, and test the Fuel Gas Header, Fuel Gas Balancing Valves, pilot gas lines, and other related piping system components. The Contractor shall also disassemble, rebuild, and reassemble the Gas Regulator with new consumable parts and internals.

B. The Contractor shall clean the Kiene valves through appropriate means, to ensure proper function and sealing.

### 4.2.4 CYLINDER LINERS

A. The Contractor shall remove, inspect, measure, and replace all Cylinder Liners with new virgin Nitride coating that meet the necessary requirements for circularity (out of roundness), porosity, taper, and cleanliness. Record data in the Final Report. Out of spec cylinder liners shall not be accepted by the Contractor who shall notify the OC San Engineer of any delays to the schedule while replacement liners are procured.

B. The Contractor shall remove, inspect, and replace liner seals, O-rings, gaskets, and bellow type seals (Wrinkle bellies), to meet or exceed OEM specifications.

C. The Contractor shall measure and verify the cylinder bore clearances are re-set as required. The Contractor shall measure and record the cylinder liner to block height after liner installation, OC San will witness, prior to installing the head, orienting the seal drain plug side coincident with the crankcase door.

### 4.2.5 ROTATING ASSEMBLY (CRANKSHAFT, CONNECTING RODS, AND PISTONS)

A. Prior to engine disassembly, the Contractor shall measure and record all throws of the Crankshaft and their respective web deflections. Record data in the Final Report. Report to OC San any abnormal readings and include the findings in the Final Report. During reassembly, and before installing the flywheel, remeasure and record the crankshaft web deflections, ensuring that the crankshaft is properly seated on the main bearings. After installation of the flywheel, remeasure crankshaft web deflections and record in Final Report. At all times, the web deflections shall be within the OEM specifications, and recorded in the Final Report.

B. The Contractor shall inspect the Crankshaft examining the entire length and journals for defects such as surface fatigue, cracks, heat stress, damage, and wear. Keep track of component locations, as it is pertinent that they are reinstalled into their original locations. If major issues are found, the Contractor shall bring to the attention of the OC San Engineer immediately, and in writing.

C. The Contractor shall remove, disassemble, clean, inspect, refurbish, reassemble, and reinstall all Pistons, Master Rods and Articulated Rods, journals, caps, bearings, bushings, dowels, and pins. The Contractor shall record and report in the Final Report, any faults or damage to these components, including but not limited to, signs of pre-ignition or detonation on the pistons, for example. The Contractor shall bring to the immediate attention of the OC San Engineer any major faults or damage that will require extensive repairs or replacement of components.

   1. Bearing and bushing clearances shall also be recorded and reported in the Final Report, for the old and new parts. Ensure that oil passageways are properly oriented, cleaned, and unobstructed, prior to installation.

D. The Contractor shall remove and perform Non-Destructive Testing (NDT) on Pistons, Master Connecting Rods, Articulated Rods, Bearing Caps, Bushings, and Bearings. OC San will witness ultrasonic testing.

    1. The results of the NDT findings to be compared to historical scans, recorded, and included in the Final Report. If major issues are found, the Contractor to bring to the attention of the OC San Engineer immediately, and in writing.

E. The Contractor shall NDT on Crank Shaft. OC San will witness NDT.

F. The Contractor shall also remove, inspect, clean, and refurbish the crankshaft counterweight assemblies. All counterweight studs and nuts shall be replaced with new, and the crankshaft counterweight stud mating threads shall be refurbished as needed. Stake the studs and nuts per SD-132, using a staking tool and staking as detailed, and after properly torquing the nut as specified. (See Appendix A-1)

G. The Contractor shall replace and install all Master Connecting Rod and Articulated Rod bushings and bearings with new OEM ones, maintaining the required OEM stated clearances and surface requirements. Record the final bushing and side clearances and include in the Final Report. No filing or shimming is permitted on the rods, bearings, or bearing caps.

H. The Contractor shall measure, inspect, replace, adjust, and reassemble all Main Bearings and Connecting Rod bearings, with new. Record the as found and final journal to bearing circumferential, side, running clearances, include in the Final Report. OC San will provide the special tool required to remove the Thrust Bearing.

    1. The Contractor shall note in Final Report conditions of the Main Bearings, Thrust Bearing, bearing shells, and hardware as found during disassembly. Items to be noted in the Final Report include but are not limited to wear patterns, bright spots, fretting, pitting, remaining thickness, and clearance measurements.

    2. During reassembly of the engine, ensure all Main Bearing Caps are reinstalled into their original locations. Replace the installation pins and ensure all oil passageways are properly cleaned and aligned. Record the final stud stretch, using new studs and locknuts leaving appropriate witness marks for inspection during regular services.

I. The Contractor shall inspect the piston and articulated rod journal for signs of surface fatigue, cracks, heat stress, damage, wear, and repair. No grinding of rod journals is permitted, only minor polishing is allowed. If major issues are found, the Contractor shall bring to the attention of the OC San Engineer immediately.

J. During reassembly of the engine, the Contractor shall install the Rod Bearing Caps, measuring the stud stretch and tightening as required. Record the final stud stretch, and include in the Final Report, marking or replacing the locknuts as previously described, per OEM requirements for material strength considerations.

K. The Contractor shall remove, replace, and reassemble all piston rings with new. Inspect Piston groove dimensions for wear, chips, and cracks. Measure and record the as found ring gaps, as well as, the final ring gaps and clearances.

L. The Contractor shall replace and reinstall all Piston wrist pins with new ones. Record the final clearances and include in the Final Report.

### 4.2.6 GENERATOR OUTBOARD BEARING

A. The Contractor shall remove, inspect, measure, and record as-found Generator Pedestal Bearing, bearing and journal clearances, and oil ring condition. Include inspection results in the Final Report. Clean and refurbish the oil rings, replace the dust seals, and replace the pedestal bearings, ensure proper clearances are maintained. Special care shall be taken to ensure that a non-conductive path from the bearing to ground is maintained, during the rehabilitation of the pedestal bearing, as detailed in the OEM specifications.

### 4.2.7 CYLINDER BLOCK AND CENTER FRAME

A. The Contractor shall lift the V-blocks off the center frame. Clean all gasket surface areas and inspect V-blocks for cracks, defects, and abnormalities. Repair all deficiencies and ensure proper sealing and operation. Replace all gaskets and seals with new and reassemble.

   1. The Contractor shall replace all cylinder head mounting studs with new.

B. The Contractor shall lift the Center Frame off the base engine block, clean all sealing surfaces and inspect for any cracks, defects, and abnormalities. Repair all deficiencies and ensure proper sealing and operation. Replace all gaskets and seals with new and reassemble.

   1. During this process, the Contractor shall also check the alignment of the engine base to ensure flatness and straightness and adjust accordingly.

   2. Check torque on block to center frame bolts and foundations bolts. Record all measurements with checklist, witness by OC San.

C. The Contractor shall clean Engine Center Frame and Crankcase by OC San accepted method. After cleaning, the Contractor shall inspect the crankcase for cracks by magna-flux method or equivalent and repair all damages with accepted procedures. Main saddles, cam bores, and cylinder bores shall be inspected, measured, and recorded in the Final Report

D. The is the possibility that rewiring and degaussing of engine block components will be needed. The Contractor shall include this in their cost estimate and shall credit back to OC San if not needed.

E. The Contractor shall replace all seals, O-rings, packing support rings, wipers, and gaskets, with new.

F. The Contractor shall replace all crankcase breather hoses and components with new.

G. The Contractor shall replace all interior crankcase hoses including main bearing oil hoses. After installation of new hoses, main lube oil piping to engine and main lube oil header inside of the crankcase shall be removed, thoroughly cleaned, and reinstalled.

H. The Contractor shall refurbish and rebuild all crankcase vent relief doors with new O-rings and gaskets.

I. The Contractor shall replace gaskets for jacket water supply header connection to block. Repair the outboard Jacket water supply header mating surfaces, as required for proper sealing.

### 4.2.8 CAMSHAFTS AND ACCESSORIES

A. The Contractor shall remove, inspect, disassemble, refurbish, reassemble, and reinstall both camshafts. Refurbishment of camshaft and replacement of cam lobes if needed will be part of optional pricing cost.

   1. Measure and record all as found camshaft bearings and thrust clearances in the Final Report. Replace the camshaft bearings on both camshafts, with new, and set the proper clearances, record in the Final Report. Inspect for abnormal wear of the camshaft, and all lobes, followers, and attachments (i.e., cam hub, gear, thrust blocks, wear block).

   2. Contractor shall replace all cam lobes(intake and exhaust strokes), followers, and cam bearing block nuts.

   3. OC San reserves the right to replace or reuse existing camshaft upon preliminary inspections. Replacement of these camshafts shall be determined during preliminary inspections.

B. The Contractor shall replace the Woodward governor with a rebuilt governor, supplied by OC San, as required.

   1. The Contractor shall inspect the Governor drive shaft, housing bushings, and bevel gear for wear, and set gear backlash as required.

   2. The Contractor shall rebuild Governor Drive new chains, bearings, bushings, and sprockets.

   3. The Contractor shall replace all rod ends on all governor linkages. Set linkage to approximate position and make final adjustments upon engine at start up.

C. The Contractor shall replace main drive chain, sprockets, and bearings. Adjust as required.

   1. The Contractor shall replace tensioner bearing and sprocket assembly.

   2. The Contractor shall Inspect all drive gears for wear and replace if needed.

D. The Contractor shall remove and replace alternator with new OEM Certified Hall Effect Switch Upgrade.

E. The Contractor shall remove all fuse rods and replace with new on Main Bearings and Master Rod Bearings. (One for each main bearing and two for each master rod bearings)

F. The Contractor shall rebuild the Rod Bearing trip vent valves and set the clearances between the trip arms and fuse rods, as required.

G. The Contractor shall inspect the auxiliary service drive gears for excessive wear, replace if needed. Replace bearings and seals. Provide a written report to OC San of all deficiencies, and recommendations after inspection is complete and send to the OC San Engineer. OC San acceptance is required, prior to reinstallation of drive assembly. Include this report into the Final Report as well.

### 4.2.9 OIL SYSTEM

A. The Contractor shall remove, disassemble, inspect, clean, and rebuild the engine driven main lube oil pump, piping, and supporting subassemblies and reinstall with new bushings and gaskets.

   1. The Contractor shall ensure oil passageways are aligned properly, bushings have required running clearances, fasteners are torqued properly, and that the oil pump is properly aligned to the crankshaft.

2. The Contractor shall ensure the drive chain is tensioned properly.

B. The Contractor shall inspect, repair, flush, and clean all suction and lube oil piping for the engine.

C. The Contractor shall replace the six-inch (6”) main lube oil check valve.

D. The Contractor shall replace Turbo lube oil filter canister assembly with new OEM Certified spin-on oil filter upgrade.

E. The Contractor shall inspect and clean the lube oil cooler. The Contractor shall also pressure test for leaks and reassemble with new gaskets.

F. The Contractor shall replace all lube oil filter elements, O-rings/ gaskets and inspect and clean strainers.

G. The Contractor shall inspect oil headers, replace all lube oil fittings, and lube oil hoses.

H. The Contractor shall replace the Turbo, Lube Oil, and Jacket Water AMOT Thermostat valves and O-rings.

I. OC San will supply the project with the required new oil need for overhauled engines.

1. OC San Reliability group will perform acceptance testing of the new oil.

J. Upon engine start-up, the Contractor shall ensure the oil pressure relief valve is set precisely as required by OC San.

### 4.2.10 INTAKE, EXHAUST, AND STARTING AIR SYSTEMS

A. The Contractor shall remove, inspect, and clean the intake air manifolds.

1. Disassemble piping and examine all portions and connections for cracks, deficiencies, and damage. Repair if required (at additional cost to OC San) per ASME PCC-2 Repair of Pressure Equipment and Piping. Install new seals and gaskets.

B. The Contractor shall remove, inspect, and clean the exhaust manifold.

1. Disassemble piping and examine all portions and connections for cracks, deficiencies, and damage. Repair if required (at additional cost to OC San) per ASME PCC-2 Repair of Pressure Equipment and Piping. Install new seals and gaskets in the main exhaust manifold (large) and cylinder head flange connections, and (reinsulate) exhaust manifold sections from the engine.

2. The Contractor shall replace all exhaust manifold slip flanges (small) with new.

C. The Contractor shall remove waste gate valve and reinstall with new gaskets.

D. The Contractor shall remove the turbocharger from the engine and install a refurbished turbocharger supplied by OC San.

E. The Contractor shall inspect and refurbish the air start distributor for proper operation. Replace the coupling between the distributor and splined shaft. Inspect all air start tubing to the bank manifolds, replace if needed. After reassembly of the unit, verify the proper timing of the air distributor to the cylinders.

F. The Contractor shall rebuild the Air Starting valves with new piston rings and valves. Finish the valves by lapping to a minimum finish of Ra 32-64 minimum and set to the correct opening clearance.

G. The Contractor shall rebuild the fuel gas changeover valve with new gaskets and seals. Verify the valve clearances are re-set correctly and record readings in Final Report.

H. The Contractor shall disconnect and remove intercoolers and piping from the engine. Upon disassembly, inspect all sections disassemble, inspect, clean, repair, and pressure test per ASME PCC-2.

I. The Contractor shall remove, inspect, refurbish, and clean turning gear assembly and reassemble, supplying parts, as needed.

J. The Contractor shall clean, prepare, and paint all portions of the previously identified engine components, matching the original color.

### 4.2.11 SAFETY AND PROTECTIVE SHUTDOWN COMPONENTS

A. The Contractor shall remove and refurbish the over-speed shutdown device and its associated system components including, but not limited to, actuator rod, springs, seals, lever, pneumatic valve, and solenoid. Calibrate trip device properly and reassemble.

B. The Contractor shall remove, replace, and reinstall all main bearing temperature detectors, connecting rod temperature detectors, vent valves and tubing, gas shut-off, and turbocharger thrust bearing failure detectors.

C. The Contractor shall remove, replace and adjust all vibration transducers.

D. The Contractor shall remove, refurbish, and confirm calibration on all Crankcase Pressure Switches.

E. The Contractor shall replace all primary ignition wiring from the existing Altronics junction box to each ignition coil. Existing raceways may be reused if in good condition. Replace conduit fittings and seal-tight flex conduits.

1. The Contractor shall replace all sparkplug wires with new.

## 4.3 OILS, LUBRICANTS, SOLVENT, AND THREAD LOCKING LIQUID

A. All oils, greases, slurries, dyes, lubricants, and thread locking compounds used in the engine overhauls, shall be supplied by the Contractor, unless otherwise noted in this Scope of Work, and shall be applied in accordance with the manufacturer's recommendations, according to the following list of acceptable compounds (or equal, per acceptance by the OC San Engineer). The Contractor shall Include a list, in the Final Report, of the actual products used, where they were used, and the approximate quantity used.

1. Anti-seize compound – Ease-Off 990
2. Adhesive sealant – General Electric RTV-106
3. Jointing compound – Marston-Bentley Hylomar PL32
4. General purpose grease – Lubriplate 630
5. Assembly paste – Dow Corning Molykote G-N
6. Thread locking liquid – Loctite #271
7. Heavy lubricant – S.T.P
8. Fitting Compound – Prussian Blue
9. Water Mix Lapping Compound

## 4.4 INSTRUMENTATION

A. The Contractor shall remove, replace, calibrate, test (including wiring and loop checks), reinstall, and commission all Instruments and actuators required to perform all work detailed herein and shall result in a complete working system. The Contractor shall include all documentation of testing and calibration in the Final Report. The minimum required instruments are identified in Appendix A-5 Checklist for Instrumentation and shall be installed as to protect against damage due to vibration. Contractor shall replace all wiring to instruments and repair any damaged conduits, as required. Appendix A-5 shall be used by the Contractor to field verify the functionality of the engine instrumentation before and after the engine-generator set overhaul is complete, with OC San to witness. All Instruments shall be calibrated and tested per the latest ISA standards and as outlined in Appendix A-6 Instrument Checking and Commissioning Requirements and using the Beamex test equipment and software, where applicable.

1. The Contractor shall perform the preliminary function checks and record, using the proper forms, as-found calibrations of each of the listed instruments with OC San witnessing.
    a. Any non-functional or malfunctioning instruments shall be replaced with new. OC San will handle the procurement of the replacement instrument via a MAXIMO service request. Once OC San receives the replacement instrument, the CONTRCTOR shall install and perform the required loop checks, testing, and calibration as required above.
2. The Contractor and OC San shall sign/date the proper forms for each preliminary function check, with electronic copies of the forms submitted to OC San Engineer.
3. After the preliminary function checks are completed, Contractor can proceed per the project, Section a above.
4. The Contractor shall perform the post-install function check and record, using proper forms, as-left calibrations of each of the listed instruments with OC San witnessing.
    a. Any non-functional or malfunctioning instruments shall be replaced with new. OC San will handle the procurement of the replacement instrument via a MAXIMO service request. Once OC San receives the replacement instrument, the CONTRCTOR shall install and perform the required loop checks, testing, and calibration as required above
    b. Contractor and OC San shall sign/date the proper form for each post-installation function check completion, with electronic copies of the forms submitted to OC San Engineer and included in the Final Report.

B. The Contractor shall replace only as needed (OCSD to supply any needed parts) all relief valves, temperature elements, pressure gauges identified in Appendix A-5.

# 5. CONTRACTOR RESPONSIBILITY

## 5.1 GENERAL

A. The Contractor shall submit to OC San a 3-week project look ahead on a weekly basis until project completion. This weekly update shall also show key milestones for completion of the subject engine.
B. The Contractor shall submit all rebuild procedures and data sheets to OC San for

review and acceptance, prior to work execution.

C. The Contractor and their personnel assigned to this Contract, shall have adequate direct experience for this work, with direct experience in overhauls of similar Cooper-Bessemer Engines, for this Scope of Work. Any personnel substitutions after award shall only be done with advanced written acceptance by OC San.
D. The Contractor and their personnel assigned to this Contract, shall have adequate direct experience for this work, with direct experience in overhauls of similar Ideal Electric Generators, for Exhibit A-2 Generator Scope of Work. Any personnel substitutions after award shall only be done with advanced written acceptance by OC San.
E. The Contractor shall complete the Scope of Work as described and supply all new parts required.
F. Though not comprehensive or all inclusive, a list of required new parts and components that shall be provided by the Contractor is specified in Required New Mechanical Parts List (Appendix A-2). All new parts supplied by the Contractor shall be OEM parts. Unless specifically mentioned as needing replacement or repair elsewhere in this Scope of Work, all components and parts found defective during overhaul, or in need of repair, will be classified as extra work and will require acceptance from the OC San representative(s) prior to replacement.
G. All Deliverables detailed in Section 8 of this Scope of Work for the Engines and Section 8 of Exhibit A-2 Scope of Work for the Generators.

## 5.2 RIGGING, DISASSEMBLY, REMOVAL, AND REASSEMBLY

A. In the event the Contractor requires the use of the OC San overhead crane, the Contractor shall submit the OC San RELEASE FOR OVERHEAD CRANE (Appendix A-8).
B. The Contractor shall provide trained staff, tools, rigging, equipment, and materials necessary to disassemble and remove the Engine and Generator components from their bases and prepare them for onsite repair and transportation to the Contractor's shop facility or alternate location.
C. The main overhead crane in the Plant No. 1 and 2 CENGEN Engine Room has a capacity of 20-Tons and may be used for disassembly and removal of the Engine and Engine and Generator main components. The Contractor shall review the Engine and Generator manufacturer's lifting recommendations and shall provide all required lifting equipment, such as slings and spreader bars.
D. The main floor of the Plant No. 1 and 2 Engine Room has a Maximum Floor Load rating of 300-pounds per square foot. The Contractor's rigging and loading efforts shall be accomplished while staying within this floor loading limitation when moving components and loaded vehicles.
E. Approximate weights of major Engine components for the LSVB-16 are shown in the Table below, as a convenience only. The Contractor shall confirm weights prior to using for calculations, lifting plans, shipping:

| ENGINE COMPONENT DESCRIPTION | Weight (lbs.) |
|---|---|
| ET18 TURBOCHARGER, COMPLETE | **2,600** |
| ET18 TURBOCHARGER ROTOR | **165** |
| FLYWHEEL | **14,610** |
| PISTON (WITH RINGS) | **380** |
| ARTICULATED CONNECTING ROD | **282** |
| MASTER CONNECTING ROD | **920** |
| MASTER CONNECTING ROD BEARING CAP | **175** |

| ENGINE COMPONENT DESCRIPTION | Weight (lbs.) |
|---|---|
| MAIN BEARING CAP | **125** |
| CYLINDER HEAD, COMPLETE LESS COVER | **1,135** |
| EXHAUST MANIFOLD, SECTION | **2,930** |
| AIR INTAKE MANIFOLDS, EA. | **1,360** |
| OUTBOARD BEARING AND STAND | **3,200** |

F. Approximate weights of major Generator components are shown in the Table below. The Contractor shall confirm weights prior to using for calculations, lifting plans, shipping:

| GENERATOR COMPONENT DESCRIPTION | Weight (lbs.) |
|---|---|
| GENERATOR MAIN STATOR | **28,600** |
| EXCITER STATOR | **1,000** |
| GENERATOR SHAFT | **12,000** |
| GENERATOR MAIN ROTOR | **24,000** |
| EXCITER ROTOR | **600** |
| TOTAL ASSEMBLED GENERATOR | **54,200** |

G. After the Engine and Generator components have been removed, the Contractor shall clean the sole plates, take precise measurements of the plates, and record the degrees of flatness and parallelism between them. The Contractor shall submit these measurements to the OC San representative, right after its completion and in the Final Report.

H. The Contractor shall properly secure, block, and support engine and generator components to prevent damage during storage, and secure to prevent unintended movement, putting in place both passive and active controls to always ensure safety of personnel. It is pertinent that the Contractor follow all OSHA standards during the entire duration of this project, as a minimum, and, that potential unintended movement(s) and energy is addressed or eliminated. This can include eliminating the propensity of reactions to occur, removing energy sources, or putting in controls to prevent hazards and injuries from occurring.

## 5.3 TRANSPORTATION

A. The Contractor shall provide sufficient supports and bracing for Engine and Generator and their components against motion, physical shock, and impacts during transport over local streets and major interstate highways alike. The Contractor shall provide full protection against all-weather elements.

B. The Contractor assumes full responsibility for all transportation, transportation scheduling, packing, handling, insurance, and other services associated with delivery of all equipment and goods deemed necessary under this Contract.

C. The Contractor shall be liable for any damage that occurs during any transport of the Engine and Generator equipment.

## 5.4 REASSEMBLY AND ALIGNMENT

A. After transporting all repaired and reassembled components back to the respective OC San CENGEN Building, Plant No. 1 or Plant No. 2, the Contractor shall reassemble the engine and generator components in its original location. The Contractor shall perform precise machine alignment of the engine to generator and

recouple the generator shaft to the mating face of the engine flywheel. The Contractor shall perform a complete train re-alignment, according to OEM Specification SC-28-11. (See Appendix A-1)

## 5.5 ENGINE-GENERATOR ACCEPTANCE TEST RUN

A. Upon completion of work on the engine and generator, final acceptance and functionality checks shall be performed by the Contractor, prior to commissioning according to this Scope of Work and all Appendices. OC San Operations will support the Contractor to provide the necessary start-up, break-in, cylinder pressure and temperature balancing, and commissioning support of the engine components and proceed to run the engine generator set under full load conditions for 96 hours per Engine Startup Procedure Requirement and Final Checklist (Appendix A-7). The Contractor shall have field staff available to assist OC San during this test run.

B. Any anomalies or failures in the Engine Generator set performance revealed at any time during the test period shall result in the test being terminated. If the problem is determined by OC San to be caused by the Contractor's work, the Contractor shall correct the problem to the satisfaction of the OC San. The test run shall then be restarted for another 96-hour period. OC San will consider the Acceptance Test to be completed after successfully running 96 hours without Engine or Generator related problems, abnormalities, or deficiencies per Engine Startup Procedure Requirement and Final Checklist (Appendix A-7).

C. The Contractor shall perform all work in accordance with accepted written procedures. The procedures shall include instructions for mechanics, a quality control plan, and a record keeping plan for recording all performed work and measurements taken. The Contractor shall submit the procedures to OC San for acceptance before the work begins. The Contractor shall provide "as found" and "as left" data, measurements, findings, and report in the Final Report as required herein.
    1. The Quality Control Plan shall include a description of the Contractor's procedures for:
        a) Calibrating test and measurement equipment, including Calibration Records and Documentation
        b) Establishing work procedures
        c) Maintaining compliance to work procedures
        d) Monitoring quality of work
        e) Training of staff
    2. The record keeping plan shall include the Contractor's procedures for:
        a) Taking and recording data
        b) Organization and retention of records
        c) Transmittal to OC San for review and acceptance.
    3. The data sheet part of the procedures shall provide documentation on all readings, measurements, findings, test results, observations, and recommendations. The data sheets shall be reviewed with OC San staff weekly and be formatted in Microsoft Excel, Version 2010 or later. The data sheets shall be included as part of the Final Report. All readings shall include "as found" and "as left" condition.
    4. The mechanical data sheets, at a minimum, shall include the following information for the engine components, and as required per this Scope of Work. Datasheets shall include all "as found" and "as left" measurements:
        a) Gas valve settings
        b) Measurements of all four main valves, for each cylinder head: intake and exhaust
        c) Measurements of exhaust and intake valve head thickness

d) Measurements of exhaust and intake valve guides
e) Intake, exhaust, and gas valve seat width
f) Intake and exhaust seat I.D. and width required
g) Intake and exhaust seat Outer Diameter (O.D.) required
h) Leak down rate of reassembled pistons, gas valves, air valves, and intake/exhaust valves
i) Cylinder liner to block height measurements
j) Cylinder liner Inner Diameter (I.D.) measurements
k) Main bearing clearances
l) Rod bearing clearances
m) Camshaft bearing clearances
n) Camshaft thrust clearances
o) Crankshaft thrust clearances
p) Outboard bearing clearances
q) Articulated Rod bushing to pin clearances
r) Rod bearing cap Extensometer stud stretch
s) Main bearing cap Extensometer stud stretch
t) Center Frame and Cylinder Block NDE report
u) Master Rods Ultrasonic Measurements
v) Web Deflections
w) Outboard bearing clearance
x) Generator, exciter air gap clearances
y) Final Engine to Generator alignment

## 6. AVAILABLE RESOURCES

### 6.1 REFRENCE DRAWINGS

A. Appendix A-1, Cooper-Bessemer LSVB Gas Engine Instruction Manual, is being provided by OC San in addition to the below tables of P&ID drawings, Appendix A-4.

| Plant 1 Generator 1 | | |
|---|---|---|
| **Source** | **Drawing No.** | **Drawing Title** |
| OC San | 16B-NP-160 | Generator Control System |
| **LSVB-12-SGC Plant 1 Engine 3** | | |
| **Source** | **Drawing No.** | **Drawing Title** |
| OC San | 16D-NP-110 | Turbo Control System |
| OC San | 16D-NP-120 | Engine Control System |
| OC San | 16D-NP-140 | Fuel Supply System |
| OC San | 16D-NP-150 | Lube Oil System |
| OC San | 16D-NP-160 | Generator Control System |
| **LSVB-16-SGC Plant 2 Genset 5** | | |
| **Source** | **Drawing No.** | **Drawing Title** |
| OC San | 26F-NP-110 | Turbo Control System |
| OC San | 26F-NP-120 | Engine Control System |
| OC San | 26F-NP-140 | Fuel Supply System |
| OC San | 26F-NP-150 | Lube Oil System |
| OC San | 26F-NP-160 | Generator Control System |
| **LSVB-16-SGC Plant 2 Genset 1** | | |
| **Source** | **Drawing No.** | **Drawing Title** |

| Plant 1 Generator 1 | | |
|---|---|---|
| **Source** | **Drawing No.** | **Drawing Title** |
| OC San | 26B-NP-110 | Turbo Control System |
| OC San | 26B-NP-120 | Engine Control System |
| OC San | 26B-NP-140 | Fuel Supply System |
| OC San | 26B-NP-150 | Lube Oil System |
| OC San | 26B-NP-160 | Generator Control System |
| **LSVB-16-SGC Plant 2 Genset 3** | | |
| **Source** | **Drawing No.** | **Drawing Title** |
| OC San | 26D-NP-110 | Turbo Control System |
| OC San | 26D-NP-120 | Engine Control System |
| OC San | 26D-NP-140 | Fuel Supply System |
| OC San | 26D-NP-150 | Lube Oil System |
| OC San | 26D-NP-160 | Generator Control System |

### 6.2 PHYSICAL RESOURCES

A. OC San will provide the followings:

1. Overhead crane
2. Access to electrical supply (120V)
3. Shop compressed air <90psi

B. The Contractor shall be responsible for providing the following at a minimum, for their own use and in accordance with Appendix A-9, Specification Section 01520:

1. Cooper will be allowed to utilize site restrooms
2. Telephone(s)
3. Air Supply over 90psi
4. Trailer(s)

### 6.3 OC SAN STAFF

A. The Contractor's Staff shall be available to support the OC San Staff for LOTO support if need.

B. OC San Engineer will schedule site visit(s), as necessary, at the Contractor's shop facility during the progress of refurbishment and repair work to monitor and inspect the Contractor's work.

C.

## 7. PROJECT SCHEDULE

A. The Contractor shall provide a detailed schedule for each of the engine-generator sets based on the order of the engine-generator set overhauls, which shall be as follows: Plant No. 1 Generator 1, Plant No. 1 Gen-Set 3, and Plant No. 2 Gen-Set 5, 1, and 3, respectively.

1. Contractor shall submit to the Engineer a minimum of 60-Days' notice shall be given to schedule AQMD testing of the Gen-Set with OC San's Regulatory Specialist. OC San will notify the Contractor when successful completion of the AQMD testing is complete, and work can begin for next Gen-Set.

2. The Contractor shall complete all Generator 1 work within 4.5 months after effective date of Notice to Proceed.
3. The Contractor shall complete all work, including the 96-hour acceptance test for each Gen-Set, within nine (9) months after release of Gen-Set to Contractor by OC San.

# 8. DELIVERABLES

## 8.1 PROJECT SCHEDULE

A. The Contractor shall provide an updated, detailed schedule for each Engine-Generator set 30 Days prior to the start of work on each set.

B. The Contractor shall submit:

1. Format: MS-Project through PMWeb
2. Draft baseline schedule within 30 Days after Notice to Proceed
3. The Contractor shall setup a workshop to review draft baseline schedule
4. The Contractor shall submit the Final Baseline schedule within 30 Days after receipt of OC San comments
5. Updated project schedule shall be submitted with each project invoice
6. Three-Week look-ahead schedule, in excel format and delivered at each weekly progress meeting.

## 8.2 SUBMITTALS

A. The Contractor shall submit the following submittals. Submittal content and deadlines are detailed in each section.

B. All submittals shall be submitted through PMWeb. Refer to Appendix A-9, Specification Section 01701 for requirements.

### 8.2.1 OC SAN OVERHEAD CRANE RELEASE

A. Shall be completed and retuned to OC San and accepted prior to any work under this contract involving the overhead cranes.

### 8.2.2 INITIAL TESTING PLAN

A. The Contractor shall submit an initial testing plan for the items listed in Section 4.1.1, as a minimum. Plan shall include, at a minimum, testing methodology, measurement equipment to be used, and data points to be taken.

B. The Contractor shall submit the initial testing plan 21 Days prior to scheduled testing.

### 8.2.3 “AS-FOUND” REPORT

A. The Contractor shall submit to the OC San Engineer the results of the initial testing in Section 4.1.1.

B. The Contractor shall submit this report immediately upon completion of testing to allow work on the engine to commence as scheduled.

### 8.2.4 PARTS REPLACEMENT DOCUMENTATION

A. The Contractor shall submit the required documentation for new parts as referenced in Section 3.1.C of this Scope of Work.

B. The Contractor shall submit this documentation a minimum of 30 Days prior to the procurement of new parts.

### 8.2.5 QUALITY CONTROL PLAN

A. The Contractor shall submit a Quality Control Plan as referenced in Section 5.5.C and subsections of this Scope of Work.

B. The Contractor shall submit this Quality Control Plan 30 Days prior to the start of work on each engine-generator set.

### 8.2.6 FINAL REPORT

A. The Contractor shall submit a Final Report for each Engine-Generator Set.

B. This Final Report shall contain, at a minimum, all measurements, testing, observations, notes, and work required under this Engine Scope of Work, Exhibit A-1, and Generator Scope of Work, Exhibit A-2.

C. The Contractor shall make available, in electronic form, the Final Report at any time the OC San Engineer requests.

D. The Contractor shall submit the Final Report within 14 Days of final acceptance of the Work for each Engine-Generator Set.

1. OC San will review and return any comments on the Final Report to the Contractor within 14 Days.

    a. If comments require the Final Report to be revised, the Contractor shall return the Final Revised Report to OC San within 14 Days of receipt of OC San comments.

## 9. SAFETY AND HAZARDOUS MATERIALS

### 9.1 OSHA AND OC SAN SAFETY

A. The Contractor shall follow all OSHA and OC San safety requirements and procedures.

B. The Contractor shall maintain on site, Safety Data Sheet documentation of all hazardous substances and materials introduced or generated by the Contractor and Subcontractors and communicate said documentation with the Contractor's supervision, craft workers, and employees prior to handling said substances or materials.

### 9.2 PLANT SAFETY AWARENESS

A. The Contractor shall be aware of the use of bleach, hydrogen peroxide, ferric chloride, acid, caustic soda, other hazardous materials, and potential presence of hazardous gasses in and around the plant.

B. There are various alarm systems installed to alert employees of hazardous conditions. The Contractor shall instruct its employees of these dangers and that they shall evacuate the area immediately should an emergency occur.

C. The Contractor shall be aware of the possibility of lead, Appendix A-11, and asbestos in various parts of the Engine-Generator Set and shall take appropriate measures to mitigate the creation of any hazardous dust or debris.

### 9.3 JOB HAZARD ANALYSIS (JHA)

A. Prior to commencing work, a Job Hazard Analysis shall be performed. The Contractor shall attend a Job Hazard Analysis meeting in which OC San's Operations & Maintenance and Risk Management personnel will be involved. All safety issues shall be addressed, and verification shall be made that all safety measures shall be carried out and required safety equipment is available.

B. Refer to OC San Safety Policy SP-205, Electrical Safety, for a detailed description of the OC San's Control of Hazardous Energy policy and procedure. A copy of this policy will be given to the Contractor.

## 10. CONTRACT MANAGEMENT

### 10.1 PROJECT CONTROL MANAGEMENT SYSTEM

A. This project shall utilize PMWeb as the Project Control Management System. The Contractor shall utilize this system for all aspects of the work for this project as detailed in Appendix A-9, Specification Section 01701.

### 10.2 MEETINGS

A. All meetings shall be virtual, held through Microsoft Teams.

B. Kick off meeting: Prior to the commencement of work under this Contract, a meeting with OC San staff shall be held to establish appropriate contacts and review the Contractor's plan to implement this work.

C. Weekly progress meetings: Shall be attended by OC San staff and the Contractor. Topics for discussion: review work in progress and receive comments. The formal agenda shall be submitted with the previous meeting notes at least one (1) day prior to each meeting and shall include a 3-week look ahead schedule.

### 10.3 WORK HOURS

A. When working on OC San site, the Contractor may work 10-hour shifts between the hours of 6:00 AM to 4:30 PM, Monday through Friday. No work shall be performed on Saturdays and Sundays, or OC San observed Holidays without prior written acceptance from the OC San Engineer.

## 11. MONITORING OF WORK

### 11.1 PROGRESS REPORTS

A. The Contractor shall submit monthly progress reports for review by the 1st of each month and shall include, at a minimum:

1. Current Activities
2. Future Activities
3. Potential out-of-scope items
4. Concerns and possible delays
5. Percentage of completion

## 12. WARRANTIES

A. The Contractor shall warrant that the work performed will be free of defects in materials and workmanship. A warranty period shall begin after the satisfactory

completion of an engine's acceptance testing, following the satisfactory completion of an individual overhaul as detailed herein.

B. New OEM parts shall be warranted for one (1) year, after substantial completion of the Generator and Gen-Sets, and the Contractor shall be responsible for removal, installation, and shipping costs of replacement. Existing parts that are repaired, machined, or otherwise overhauled, shall be warranted for 180 Days and the Contractor shall be responsible for removal, installation, replacement, and shipping costs of replacement. The warranty against defects in workmanship shall extend for 180 Days and the Contractor shall be responsible for correcting the defective work.

C. All warranty periods shall begin after satisfactory completion of engine and generator's mechanical, instrumentation and electrical completion, and acceptance testing.

## 13. STAFF ASSISTANCE

A. All communications shall go through OC San Engineer.

B. OC San will also have onsite technical representatives from maintenance, operations, and engineering departments during the entire duration of this project.

## 14. SCOPE OF WORK ATTACHMENTS

A. Exhibit A-2 Generator Scope of Work

B. A-1 Cooper-Bessemer LSVB Gas Engine Instruction Manual

C. A-2 Required New Parts

D. A-3 Generator Reference Drawings

E. A-4 Process and Instrumentation Diagram (P&ID) Reference Drawings

F. A-5 Instrumentation Checklist

G. A-6 Instrument Checking and Commissioning Requirements

H. A-7 Engine Start-up Procedure Requirement and Checklist

I. A-8 Overhead Crane Release

J. A-9 Project Specifications

   1. 01520 Contractor Field Offices
   2. 01600 Shipping Storage and Handling
   3. 01701 Project Control Management System

K. A-10 OC San AQMD Permits

L. A-11 Lead Inventory

# EXHIBIT A-2
# Generator Overhauls

# TABLE OF CONTENTS

***The following information is technical information specific to the generators at both plants. All other general information (Sections 6-14) related to this project is applicable to BOTH engine and generator work at BOTH plants and can be found on Exhibit A-1 Scope of Work.***

## 1. BACKGROUND

A. The Central Generation (CENGEN) Facilities at OC San Treatment Plants No. 1 and 2 were completed in 1993 and 1990 respectively. Plant 1 consists of three (3) reciprocating engine-generator sets, Cooper-Bessemer LSVB-12 SCG 12-cylinder engines driving Ideal Electric SAMB 12.47-kV 2,500-kW synchronous generators at 400 RPM. Plant 2 consists of five (5) reciprocating engine-generator sets, Cooper-Bessemer LSVB-16 SCG 16-cylinder engines driving Ideal Electric SAMB 12.47-kV 3,000-kW synchronous generators at 360 RPM. These engine-generator sets have been in service for over 20 years and need to be overhauled.

B. The CENGEN Generators supply electrical power and satisfy the requirements in OC San's National Pollution Discharge Elimination System permit requirement for the reliability of the electric supply serving on-site electric loads. The CENGEN facilities are the primary source of electricity and thermal energy for treatment Plant No. 1 and 2, while Southern California Edison provides the backup source. While separate standby power generation is available for critical plant loads, the reliable operation of the CENGEN facilities is the key to assuring continuous operation of the process plants and to the prevention of sewage spills.

## 2. GENERAL PROJECT DESCRIPTION

A. The Contractor shall test, overhaul, refurbish, and repair as needed the generators for Generator 1 at Plant No. 1 and Engine-Generator Sets, 3 at Plant No. 1 and 5, 1, and 3 at Plant No.2. This Scope of work (SOW) details the overhaul of the Generator for each Engine-Generator set. Each of the generators uses a brushless, on-shaft field excitor and rotating rectifier assembly. Generator ratings, dimensions, and weights can be found in Synchronous Generator Reference Drawings (Attachment A-5). The mechanical portions (i.e. Outboard Bearing) are covered by the Contractor under Engine Overhaul Scope Of Work (Exhibit A-1).

### 2.1 CONTRACTOR QUALIFICATIONS

A. The Contractor shall have five (5) years of experience with 12-kV and higher as well 2500-kW or larger equipment and shall submit with their bid a reference list of previous work. OC San will validate the reference list.

## 3. WORK ELEMENTS

### 3.1 GENERAL

A. The Contractor shall provide all labor, tools, materials, supplies, test equipment, disassembly, reassembly, alignment, rigging, transportation, mechanical, and electrical shop services to test, refurbish, and repair the CENGEN Generators to restore them to full capability.

B. All parts shall be supplied by the Contractor and shall be in new, unused, and uncompromised condition and shall be Ideal Electric OEM parts or better.

C. The Contractor shall conform to applicable portions of IEEE Standard 1068-2015, Standard for the Repair and Rewinding of AC Electric Motors in the Petroleum, Chemical, and Process Industries.

### 3.1.1 RIGGING, DISASSEMBLY, AND REMOVAL

A. The Contractor shall provide all trained staff, tools, rigging, equipment, and materials necessary to disassemble and remove the major generator components from their bases and prepare them for transportation to the Contractor's shop facility.

B. The main overhead crane in each the CENGEN Engine Rooms may be used for disassembly and removal of the Generator components. The Contractor shall review the generator manufacturer's lifting recommendations and provide any required lifting equipment such as slings or spreader bars. A crane can be made available to the Contractor for use and shall be left in the "as found" conditions, incurring no ancillary damage. The Contractor shall submit the OC San RELEASE FOR OVERHEAD CRANE (Appendix A-8).

C. The main floor of the CENGEN Engine Rooms have a maximum floor load rating of 300 pounds per square foot. The Contractor's rigging and loading efforts shall be accomplished while staying within the floor loading limitations when moving components and loading vehicles.

1. The Contractor shall not set any generator components on the floor of the CENGEN Engine room. All generator components shall only be placed on a truck to be moved out of the building.

D. Approximate weights of major generator components:

| GENERATOR COMPONENT DESCRIPTION | Weight (lbs.) |
|---|---|
| GENERATOR MAIN STATOR | **28,600** |
| EXCITER STATOR | **1,000** |
| GENERATOR SHAFT | **12,000** |
| GENERATOR MAIN ROTOR | **24,000** |
| EXCITER ROTOR | **600** |
| TOTAL ASSEMBLED GENERATOR | **54,200** |

E. After the generator components have been removed, the Contractor shall clean the sole plates and take precise measurements of the plates and record the degrees of flatness and parallelism between them. The Contractor shall submit these measurements to the OC San Engineer and include in the Contractor's Final Report for the engine overhaul.

### 3.1.2 TRANSPORTATION

A. The Contractor shall provide sufficient supports and bracing for Generator components against motion, physical shock, and impacts during transport over local streets and major interstate highways alike. The Contractor shall provide full protection against all-weather elements.

B. The Contractor assumes full responsibility for all transportation, transportation scheduling, packing, handling, insurance, and other services associated with delivery of all equipment and goods deemed necessary under this contract.

## 3.2 SEQUENCE OF WORK

A. The Generator work shall coincide with the engine overhaul according to the order of Generator and Gen-set Overhauls listed in Section 2.A of this Scope of Work, to leverage its availability and disposition at the time of the relevant engine overhaul and be completed and tested as a complete engine-generator set at the appropriate time per the Engine Startup Procedure Requirement And Final Checklist (Appendix A-7) or as required therein.

## 3.3 GENERATOR LOTO AND DISCONNECTION

A. OC San's Maintenance staff will lock out, tag out, and disconnect all electrical connections to the generator and exciter including 12kV power, 120V heater power, exciter field, and RTD instrumentation leads. The Contractor shall verify that this has been done and assume all responsibility. Only OC San personnel will be allowed to perform any operation (closing and opening) of electrical circuits, no exceptions allowed.

B. The Contractor shall notify the OC San Engineer a minimum of 20 Days prior to the start of work to submit the shutdown request for the Generator to be overhauled.

## 3.4 PRELIMINARY INSPECTION AND TESTING

A. The Contractor shall perform detailed inspection and testing, as stated below, as a minimum, of the Generator in-place and at the Contractor's shop, evaluating and recording their overall "as-is' and "as-left" condition, and noting any discrepancies, deficiencies, and abnormalities. Include results of Inspection and Testing in the Generator Final Report.

B. The Contractor shall submit a report of all findings and "as left" condition on each generator, to the OC San Engineer and as part of the Final Report.

### 3.4.1 INSPECTIONS AND MEASURMENTS

A. Take measurements of air gaps of main rotating fields to the stator and exciter rotor to the exciter fields

B. Bearing clearance of generator pedestal bearing

C. Generator Main Terminal Box Components (current transformers, insulators) for cracks and damage

D. Main Generator leads for corona, tracking, and insulation cracks

E. Exposed stator windings for signs of corona and arcing

F. Exciter rotor winding

G. Exciter diode wheel

### 3.4.2 TESTING

A. Insulation resistance and polarization index of main stator and rotor, exciter rotor and stator

B. Winding Continuity Resistance of Main stator and rotor, and Exciter stator and rotor

C. Surge capacitors and arrestors

D. Winding resistance for the main rotor and stator windings, and the exciter rotor and stator windings

E. Main Stator Surge Tests

F. Partial Discharge Tests

G. Power Factor of exciter and stator windings

H. Exciter diode wheel

I. AC/DC Pole Drop Test

## 3.5 SHOP SERVICES FOR REFURBISHMENT OF GENERATOR COMPONENTS

### 3.5.1 INITIAL SHOP TESTING

A. After generator components have been received at Contractor's shop, the Contractor shall visually inspect and electrically test all parts and components, with OC San to witness.

B. The Contractor shall submit to the OC San Engineer a report evaluating initial condition of received items and include in the Contractor's Final Report for the generator. Electrical Shop Tests shall include those referenced in Section 3.4.2.

### 3.5.2 CLEANING

A. The Contractor shall steam clean the main stator windings, main rotor field, exciter rotor, and exciter fields; and baked at a temperature compatible with the insulating materials.

### 3.5.3 PARTS REPLACEMENT

A. The Contractor shall replace generator components, as required, based on findings from the initial testing and inspections. Contractor shall replace the Generator Leads on all the Generators.

1. In the event the Generator Components need to be rewound, the Contractor shall, prior to the commencement of work, have the required materials in stock and on-hand as to avoid any schedule delays.

### 3.5.4 ROTATING RECTIFIER ASSEMBLY

A. The Contractor shall rebuild the Rotating Rectifier assembly of the exciter with new, solid-state components meeting or exceeding the original equipment specifications.

### 3.5.5 SPACE HEATERS

A. The Contractor shall replace existing space heater elements and wiring in kind.

### 3.5.6 RESISTANCE TEMPERATURE DETECTORS (RTD'S)

A. The Contractor shall replace all RTD's and wiring in kind.

### 3.5.7 DIAGNOSTIC TESTING

A. The Contractor shall comprehensively test all generator components including main stator windings, main rotor field, exciter rotor and fields, rotating diode assembly, space heaters, and RTDs. All tests shall be conducted in accordance

with the latest NETA and IEEE 1068 standards for testing electrical motors and generators, with OC San to witness.

### 3.5.8 TEST REPORT

A. The Contractor shall submit to the OC San Engineer a detailed report documenting the tests performed, values obtained or calculated and evaluating the current condition of the tested items. The Contractor shall comment on the approximate remaining useful life based on winding condition and the test data obtained. This report shall also be included in the Contractor's Final Report for each generator.

## 3.6 REASSEMBLY AND ALIGNMENT

A. After transporting all components back to the respective OC San CENGEN Building, the Contractor shall reassemble each Generator on its original sole plates. The Contractor shall perform precise machine alignment of the generator components to recouple the generator shaft to the mating face of the engine flywheel.

## 3.7 INSTALLATION OF EQUIPMENT COVERS

A. The Contractor shall reinstall all generator enclosure covers with OC San Engineer witnessing.

## 3.8 FINAL REASSEMBLY ELECTRICAL TESTING

A. After all mechanical assembly and alignment tasks have been completed on each generator, the stator, rotor field, exciter rotor, and exciter fields shall be NETA tested by the Contractor to verify that no damage has occurred during transportation and reassembly. OC San staff will be present to witness the performance of these tests. The Contractor shall submit final test data to the OC San Engineer for review.

## 3.9 RECONNECTION OF GENERATOR LEADS

A. OC San Electrical Maintenance staff will reconnect all field leads to the generator.

B. The Contractor shall verify Generator pole connections are correct.

## 3.10 FINAL ENGINE-GENERATOR ACCEPTANCE TEST RUN

A. Upon completion of work on each generator, and associated engine, OC San operations and maintenance staff will support the contractor in the 96-hour acceptance test as detailed in scope of work, Exhibit A-1.

B. Any anomalies or failures in Generator performance revealed at any time during the test period shall result in the test being terminated. If the problem is determined by OC San to be caused by the Contractor's work, the Contractor shall correct the problem to the satisfaction of the OC San Engineer. The test run shall then be restarted for another 96-hour period. OC San will consider the Acceptance Test to be completed after successfully running 96-hours without Generator problems.

# 4. RESOURCES AVAILABLE

## 4.1 GENERATOR REFERENCE DRAWINGS

A. Refer to Appendix A-3 for Generator Reference Drawings. The Contractor shall use these as a guide only as the Generators for Plant No. 1 and Plant No. 2 are similar, but not the same.

## 5. DELIVERABLES

A. The Contractor shall submit the following submittals. Submittal content and deadlines are detailed in each section.

B. All submittals shall be submitted through PMWeb. Refer to Attachment A-11 Specification Section 01701 for requirements.

### 5.1 INITIAL TESTING PLAN

A. The Contractor shall submit an initial testing plan for the items listed in Section 3.4.2, as a minimum. The Plan shall include, at a minimum, testing methodology, measurement equipment to be used, and data points to be taken.

B. The Contractor shall submit the initial testing plan 15 Days prior to scheduled testing.

### 5.2 "AS-FOUND" REPORT

A. The Contractor shall submit to the OC San Engineer the results of the initial testing in Section 3.4.2.

B. The Contractor shall submit this report immediately upon completion of testing to allow work on the engine to commence as scheduled.

### 5.3 QUALITY CONTROL PLAN

A. The Contractor shall submit a Quality Control Plan per Exhibit A-1.

B. The Contractor shall submit this Quality Control Plan 30 Days prior to the start of work on each engine-generator set.

### 5.4 GENERATOR FINAL REPORT

A. The Contractor shall submit a Final Report for the Overhaul of each generator.

B. This Final Report shall contain, at a minimum, all measurements, testing, observations, notes, and work required by this Scope of Work.

C. The Contractor shall make available, in electronic form, the Final Report at any time the OC San Engineer requests.

D. The Contractor shall submit the Final Report for each Generator within 10 Days of final acceptance of the Generator Work.

1. OC San will review and return any comments on the Final Report to the Contractor within 10 Days.

    a. If comments require the Final Report to be revised, The Contractor shall return the Final Revised Report to OC San within 10 Days of receipt of OC San comments.

**EXHIBIT B**

**PROPOSAL**

**for**

**Engine and Generator Overhauls at Plant No. 1 and 2**

COOPER | MACHINERY SERVICES

**Proposal number 220419-225 rev 3** **6/23/2022**

## Orange County Sanitation District

Orange County Sanitation District
10844 Ellis Avenue.
Fountain Valley, CA 92708

Cooper Machinery Services
16250 Port Northwest Drive
Houston, TX 77041

**Jackie Lagade**
Phone: 714-593-7557
Email: jlagade@ocsd.com

**Mike Perez**
Mobile : 562-818-2094
Email : Michael.perez@cooperservices.com

Cooper Machinery Services, hereinafter called the Seller or Contractor, proposes to furnish the following described service to Orange County Sanitation District, hereinafter called the Purchaser or OCSD, for the price and upon the terms, conditions and agreements hereinafter stated on the attached document.

# TABLE OF CONTENTS

# SECTION A OFFER LETTER

**Ms. Jackie Lagade**
Contracts, Purchasing & Materials Management – Principal Buyer
Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92708

**Subject:** Request for Proposal (RFP) for Engine and Generator Overhauls at Plant No. 1 and 2 Specification No. J-135B

Dear Ms. Lagade,

Thank you for the opportunity to provide you a proposal to overhaul one 12-cylinder and four 16-cylinder Cooper Bessemer LSVB-SGC Clean burn engine along with two 2.5 KW Generators and three 3.0 KW generators. Our proposal outlines how we will overhaul each piece of equipment. This includes the technical expertise, proposed staffing, work plan, and project costs.

Cooper Machinery Services is the right choice for several reasons:

- Original Engine Manufacturer of the Cooper Bessemer LSVB-SGC engine
- Sole Source Supplier that can provide OEM parts, repairs, and services
- Provides industry leading service and support
- Experienced project managers familiar with products and services
- Long Terms Experience with these types of projects

Legal entity name and address:
Cooper Machinery Services, LLC
16250 Port Northwest Drive
Houston, Texas 77041

DIR Number PW-LR-1000704071 expires on June 30,2022

The following subcontractors will be utilized during the project for the defined services. We have utilized all subcontractors on many previous projects.

- Precision Filtration Products - To perform required Oil Flush
- Ideal Electric - Generator Removal/Installation Support
- Infinity NDT LLC – Nondestructive testing
- Dunkle Bros. – Rigging & Crane
- Hampton Tedder Technical Services – Electrician

For questions on proposal contact:
Michael Perez
Account Manager
Cell: 562-818-2094
Email: Michael.Perez@cooperservices.com

Proposal pricing and terms are valid for 180 days from the date issued.
Material price increase can be avoided if all parts can be paid in full and title transferred when available by unit.

We look forward to working with you on this project. Should you have any questions or require additional information, please do not hesitate to contact me.

Signature

_____

John Sargent
Email: John Sargent @cooperservcies.com
Chief Executive Officer

# SECTION B- TECHNICAL PROPOSAL

## Proposed Staffing and Project Organization

### Expected Sub-Vendors

- Turbine Technology Services
  - Address: 12661 Challenger Parkway, Suite 250, Orlando, FL 32826
  - Contact Name: Matt Shaw
  - Phone Number: 281-253-1909
  - Scope: I&E
- Precision Filtration Products
  - Address3770 Layfield, Rd, Pennsburg, PA 18073-0218
  - Phone number: 215-679-6645
  - E-mail – sarah@pfpusa.com
  - Scope: Oil Flush
- Ideal Electric
  - Address: 330 East First Street, Mansfield, OH 44902
  - Contact Name – Jim Lehman
  - Phone Number – 419-520-3224
  - E-mail – Jim.lehman@theidealelectric.com
  - Scope: Generator refurbishment
- Elwood Crankshaft & Machine Company
  - Address: 2727 Freedland Rd, Hermitage, PA 16148
  - Contact Name: Steve Alessio
  - Phone Number: 724-308-4048
  - Scope: Crankshaft inspection
- Kams Inc
  - Address: 1831 NW 4th Dr, Oklahoma City, OK 73106
  - Contact: Jeff Horton
  - Phone Number: 405-850-9128
  - Scope: Camshaft rework
- Infinity NDT LLC
  - Address:9014 Sweet Springs Lane, Cypress, Texas 77429
  - Contact: Cameron Harrison
  - Phone: 713-518-3399
  - Scope: Non destructive testing
- Hampton Tedder Technical Services
  - Address 4563 State Street Montclair, CA 91763
  - Contact: Jim Andersen
  - E-mail: jim.andersen@hamptontedder.com

**Crew Composition**

- (1) Site Coordinator/Quality Control Representative
- (1) Sr. Service Representative
- (1) Crew Chief
- (4) Mechanics including (1) Apprentice if available
- (1) Control Representative as needed
- (1) Control Technician as needed

**Assigned Personnel**

Because of the unknow start date of this project specific personnel that will be assigned cannot be determined at this time. Names and resumes of critical personnel will be submitted for review 2 months prior start of any onsite work. Due to the extreme length of this contract Cooper cannot guarantee key personnel will be same for the entire length of the contract. Cooper will make every effort to retain all key personnel on the contract but if any changes are required will supply adequate notice along with resume of replacement personnel.

Project Manager

*Formal PMI Project Manager Definition: The individual assigned by the performing organization to lead the team that is responsible for achieving the project objectives (Ref. PMI PMBOK 5th Edition).* An internal as well as external customer facing Project Management role charged with accountability of the overall execution of a project and assurance that triple constraints (scope, budget and schedule) are accurately defined and controlled, and that all deliverables are met. In summary, this individual is charged with leading all aspects of the project, ensuring that all stake holders are duly represented, making certain all available resources required for the success of the project are identified and allocated accordingly, and managing both technical and commercial elements of the project. Standard duties include defining, implementing, and managing the project team and utilizing all applicable standard project management processes related to Initiating, Planning/Scheduling, Execution, Monitoring/Controlling and Closing a project. The Project Manager will be the main contact/conduit for all communications between Cooper and OCSD. A communication plan for the project will be developed and approved during the project kick off meeting.

Service Representative

A customer-facing Field Services role charged with overall oversight and responsibility for field service activities and will serve as the primary point of contact for customer interface the work site. This individual will oversee and supervises field service personnel comprised of different skill sets and experience levels and ensure work is performed in a safe and timely manner with all applicable standards and specifications being employed and upheld. This role is also responsible for accessing and interpreting assembly and layout drawings, Bill-of-Materials records, schematics and other engineering and design documents. Additionally, the individual in this role is responsible for imparting, obtaining, and documenting relevant information and data related to the site overhaul activities, component repair and refurbishment, sub vendor activities as well as evaluating and determining serviceability of componentry and overall health of equipment.

Site Coordinator/Quality Control

A customer-facing Field Services or Project Management role charged with administrative and logistical oversight and responsibilities for field service activities at a given work site.
This role may also be assigned responsibility for obtaining and documenting relevant information and data related to installation/commissioning and maintenance of customer-owned equipment, component repair and refurbishment, retrofits/modifications, and overhaul of equipment to assist the Service Representative or other lead role. This individual will also be assigned responsibilities for inbound and outbound coordination of tooling, materials and supplies at a given work site.

Mechanics

An internal Field Services role that can be at times customer facing and charged with responsibility of safe and efficient performance of mechanical-oriented tasks related to maintenance of customer-owned equipment, component repair and refurbishment, retrofits/modifications, and overhaul of equipment under the guidance of a senior entity such as a Site Coordinator, Service Representative, Senior Service Representative or Field Engineer. Duties of this role often include removal, disassembly, cleaning, installation, and repair/refurbishment of mechanical devices such as cylinder heads, power cylinders / liner assemblies, connecting rods, power pistons, coolant and lubricant circulating pumps and drives, bearings, bushings, etc.

Instrumentation Technician

An internal Field Services role that can be customer facing and charged with responsibility of safe and efficient performance of instrumentation and controls-oriented tasks related to installation/commissioning and maintenance of customer-owned equipment, component repair and refurbishment, retrofits/modifications, and overhaul of equipment under the guidance of a senior entity such as a Site Coordinator, Service Representative, Senior Service Representative or Field Engineer. Duties of this role often include removal, installation, testing, calibration and repair/refurbishment of safety and control devices as well as related hardware, software, wiring, conduit, etc.

Project Support Team

An assembly of core and extended project team members typically comprised of multiple functional roles and project stakeholders. Within the RC organization such individuals will typically include an assigned Project Manager and a Project Sponsor, external stake holders, key field service and parts personnel, engineering resources, a designated Sourcing/Supply Team member, a designated Logistics Coordinator, applicable Center of Excellence (COE) and other supporting work center(s), a quality assurance delegate, a Comm Ops lead and an accounting delegate (if PI or MI plan). Also, provisions for publication of manuals and related project documentation as well as training resources may be assigned.

Machine Shop Manager

This individual typically oversees or supervises machinist and test/assembly personnel and ensures work is performed in a safe and timely manner and all applicable standards and

specifications are employed and upheld. In a typical setting this individual will ensure all work is performed in a timely manner and all applicable standards and specifications and employed and upheld. Duties often include workflow planning, oversight of component repair / refurbishment, resource estimates and pricing, COE manufacturing and component modifications.

Service Manager

. The individual in this role is charged with P&L accountability and in a typical setting this individual will assign and direct Service Representatives and ensure all work is performed in a timely manner and all applicable standards and specifications upheld. Duties include allocation of resources to execute installation/commissioning and maintenance of customer-owned equipment, component repair and refurbishment, retrofits/modifications and overhaul of equipment.

Customer Care Specialist

An internal as well as external customer facing role charged with transactional order initiation and management related to the supply of parts and services for support of new and aftermarket equipment and applications. This role is also responsible for accessing and interpreting assembly and layout drawings, and Bill-of-Materials records to verify and assure the correct materials are applied to the given equipment and that such matches and compliments the current configuration. In this role the individual will initiate and load resources to an order(s), track and manage the order(s) and provide designated personnel with lead time, status, pricing and other relevant information as needed.

Technical Support Team

An assembly of individuals that may be comprised of internal and/or external personnel of various skill sets and disciplines required to current and planned work at a given site based upon and specifically aligned with the project scope-of-supply and deliverables. This team is typically comprised of individuals representing a variety of functional roles such as but not limited to Engineering, Technical Support and Quality Management. However, other individuals from both within and outside of the business that have pertinent knowledge or specialized skills needed to support and ensure the success of a given project will be utilized as required.

# Work Plan

## Engine Scope of Work

| | |
|---|---|
| FUNCTIONALITY TESTING AND MEASUREMENTS<br>4.1.1 TESTING<br>A. The Contractor shall perform the following testing prior to any engine-generator set work and shall be included in the Final Report as "as-found" testing. Additionally, after the engine-generator work is completed, the following testing shall be performed and included in the Final Report as "as-left" testing. The "as-found" results shall be submitted to OC San prior to the commencement of work.<br>1. Record Crankcase Pressure<br>2. Compression and Leak-down Testing for each cylinder (complete "as-left" testing before commissioning)<br>3. Starting Air Valve Functionality<br>4. Instrumentation Functionality (See Appendix A-6)<br>B. Testing done by OC San that will be provided to the Contractor to be included in initial report to OC San Engineer and Final Report<br>1. Oil Health<br>a. International Organization of Standardization (ISO) Cleanliness Level Measurement<br>b. Additive Health Baseline Measurement<br>2. Vibration Testing of Engine, Generator, and Turbo<br>4.1.2 MEASURMENTS<br>A. The Contractor shall take measurements of the below listed components, as a minimum. The results of these measurements shall be included in the Final Report as "as-found" measurements. Measurements of the listed items shall also occur while the engine-generator set is being assembled, as-appropriate, and included in the Final Report as "as-left" inspection and measurements.<br><br>1. Outboard Pedestal Bearing Clearance between Engine and Generator<br>2. Engine-Generator Alignment<br>3 Crank Shaft Web Deflection and Connecting Rod run-out<br>4. Valve, Spring, and Rocker Arm clearances<br>5. Thrust Bearing Clearances<br>a. Crank Shaft<br>b. Cam Shafts<br>c. Turbocharger<br>6. Radial Bearing Clearances<br>a. Crank Shaft<br>b. Cam Shafts<br>c. Connecting Rods<br>7. Bushings Condition and Clearances | Cooper's Field Crew will, once on site and prior to disassembly will record:<br>- crankcase pressure via existing crankcase monometer<br>- compression and leakdown test of all cylinders using a cooper provided pressure gage<br>- Check function of air starting valves<br>- Complete existing instrumentation functionality testing<br><br>Quality to obtain Oil Health, and vibration testing reports of the engine, generator and turbo from Orange County.<br>Oil shall be drained by Orange County<br><br>The field service crew will then begin preliminary disassembly of the unit, removing crankcase doors, cam galley doors, and rocker bonnets to begin initial inspections.<br><br>Technicians shall obtain:<br>1. Outboard Pedestal Bearing Clearance between Engine and Generator<br>2. Engine-Generator Alignment<br>3. Crank Shaft Web Deflection and Connecting Rod thrust<br>4. Rocker arm clearances<br>5. Thrust Bearing Clearances of cams and crank<br>a. Crankshaft<br>b. Camshafts<br>c. Turbocharger<br>6. Radial Bearing Clearances<br>a. Crank Shaft<br>b. Cam Shafts<br>c. Connecting Rods<br>7. Bushings Condition and Clearances<br>a. Connecting Rod End<br>b. Piston Pin<br>8. Piston, piston ring condition, and clearances |

| | |
|---|---|
| a. Connecting Rod End<br>b. Piston Pin<br>8. Piston and Piston Ring Condition and Clearances<br>9. Piston Ring Gaps<br>10. Cylinder Liner Condition and Measurements | 9. Piston ring gaps<br>10. Cylinder liner condition and measurements<br><br>Once initial inspections are complete, technicians will continue with disassembly of the engine. |
| 4.2 MECHANICAL<br>4.2.1 GENERAL<br>A. The Contractor shall overhaul the Engine-Generator Sets in accordance with industry best practices and any information that can be obtained from the OEM.<br>B. During the overhaul, the Contractor shall apply any required lubricants, anti-seize, or other compounds to fasteners or contact surfaces to achieve the required fastener tightening specifications and to prevent galvanic corrosion. | All parts removed from engine are to be visually inspected, sealing surfaces cleaned, and stored in a safe location until required for reinstallation.<br>Crankcase to be inspected and cleaned prior to reassembly<br>Once the base-frame has been adjusted as necessary, reassembly shall begin. |
| 4.2.2 CYLINDER HEADS<br>A. The Contractor shall remove all valve (rocker) covers and clean, inspect, and repair. Replace mounting bolts. Store so as safeguard from scratching, denting, and marring the sealing surfaces of the Head itself.<br>B. The Contractor shall perform dye penetrant testing to all cylinder head surfaces, to check for surface cracks and defects. Pre-cleaning, application of penetrant, excess penetrant removal, application of developer, inspection, and post cleaning to be followed per the dye penetrant's manufacture instructions.<br>1. The Contractor shall overhaul all cylinder heads, as specified below.<br>C. The Contractor shall resurface all head sealing surfaces using appropriate methods to achieve, as a minimum, Ra 32-64 finish, with the flatness required for proper sealing. The Contractor shall use only new Head Gaskets when reinstalling the overhauled heads.<br><br>D. The Contractor shall inspect and replace the intake and exhaust valve springs with new OEM Parts. Measure and record free heights of all valve springs, old and new; test and record spring rates of new springs to ensure they are correct and report in Final Report.<br>E. The Contractor shall inspect and replace all intake, exhaust, starting air, and fuel gas isolation valves with new OEM Parts. The Contractor shall also include in the final report, any build-up, scoring, pitting, or other abnormal surface conditions of the valves, noting which vales specifically the condition occurred and include pictures.<br>F. The Contractor shall inspect and replace all valve guides and valve seat inserts. The Contractor shall | - **Heads**<br>- Heads to be shipped to Cooper's St. Rose facility along with the rockers for disassembly, NDT, inspection, refinish, reassembly and testing<br>- Valves to be replaced, sealing surface and valve lift checked<br>- All abnormalities are to be noted<br>- Individual inspection reports of each head will be provided<br>- Heads shall be sent back to site cleaned and sealed<br>- Kiene valves to be cleaned, inspected and reused<br>- The reconditioned heads will be installed with all new head gaskets |

| | |
|---|---|
| also include in the final report, any build-up, scoring, pitting, or other abnormal surface conditions of the valves, noting which vales specifically the condition occurred and include pictures.<br>1. Ensure proper fitment of the valve guide to cylinder head and valve stem to valve guide.<br>2. Lap intake, exhaust, air, and gas valve seats, as required, to match new valves and obtain the required sealing and contact requirements and clean thoroughly.<br>G. Upon reassembly of each Cylinder Head, after making the necessary adjustments, the Contractor shall leak test all intake, exhaust, air, and gas valves. Measure and record sealing pressures and leak down rates for each valve, for OC San Engineer review and acceptance. Included this data in the Final Report as well.<br>H. The Contractor shall inspect and replace all seals and gaskets on the Cylinder Head with new.<br>I. The Contractor shall inspect and replace bushings and rocker arm shafts, on all rocker arm assemblies, with new, ensuring to properly orient, machine, and test them.<br>J. The Contractor shall inspect and replace all hydraulic lifters, tappets, locknuts, and adjusting screws, with new. Hone the tappet bores to remove any scuff or wear marks, maintaining required clearance and surface finish requirements. Adjust the hydraulic lifters per OEM specifications.<br>K. During reassembly of the engine, prior to start-up, the Contractor shall measure, adjust, and set the rocker arm to valve lash, as required.<br>L. OC San will provide the Contractor with new jet cells for each engine covered under this Scope of Work.<br>M. The Contractor shall disassemble, replace, and reassemble all breather hoses and filters on the cylinder heads ensuring suitable sealing performance is achieved with new gaskets.<br>N. The Contractor shall disassemble, replace, reassemble all water jumpers, connections, and accessories, rebuilding and resurfacing connections as necessary to achieve a minimum surface finish of Ra 125-250 and satisfactory sealing performance, including new gaskets.<br>O. The Contractor shall reassemble the Cylinder Heads and supporting systems, piping, and connections. Pressure test all systems individually, using process specific media per ASME PCC-2 for repaired systems; and ASME B31.1 for new or newly welded systems, for a duration of one (1) | - **Rockers and pushrods**<br>- rockers to be shipped to Cooper St. Rose facility<br>- bushings and lifters removed<br>- rockers inspected<br>- rockers to be rebuilt/refinished with new bushings and lifters<br>- **Cam followers**<br>- to be inspected for wear and fit withing cam follower housing<br>- Followers to be replaced with new<br><br>- **Fuel system** |

| | |
|---|---|
| hour minimum, and correcting leaks or deficiencies as required per the applicable standard. | - Fuel system will be removed, separated, cleaned and inspected<br>- Regulator to be rebuilt |
| 4.2.3 ENGINE FUEL SYSTEM | |
| A. The Contractor shall disassemble, inspect, clean, repair, reassemble, and test the Fuel Gas Header, Fuel Gas Balancing Valves, pilot gas lines, and other related piping system components. The Contractor shall also disassemble, rebuild, and reassemble the Gas Regulator with new consumable parts and internals. | - **Fuel, water, and ignition headers**<br>- **All lube oil lines disconnected**<br>- Mark connections for reinstallation<br><br>- **Liners**<br>- Conduct as found inspections on existing liners for tolerance and cross-hatch etc |
| B. The Contractor shall clean the Kiene valves through appropriate means, to ensure proper function and sealing. | - Liners will be replaced with N-12 Liners variants(Cooper's Environmental friendly solution to replacing chrome) |
| 4.2.4 CYLINDER LINERS | |
| A. The Contractor shall remove, inspect, measure, and replace all Cylinder Liners with new virgin American chromed liners that meet the necessary requirements for circularity (out of roundness), porosity, taper, and cleanliness. Record data in the Final Report. Out of spec cylinder liners shall not be accepted by the Contractor who shall notify the OC San Engineer of any delays to the schedule while replacement liners are procured. | - Ledges within cylinder blocks to be cleaned for proper fit between blocks and liners<br>- Liner to deck height to be taken once installed<br>- **Water jacket expansion joints**<br>- Replaced with brand new units and seals |
| B. The Contractor shall remove, inspect, and replace liner seals, O-rings, gaskets, and bellow type seals (Wrinkle bellies), to meet or exceed OEM specifications. | |
| C. The Contractor shall measure and verify the cylinder bore clearances are re-set as required. The Contractor shall measure and record the cylinder liner to block height after liner installation, OC San will witness, prior to installing the head, orienting the seal drain plug side coincident with the crankcase door. | - **Crankshaft**<br>- Web deflections taken with both the rotating assembly together and separated<br>- To be supported in crankshaft box, Cooper previously had built for Orange County(Cooper to have a separate box built for 16cyl cranks) |
| 4.2.5 ROTATING ASSEMBLY (CRANKSHAFT, CONNECTING RODS, AND PISTONS) | - Crankshaft to be sent out for inspection to Ellwood in Pennsylvania Post inspection, crankshaft to be delivered back on site |
| A. Prior to engine disassembly, the Contractor shall measure and record all throws of the Crankshaft and their respective web deflections. Record data in the Final Report. Report to OC San any abnormal readings and include the findings in the Final Report. During reassembly, and before installing the flywheel, remeasure and record the crankshaft web deflections, ensuring that the crankshaft is properly seated on the main bearings. After installation of the flywheel, remeasure crankshaft web deflections and record in Final Report. At all times, the web deflections shall be within the OEM specifications, and recorded in the Final Report. | - All wear surfaces and oil ports cleaned and checked prior to reinstall<br>- All new main bearings to be inspected, dimensions taken, and oil applied prior to install<br>- **Main caps**<br>- Oil feed hoses to be removed from caps and oil passages covered for foreign material exclusion<br>- Caps to be numbered for accurate reinstall<br>- inspect for deformities, cracks, etc<br>- Caps to have brand new bearings installed in them |
| B. The Contractor shall inspect the Crankshaft examining the entire length and journals for defects such as surface fatigue, cracks, heat stress, damage, | - Torque'd to Cooper spec and extensometer stud stretch measured |

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| and wear. Keep track of component locations, as it is pertinent that they are reinstalled into their original locations. If major issues are found, the Contractor shall bring to the attention of the OC San Engineer immediately, and in writing.<br>C. The Contractor shall remove, disassemble, clean, inspect, refurbish, reassemble, and reinstall all Pistons, Master Rods and Articulated Rods, journals, caps, bearings, bushings, dowels, and pins. The Contractor shall record and report in the Final Report, any faults or damage to these components, including but not limited to, signs of pre-ignition or detonation on the pistons, for example. The Contractor shall bring to the immediate attention of the OC San Engineer any major faults or damage that will require extensive repairs or replacement of components.<br>1. Bearing and bushing clearances shall also be recorded and reported in the Final Report, for the old and new parts. Ensure that oil passageways are properly oriented, cleaned, and unobstructed, prior to installation.<br><br>D. The Contractor shall remove and perform Ultrasonic Testing (UT) on Pistons, Master Connecting Rods, Articulated Rods, Bearing Caps, Bushings, and Bearings. OC San will witness ultrasonic testing.<br>1. The results of the UT findings to be compared to historical scans, recorded, and included in the Final Report. If major issues are found, the Contractor to bring to the attention of the OC San Engineer immediately, and in writing.<br>E. The Contractor shall perform Ultrasonic Testing (UT) on Crank Shaft. OC San will witness ultrasonic testing.<br>F. The Contractor shall also remove, inspect, clean, and refurbish the crankshaft counterweight assemblies. All counterweight studs and nuts shall be replaced with new, and the crankshaft counterweight stud mating threads shall be refurbished as needed. Stake the studs and nuts per SD-132, using a staking tool and staking as detailed, and after properly torquing the nut as specified. (See Appendix A-1)<br>G. The Contractor shall replace and install all Master Connecting Rod and Articulated Rod bushings and bearings with new OEM ones, maintaining the required OEM stated clearances and surface requirements. Record the final bushing and side clearances and include in the Final Report. No filing or shimming is permitted on the rods, bearings, or bearing caps. | - Crankshaft web deflection, main bearing clearances, and thrust measured<br>- Counterweights to be mounted back to crankshaft with all new studs, per cooper torque specs<br>- **Master and articulating rods**<br>- Rods sent to Cooper PNW facility<br>- Bushings removed from master rods<br>- Master rods to be CMM'd for geometric tolerance assurance<br>- Articulating rods to be inspected for tolerances and straightness<br>- Wet mag inspection to be conducted<br>- New bushings to be inspected and installed in master rods<br>- Brand new rod bearings inspected then installed<br>- Upon installation rods shall be torqued and stud stretch will be measured and recorded<br>- **Articulating rod and piston pins**<br>- New pins to be supplied, tolerance, and blued to their respective bushing to check for contact patch |

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| H. The Contractor shall measure, inspect, replace, adjust, and reassemble all Main Bearings and Connecting Rod bearings, with new. Record the as found and final journal to bearing circumferential, side, running clearances, include in the Final Report. OC San will provide the special tool required to remove the Thrust Bearing.<br>1. The Contractor shall note in Final Report conditions of the Main Bearings, Thrust Bearing, bearing shells, and hardware as found during disassembly. Items to be noted in the Final Report include but are not limited to wear patterns, bright spots, fretting, pitting, remaining thickness, and clearance measurements.<br>2. During reassembly of the engine, ensure all Main Bearing Caps are reinstalled into their original locations. Replace the installation pins and ensure all oil passageways are properly cleaned and aligned. Record the final stud stretch, using new studs and locknuts leaving appropriate witness marks for inspection during regular services.<br>I. The Contractor shall inspect the piston and articulated rod journal for signs of surface fatigue, cracks, heat stress, damage, wear, and repair. No grinding of rod journals is permitted, only minor polishing is allowed. If major issues are found, the Contractor shall bring to the attention of the OC San Engineer immediately.<br>J. During reassembly of the engine, the Contractor shall install the Rod Bearing Caps, measuring the stud stretch and tightening as required. Record the final stud stretch, and include in the Final Report, marking or replacing the locknuts as previously described, per OEM requirements for material strength considerations.<br>K. The Contractor shall profile, recondition, and re-tin all piston and piston crowns per required surface preparation, and ensure proper fit and clearances.<br>L. The Contractor shall remove, replace, and reassemble all piston rings with new. Inspect Piston groove dimensions for wear, chips, and cracks. Measure and record the as found ring gaps, as well as, the final ring gaps and clearances.<br>M. The Contractor shall replace and reinstall all Piston wrist pins with new ones. Record the final clearances and include in the Final Report.<br><br>4.2.6 GENERATOR OUTBOARD BEARING<br>A. The Contractor shall remove, inspect, measure, and record as-found Generator Pedestal Bearing, bearing and journal clearances, and oil ring condition. Include inspection results in the Final Report. Clean and refurbish the oil rings, replace the dust seals, and replace the pedestal bearings, | - **Pistons**<br>- Inspect<br>- Check tinning thickness<br>- Measure ring groves<br>- Take existing ring gap and condition<br>- Replace as necessary(proposal will include pricing option to replace all)<br><br>- **Cylinder blocks**<br>- Liner bores and deck height to be inspected<br>- Sealing surfaces to be visually inspected for pitting, erosion, etc. |

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| ensure proper clearances are maintained. Special care shall be taken to ensure that a non-conductive path from the bearing to ground is maintained, during the rehabilitation of the pedestal bearing, as detailed in the OEM specifications. | - Block to be inspected for deformities<br>- Studs removed from cylinder blocks and replaced with new<br>- Cylinder to upper frame gaskets to be replaced with new |
| 4.2.7 CYLINDER BLOCK AND CENTER FRAME | - **Upper frame** |
| A. The Contractor shall lift the V-blocks off the center frame. Clean all gasket surface areas and inspect V-blocks for cracks, defects, and abnormalities. Repair all deficiencies and ensure proper sealing and operation. Replace all gaskets and seals with new and reassemble. | - studs and frame to be NDT'd<br>- block to be stored safely<br>- upon reinstallation new frame gasket to be used<br>- If damage to the frame or cylinder blocks is found an extra work order will be required |
| 1. The Contractor shall replace all cylinder head mounting studs with new. | |
| B. The Contractor shall lift the Center Frame off the base engine block, clean all sealing surfaces and inspect for any cracks, defects, and abnormalities. Repair all deficiencies and ensure proper sealing and operation. Replace all gaskets and seals with new and reassemble. | |
| 1. During this process, the Contractor shall also check the alignment of the engine base to ensure flatness and straightness and adjust accordingly. | |
| 2. Check torque on block to center frame bolts and foundations bolts. Record all measurements with checklist, witness by OC San. | |
| C. The Contractor shall clean Engine Center Frame and Crankcase by OC San accepted method. After cleaning, the Contractor shall inspect the crankcase for cracks by magna-flux method or equivalent and repair all damages with accepted procedures. Main saddles, cam bores, and cylinder bores shall be inspected, measured, and recorded in the Final Report | Cooper field service team will conduct the following:<br><br>- Reinstall main caps post removal of crankshaft<br>- Measure I.D. of crank bores<br>- Check base alignment<br>- Wireline crank bore<br>- Adjust base as necessary |
| D. The is the possibility that rewiring and degaussing of engine block components will be needed. The Contractor shall include this in their cost estimate and shall credit back to OC San if not needed. | (note: if field machining or boring is required to straighten the bore, an extra work order will be required) |
| E. The Contractor shall replace all seals, O-rings, packing support rings, wipers, and gaskets, with new. | - **Crankcase**<br>- Crankcase is to be thoroughly cleaned |
| F. The Contractor shall replace all crankcase breather hoses and components with new. | - Oil header will be removed and cleaned<br>- New hoses provided |
| G. The Contractor shall replace all interior crankcase hoses including main bearing oil hoses. After installation of new hoses, main lube oil piping to engine and main lube oil header inside of the crankcase shall be removed, thoroughly cleaned, and reinstalled. | - Bicera doors to be rebuilt<br><br>- **Camshaft**<br>- As found running clearances taken for thrust and bearing clearance |
| H. The Contractor shall refurbish and rebuild all crankcase vent relief doors with new O-rings and gaskets. | - Lobes to be visually inspected for wear or deformities |

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| I. The Contractor shall replace gaskets for jacket water supply header connection to block. Repair the outboard Jacket water supply header mating surfaces, as required for proper sealing. | - To be inspected at Kams Inc in Oklahoma City<br>- Upon completion of inspection, cams to be reused, re-lobed or replaced with a brand new shaft and lobes<br>- Upon reinstallation, run clearances to be taken again |
| 4.2.8 CAMSHAFTS AND ACCESSORIES<br>A. The Contractor shall remove, inspect, disassemble, refurbish, reassemble, and reinstall both camshafts.<br>1. Measure and record all as found camshaft bearings and thrust clearances in the Final Report. Replace the camshaft bearings on both camshafts, with new, and set the proper clearances, record in the Final Report. Inspect for abnormal wear of the camshaft, and all lobes, followers, and attachments (i.e., cam hub, gear, thrust blocks, wear block). | |
| 2. Contractor shall replace all cam lobes (intake and exhaust strokes), followers, and cam bearing block nuts. | • **Woodward Governor drive system**<br>- Inspect shaft, bushings and gears<br>- New chains, bearings, and bushings and rod ends installed |
| 3. OC San reserves the right to replace or reuse existing camshaft upon preliminary inspections. Replacement of these camshafts shall be determined during preliminary inspections.<br>B. The Contractor shall replace the Woodward governor with a rebuilt governor, supplied by OC San, as required. | |
| 1. The Contractor shall inspect the Governor drive shaft, housing bushings, and bevel gear for wear, and set gear backlash as required. | • **Chain Drive**<br>- Chain drive system to be inspected for wear |
| 2. The Contractor shall rebuild Governor Drive new chains, bearings, bushings, and sprockets. | - Sprockets and gears will be replaced on an as needed basis<br>- New chain will be provided and installed |
| 3. The Contractor shall replace all rod ends on all governor linkages. Set linkage to approximate position and make final adjustments upon engine at start up. | - **Alternator**<br>- Inspect for wear on the ring and pinion gears, record |
| C. The Contractor shall replace main drive chain, sprockets, and bearings. Adjust as required. | - Replace alternator with Hall Effect upgrade utilizing a mag. pick up |
| 1. The Contractor shall replace tensioner bearing and sprocket assembly. | |
| 2. The Contractor shall Inspect all drive gears for wear and replace if needed. | |
| D. The Contractor shall remove and replace alternator with new OEM Certified Hall Effect Switch Upgrade. | |
| E. The Contractor shall remove all fuse rods and replace with new on Main Bearings and Master Rod Bearings. (One for each main bearing and two for each master rod bearings) | |
| F. The Contractor shall rebuild the Rod Bearing trip vent valves and set the clearances between the trip arms and fuse rods, as required. | - **Oil pump** |
| G. The Contractor shall inspect the auxiliary service drive gears for excessive wear, replace if needed. Replace bearings and seals. Provide a written report to OC San of all deficiencies, and | - Crate for shipment to Cooper facility, pump will then be sent to manufacturer for inspection and/or rebuild |

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| recommendations after inspection is complete and send to the OC San Engineer. OC San acceptance is required, prior to reinstallation of drive assembly. Include this report into the Final Report as well. | - Upon reinstallation, Cooper Field Team will check running clearance and alignment to crank |
| 4.2.9 OIL SYSTEM | |
| A. The Contractor shall remove, disassemble, inspect, clean, and rebuild the engine driven main lube oil pump, piping, and supporting subassemblies and reinstall with new bushings and gaskets. | |
| 1. The Contractor shall ensure oil passageways are aligned properly, bushings have required running clearances, fasteners are torqued properly, and that the oil pump is properly aligned to the crankshaft. | - **Turbocharger oil system**<br>- Old filter system to be removed from unit<br>- Spin on filter upgrade will be installed to replace |
| 2. The Contractor shall ensure the drive chain is tensioned properly. | |
| B. The Contractor shall inspect, repair, flush, and clean all suction and lube oil piping for the engine. | |
| C. The Contractor shall replace the six-inch (6”) main lube oil check valve. | |
| D. The Contractor shall replace Turbo lube oil filter canister assembly with new OEM Certified spin-on oil filter upgrade. | - **Lube oil system** |
| E. The Contractor shall inspect and clean the lube oil cooler. The Contractor shall also pressure test for leaks and reassemble with new gaskets. | - System to be inspected for wear, leaks and aging hoses<br>- Replace as necessary |
| F. The Contractor shall replace all lube oil filter elements, O-rings/ gaskets and inspect and clean strainers. | - Thermostats to be replaced |
| G. The Contractor shall inspect oil headers, replace all lube oil fittings, and lube oil hoses. | |
| H. The Contractor shall replace the Turbo, Lube Oil, and Jacket Water AMOT Thermostat valves and O-rings. | |
| I. OC San will supply the project with the required new oil need for overhauled engines. | |
| 1. OC San Reliability group will perform acceptance testing of the new oil. | - **Exhaust and intake manifolds** |
| J. Upon engine start-up, the Contractor shall ensure the oil pressure relief valve is set precisely as required by OC San. | - Intake and exhaust manifolds will be removed and cleaned<br>- Inspect for deformities, cracks, or corrosion<br>- New gaskets to be applied to both for reinstallation |
| 4.2.10 INTAKE, EXHAUST, AND STARTING AIR SYSTEMS | |
| A. The Contractor shall remove, inspect, and clean the intake air manifolds. | |
| 1. Disassemble piping and examine all portions and connections for cracks, deficiencies, and damage. Repair per ASME PCC-2 Repair of Pressure Equipment and Piping. Install new seals and gaskets. | |
| B. The Contractor shall remove, inspect, and clean the exhaust manifold. | |

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| 1. Disassemble piping and examine all portions and connections for cracks, deficiencies, and damage. Repair per ASME PCC-2 Repair of Pressure Equipment and Piping. Install new seals and gaskets in the main exhaust manifold (large) and cylinder head flange connections, and (reinsulate) exhaust manifold sections from the engine.<br>2. The Contractor shall replace all exhaust manifold slip flanges (small) with new.<br>C. The Contractor shall remove waste gate valve and reinstall with new gaskets.<br>D. The Contractor shall remove the turbocharger from the engine and install a refurbished turbocharger supplied by OC San.<br>E. The Contractor shall inspect and refurbish the air start distributor for proper operation. Replace the coupling between the distributor and splined shaft. Inspect all air start tubing to the bank manifolds, replace if needed. After reassembly of the unit, verify the proper timing of the air distributor to the cylinders.<br>F. The Contractor shall rebuild the Air Starting valves with new piston rings and valves. Finish the valves by lapping to a minimum finish of Ra 32-64 minimum and set to the correct opening clearance.<br><br>G. The Contractor shall rebuild the fuel gas changeover valve with new gaskets and seals. Verify the valve clearances are re-set correctly and record readings in Final Report.<br>H. The Contractor shall disconnect and remove intercoolers and piping from the engine. Upon disassembly, inspect all sections disassemble, inspect, clean, repair, and pressure test per ASME PCC-2.<br>I. The Contractor shall remove, inspect, refurbish, and clean turning gear assembly and reassemble, supplying parts, as needed.<br>J. The Contractor shall clean, prepare, and paint all portions of the previously identified engine components, matching the original color.<br>4.2.11 SAFETY AND PROTECTIVE SHUTDOWN COMPONENTS<br>A. The Contractor shall remove and refurbish the over-speed shutdown device and its associated system components including, but not limited to, actuator rod, springs, seals, lever, pneumatic valve, and solenoid. Calibrate trip device properly and reassemble.<br>B. The Contractor shall remove, replace, and reinstall all main bearing temperature detectors, connecting rod temperature detectors, vent valves and tubing, gas shut- off, and turbocharger thrust bearing failure detectors. | • **Turbocharger**<br>- Filter system to be removed<br>- Turbo provided by OC to be reinstalled on unit<br>- Old wastegate will be removed and replaced with new unit from cooper<br>• **Air start distributor**<br>- Test for function, and inspect air tubing<br>- Replace coupler<br>- Verify timing<br><br>• **Air start valves**<br>- Will be removed from site and sent to Cooper St. Rose facility for rebuild<br>- Once rebuilt they will be sent back to site with the heads<br>• **Fuel gas changeover valve**<br>- Valve to be tested for function and resealed<br>• **Intercoolers**<br>- Send to Cooper Odessa facility for pressure, leak test and cleaning<br><br>• **Turning gear**<br>- Turning gear to be tested for function, seals checked.<br>- Turning gear fixed as necessary<br><br>• **Paint**<br>- Cooper field team will provide paint touch-up as necessary for chips or scratches to maintain conformity of the unit.<br><br>• **Safety components**<br>- Over speed system to be inspected for fit and function<br>- Repair/replace components as necessary<br>- Reassemble and reset trips<br><br>- All transducers and pressure switches will be function checked and removed from unit for protection until unit reassembly |

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| C. The Contractor shall remove, replace and adjust all vibration transducers.<br>D. The Contractor shall remove, refurbish, and confirm calibration on all Crankcase Pressure Switches.<br>E. The Contractor shall replace all primary ignition wiring from the existing Altronics junction box to each ignition coil. Existing raceways may be reused if in good condition. Replace conduit fittings and seal-tight flex conduits.<br>1. The Contractor shall replace all sparkplug wires with new.<br>OILS, LUBRICANTS, SOLVENT, AND THREAD LOCKING LIQUID<br>A. All oils, greases, slurries, dyes, lubricants, and thread locking compounds used in the engine overhauls, shall be supplied by the Contractor, unless otherwise noted in this Scope of Work, and shall be applied in accordance with the manufacturer's recommendations, according to the following list of acceptable compounds (or equal, per acceptance by the OC San Engineer). The Contractor shall Include a list, in the Final Report, of the actual products used, where they were used, and the approximate quantity used.<br>1. Anti-seize compound – Ease-Off 990<br>2. Adhesive sealant – General Electric RTV-106<br>3. Jointing compound – Marston-Bentley Hylomar PL32<br>4. General purpose grease – Lubriplate 630<br>5. Assembly paste – Dow Corning Molykote G-N<br>6. Thread locking liquid – Loctite #271<br>7. Heavy lubricant – S.T.P<br>8. Fitting Compound – Prussian Blue<br>9. Water Mix Lapping Compound<br><br>INSTRUMENTATION<br>A. The Contractor shall remove, replace, calibrate, test (including wiring and loop checks), reinstall, and commission all Instruments and actuators required to perform all work detailed herein and shall result in a complete working system. The Contractor shall include all documentation of testing and calibration in the Final Report. The minimum required instruments are identified in Appendix A-5 Checklist for Instrumentation and shall be installed as to protect against damage due to vibration. Contractor shall replace all wiring to instruments and repair any damaged conduits, as required. Appendix A-5 shall be used by the Contractor to field verify the functionality of the engine instrumentation before and after the engine-generator set overhaul is complete, with OC San to | • **Consumables**<br>- Consumables used will be listed in the tolerance sheets quality provides to explain in which instance they were used<br><br>• **I&E**<br>- Cooper's I&E subcontractor will verify calibration, inspect and replace as necessary instrumentation and end devices<br>- OCSAN will provide any new instrumentation in the event it requires replacement<br>- Subcontractor will run new ignition wires from Altronic junction box to all ignition coils<br>- Records of function and required repair will be provided to Cooper's Quality Representative to list in initial inspections as well as the final report |

witness. All Instruments shall be calibrated and tested per the latest ISA standards and as outlined in Appendix A-6 Instrument Checking and Commissioning Requirements and using the Beamex test equipment and software, where applicable.

1. The Contractor shall perform the preliminary function checks and record, using the proper forms, as-found calibrations of each of the listed instruments with OC San witnessing.

a. Any non-functional or malfunctioning instruments shall be replaced with new. OC San will handle the procurement of the replacement instrument via a MAXIMO service request. Once OC San receives the replacement instrument, the CONTRCTOR shall install and perform the required loop checks, testing, and calibration as required above.

2. The Contractor and OC San shall sign/date the proper forms for each preliminary function check, with electronic copies of the forms submitted to OC San Engineer.
3. After the preliminary function checks are completed, Contractor can proceed per the project, Section a above.
4. The Contractor shall perform the post-install function check and record, using proper forms, as-left calibrations of each of the listed instruments with OC San witnessing.

a. Any non-functional or malfunctioning instruments shall be replaced with new. OC San will handle the procurement of the replacement instrument via a MAXIMO service request. Once OC San receives the replacement instrument, the CONTRCTOR shall install and perform the required loop checks, testing, and calibration as required above

b. Contractor and OC San shall sign/date the proper form for each post- installation function check completion, with electronic copies of the forms submitted to OC San Engineer and included in the Final Report.

B. The Contractor shall replace all relief valves, temperature elements, pressure gauges identified in Appendix A-5.

REASSEMBLY AND ALIGNMENT

A. After transporting all repaired and reassembled components back to the respective OC San CENGEN Building, Plant No. 1 or Plant No. 2, the Contractor shall reassemble the engine and generator components in its original location. The Contractor shall perform precise machine alignment of the engine to generator and recouple the generator shaft to the mating face of the engine flywheel. The

- **Alignment**

- Field service team to complete alignment of generator and engine per OEM Cooper standards

- **Startup**

- Cooper field team shall follow OEM startup procedures, up to a 96hr run until hand off of a complete, running engine to OCSAN

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| Contractor shall perform a complete train re-alignment, according to OEM<br>Specification SC-28-11. (See Appendix A-1)<br>ENGINE-GENERATOR ACCEPTANCE TEST RUN<br>A. Upon completion of work on the engine and generator, final acceptance and functionality checks shall be performed by the Contractor, prior to commissioning according to this Scope of Work and all Appendices. OC San Operations will support the Contractor to provide the necessary start-up, break-in, cylinder pressure and temperature balancing, and commissioning support of the engine components<br>and proceed to run the engine generator set under full load conditions for 96 hours per Engine Startup Procedure Requirement and Final Checklist (Appendix A-7). The Contractor shall have field staff available to assist OC San during this test run.<br>B. Any anomalies or failures in the Engine Generator set performance revealed at any time during the test period shall result in the test being terminated. If the problem is determined by OC San to be caused by the Contractor's work, the Contractor shall correct the problem to the satisfaction of the OC San. The test run shall then be restarted for another 96-hour period. OC San will consider the Acceptance Test to<br>be completed after successfully running 96 hours without Engine or Generator related problems, abnormalities, or deficiencies per Engine Startup Procedure<br>Requirement and Final Checklist (Appendix A-7).<br>C. The Contractor shall perform all work in accordance with accepted written procedures. The procedures shall include instructions for mechanics, a quality<br>control plan, and a record keeping plan for recording all performed work and<br>measurements taken. The Contractor shall submit the procedures to OC San for<br>acceptance before the work begins. The Contractor shall provide "as found" and "as<br>left" data, measurements, findings, and report in the Final Report as required herein.<br>1. The Quality Control Plan shall include a description of the Contractor's procedures for:<br>a) Calibrating test and measurement equipment, including Calibration Records and Documentation<br>b) Establishing work procedures<br>c) Maintaining compliance to work procedures<br>d) Monitoring quality of work<br>e) Training of staff | • **Quality**<br>- Coopers team shall keep and record all as found and as left data and work completed<br>- Will provide quality spot checks, as well as make available all records of the unit taken to OCSAN engineering staff |

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| 2. The record keeping plan shall include the Contractor's procedures for:<br>a) Taking and recording data<br>b) Organization and retention of records<br>c) Transmittal to OC San for review and acceptance.<br>3. The data sheet part of the procedures shall provide documentation on all readings, measurements, findings, test results, observations, and recommendations. The data sheets shall be reviewed with OC San staff weekly and be formatted in Microsoft Excel, Version 2010 or later. The data sheets shall be included as part of the Final Report. All readings shall include "as found" and "as left" condition.<br>4. The mechanical data sheets, at a minimum, shall include the following information for the engine components, and as required per this Scope of Work.<br>Datasheets shall include all "as found" and "as left" measurements:<br>a) Gas valve settings<br>b) Measurements of all four main valves, for each cylinder head: intake and exhaust<br>c) Measurements of exhaust and intake valve head thickness<br>d) Measurements of exhaust and intake valve guides<br>e) Intake, exhaust, and gas valve seat width<br>f) Intake and exhaust seat I.D. and width required<br>g) Intake and exhaust seat Outer Diameter (O.D.) required<br>h) Leak down rate of reassembled pistons, gas valves, air valves, and intake/exhaust valves<br>i) Cylinder liner to block height measurements<br>j) Cylinder liner Inner Diameter (I.D.) measurements<br>k) Main bearing clearances<br>l) Rod bearing clearances<br>m) Camshaft bearing clearances<br>n) Camshaft thrust clearances<br>o) Crankshaft thrust clearances<br>p) Outboard bearing clearances<br>q) Articulated Rod bushing to pin clearances<br>r) Rod bearing cap Extensometer stud stretch<br>s) Main bearing cap Extensometer stud stretch<br>t) Center Frame and Cylinder Block NDE report<br>u) Master Rods Ultrasonic Measurements<br>v) Web Deflections<br>w) Outboard bearing clearance<br>x) Generator, exciter air gap clearances<br>y) Final Engine to Generator alignment | |

## Generator Scope of Work

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| GENERAL PROJECT DESCRIPTION<br>A. The Contractor shall test, overhaul, refurbish, and repair as needed the generators for Generator 1 at Plant No. 1 and Engine-Generator Sets, 3 at Plant No. 1 and 5, 1, and 3 at Plant No.2. This Scope of work (SOW) details the overhaul of the Generator for each Engine-Generator set. Each of the generators uses a brushless, on-shaft field excitor and rotating rectifier assembly. Generator ratings, dimensions, and weights can be found in Synchronous Generator Reference Drawings (Attachment A-5). The mechanical portions (i.e. Outboard Bearing) are covered by the Contractor under Engine Overhaul Scope Of Work (Exhibit A-1).<br>CONTRACTOR QUALIFICATIONS<br>A. The Contractor shall have five (5) years of experience with 12-kV and higher as well 2500-kW or larger equipment and shall submit with their bid a reference list of previous work. OC San will validate the reference list.<br>3. WORK ELEMENTS<br>GENERAL<br>A. The Contractor shall provide all labor, tools, materials, supplies, test equipment, disassembly, reassembly, alignment, rigging, transportation, mechanical, and electrical shop services to test, refurbish, and repair the CENGEN Generators to restore them to full capability.<br>All parts shall be supplied by the Contractor and shall be in new, unused, and uncompromised condition and shall be Ideal Electric OEM parts or better.<br>C. The Contractor shall conform to applicable portions of IEEE Standard 1068-2015, Standard for the Repair and Rewinding of AC Electric Motors in the Petroleum, Chemical, and Process Industries.<br>3.1.1 RIGGING, DISASSEMBLY, AND REMOVAL<br>A. The Contractor shall provide all trained staff, tools, rigging, equipment, and materials necessary to disassemble and remove the major generator components from their bases and prepare them for transportation to the Contractor's shop facility.<br>B. The main overhead crane in each the CENGEN Engine Rooms may be used for disassembly and removal of the Generator components. The Contractor shall review the | - Generator work shall be subcontracted out to Ideal Electric(generator OEM) to perform entire scope of working including removal, teardown, inspection, refurbishment, reassembly and placement of generator.<br>Final report will include all records received from Ideal Electric regarding the work done to the generator, to OCSAN engineering |

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| generator manufacturer's lifting recommendations and provide any required lifting equipment such as slings or spreader bars. A crane can be made available to the Contractor for use and shall be left in the "as found" conditions, incurring no ancillary damage. The Contractor shall submit the OC San RELEASE<br>FOR OVERHEAD CRANE (Appendix A-8).<br>C. The main floor of the CENGEN Engine Rooms have a maximum floor load rating of 300 pounds per square foot. The Contractor's rigging and loading efforts shall be accomplished while staying within the floor loading limitations when moving components and loading vehicles.<br>1. The Contractor shall not set any generator components on the floor of the CENGEN Engine room. All generator components shall only be placed on a truck to be moved out of the building.<br>D. Approximate weights of major generator components:<br>GENERATOR COMPONENT DESCRIPTION<br>Weight (lbs.)<br>GENERATOR MAIN STATOR 28,600<br>EXCITER STATOR 1,000<br>GENERATOR SHAFT 12,000<br>GENERATOR MAIN ROTOR 24,000<br>EXCITER ROTOR 600<br>TOTAL ASSEMBLED GENERATOR 54,200<br>E. After the generator components have been removed, the Contractor shall clean the sole plates and take precise measurements of the plates and record the degrees of flatness and parallelism between them. The Contractor shall submit these measurements to the OC San Engineer and include in the Contractor's Final Report for the engine overhaul.<br>3.1.2 TRANSPORTATION<br>A. The Contractor shall provide sufficient supports and bracing for Generator components against motion, physical shock, and impacts during transport over local streets and major interstate highways alike. The Contractor shall provide full protection against all-weather elements.<br>B. The Contractor assumes full responsibility for all transportation, transportation scheduling, packing, handling, insurance, and other services associated with delivery of all equipment and goods deemed necessary under this contract.<br>SEQUENCE OF WORK<br>A. The Generator work shall coincide with the engine overhaul according to the order of Generator and Gen-set Overhauls listed in Section 2.A of this Scope of Work, to | |

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| leverage its availability and disposition at the time of the relevant engine overhaul and be completed and tested as a complete engine-generator set at the appropriate time per the Engine Startup Procedure Requirement And Final Checklist (Appendix A-7) or as required therein.<br>GENERATOR LOTO AND DISCONNECTION<br>A. OC San's Maintenance staff will lock out, tag out, and disconnect all electrical connections to the generator and exciter including 12kV power, 120V heater power, exciter field, and RTD instrumentation leads. The Contractor shall verify that this has been done and assume all responsibility. Only OC San personnel will be allowed to perform any operation (closing and opening) of electrical circuits, no exceptions allowed.<br>B. The Contractor shall notify the OC San engineer a minimum of 20 Days prior to the start of work to submit the shutdown request for the Generator to be overhauled.<br>PRELIMINARY INSPECTION AND TESTING<br>A. The Contractor shall perform detailed inspection and testing, as stated below, as a minimum, of the Generator in-place and at the Contractor's shop, evaluating and recording their overall "as-is' and "as-left" condition, and noting any discrepancies, deficiencies, and abnormalities. Include results of Inspection and Testing in the<br>Generator Final Report.<br>B. The Contractor shall submit a report of all findings and "as left" condition on each generator, to the OC San Engineer and as part of the Final Report.<br>3.4.1 INSPECTIONS AND MEASURMENTS<br>A. Take measurements of air gaps of main rotating fields to the stator and exciter rotor to the exciter fields<br>B. Bearing clearance of generator pedestal bearing<br>C. Generator Main Terminal Box Components (current transformers, insulators) for cracks and damage<br>D. Main Generator leads for corona, tracking, and insulation cracks<br>E. Exposed stator windings for signs of corona and arcing<br>F. Exciter rotor winding<br>G. Exciter diode wheel<br>3.4.2 TESTING<br>A. Insulation resistance and polarization index of main stator and rotor, exciter rotor | |

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| and stator<br>B. Winding Continuity Resistance of Main stator and rotor, and Exciter stator and rotor<br>C. Surge capacitors and arrestors<br>D. Winding resistance for the main rotor and stator windings, and the exciter rotor and stator windings<br>E. Main Stator Surge Tests<br>F. Partial Discharge Tests<br>G. Power Factor of exciter and stator windings<br>H. Exciter diode wheel<br>I. AC/DC Pole Drop Test<br>SHOP SERVICES FOR REFURBISHMENT OF GENERATOR COMPONENTS<br>3.5.1 INITIAL SHOP TESTING<br>A. After generator components have been received at Contractor's shop, the Contractor shall visually inspect and electrically test all parts and components, with OC San to witness.<br>B. The Contractor shall submit to the OC San Engineer a report evaluating initial condition of received items and include in the Contractor's Final Report for the generator. Electrical Shop Tests shall include those referenced in Section 3.4.2.<br>3.5.2 CLEANING<br>A. The Contractor shall steam clean the main stator windings, main rotor field, exciter rotor, and exciter fields; and baked at a temperature compatible with the insulating materials.<br>3.5.3 PARTS REPLACEMENT<br>A. The Contractor shall replace generator components, as required, based on findings from the initial testing and inspections. Contractor shall replace the Generator Leads on all the Generators.<br>1. In the event the Generator Components need to be rewound, the Contractor shall, prior to the commencement of work, have the required materials in stock and on-hand as to avoid any schedule delays.<br>3.5.4 ROTATING RECTIFIER ASSEMBLY<br>A. The Contractor shall rebuild the Rotating Rectifier assembly of the exciter with new, solid-state components meeting or exceeding the original equipment specifications.<br>3.5.5 SPACE HEATERS<br>A. The Contractor shall replace existing space heater elements and wiring in kind.<br>3.5.6 RESISTANCE TEMPERATURE DETECTORS (RTD'S) | |

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| A. The Contractor shall replace all RTD's and wiring in kind.<br>3.5.7 DIAGNOSTIC TESTING<br>A. The Contractor shall comprehensively test all generator components including main stator windings, main rotor field, exciter rotor and fields, rotating diode assembly, space heaters, and RTDs. All tests shall be conducted in accordance with the latest NETA and IEEE 1068 standards for testing electrical motors and generators, with OC San to witness.<br>3.5.8 TEST REPORT<br>A. The Contractor shall submit to the OC San Engineer a detailed report documenting the tests performed, values obtained or calculated and evaluating the current condition of the tested items. The Contractor shall comment on the approximate remaining useful life based on winding condition and the test data obtained. This report shall also be included in the Contractor's Final Report for each generator.<br>REASSEMBLY AND ALIGNMENT<br>A. After transporting all components back to the respective OC San CENGEN Building, the Contractor shall reassemble each Generator on its original soleplates. The Contractor shall perform precise machine alignment of the generator components to recouple the generator shaft to the mating face of the engine flywheel.<br>INSTALLATION OF EQUIPMENT COVERS<br>A. The Contractor shall reinstall all generator enclosure covers with OC San Engineer witnessing.<br>FINAL REASSEMBLY ELECTRICAL TESTING<br>A. After all mechanical assembly and alignment tasks have been completed on each generator, the stator, rotor field, exciter rotor, and exciter fields shall be NETA tested by the Contractor to verify that no damage has occurred during transportation and reassembly. OC San staff will be present to witness the performance of these tests. The Contractor shall submit final test data to the OC San Engineer for review.<br>RECONNECTION OF GENERATOR LEADS<br>A. OC San Electrical Maintenance staff will reconnect all field leads to the generator.<br>B. The Contractor shall verify Generator pole connections are correct.<br>FINAL ENGINE-GENERATOR ACCEPTANCE TEST RUN<br>A. Upon completion of work on each generator, and associated engine, OC San operations and | |

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| maintenance staff will support the contractor in the 96-hour acceptance test as detailed in scope of work, Exhibit A-1.<br>B. Any anomalies or failures in Generator performance revealed at any time during the test period shall result in the test being terminated. If the problem is determined by OC San to be caused by the Contractor's work, the Contractor shall correct the problem to the satisfaction of the OC San Engineer. The test run shall then be restarted for another 96-hour period. OC San will consider the Acceptance Test to be completed after successfully running 96-hours without Generator problems.<br>4. RESOURCES AVAILABLE<br>GENERATOR REFERENCE DRAWINGS<br>A. Refer to Appendix A-3 for Generator Reference Drawings. The Contractor shall use these as a guide only as the Generators for Plant No. 1 and Plant No. 2 are similar, but not the same.<br>5. DELIVERABLES<br>A. The Contractor shall submit the following submittals. Submittal content and deadlines are detailed in each section.<br>B. All submittals shall be submitted through PMWeb. Refer to Attachment A-11 Specification Section 01701 for requirements.<br>INITIAL TESTING PLAN<br>A. The Contractor shall submit an initial testing plan for the items listed in Section 3.4.2, as a minimum. The Plan shall include, at a minimum, testing methodology, measurement equipment to be used, and data points to be taken.<br>B. The Contractor shall submit the initial testing plan 15 Days prior to scheduled testing.<br>"AS-FOUND" REPORT<br>A. The Contractor shall submit to the OC San Engineer the results of the initial testing in Section 3.4.2.<br>B. The Contractor shall submit this report immediately upon completion of testing to allow work on the engine to commence as scheduled.<br>QUALITY CONTROL PLAN<br>A. The Contractor shall submit a Quality Control Plan per Exhibit A-1.<br>B. The Contractor shall submit this Quality Control Plan 30 Days prior to the start of work on each engine-generator set.<br>GENERATOR FINAL REPORT<br>A. The Contractor shall submit a Final Report for the Overhaul of each generator. | |

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| B. This Final Report shall contain, at a minimum, all measurements, testing, observations, notes, and work required by this Scope of Work.<br>C. The Contractor shall make available, in electronic form, the Final Report at any time the OC San Engineer requests.<br>D. The Contractor shall submit the Final Report for each Generator within 10 Days of final acceptance of the Generator Work.<br>1. OC San will review and return any comments on the Final Report to the Contractor within 10 Days.<br>a. If comments require the Final Report to be revised, The Contractor shall return the Final Revised Report to OC San within 10 Days of receipt of OC San comments. | |

# SECTION C
# PROCEDURAL OR TECHNICAL ENHANCEMENTS

Procedural or Technical Enhancements - Proposer may also propose procedural or technical enhancements/innovations to the Scope of Work which do not materially deviate from the objectives or required content of this RFP.

# SECTION D:
# TECHNICAL EXCEPTIONS/DEVIATIONS

- Any new power liners supplied will not be chrome platted. Per discuss the will be surface hardened via the new OEM approved nitrating process.
- Cooper will not “re-tin” power pistons
- Any new pistons supplied will not be tin platted, they will be dual coated per the new OEM standard.

**GENERAL RESPONSIBILITIES**

Cooper Responsibilities

1. Contractor to supply all parts, experienced personnel, tools, travel, and per-diem to perform scope of work, other than customer-supplied parts specified in scope of work. Contractor will not warranty any material supplied by others.
2. Contractor provides timeline to perform scope of work.
3. Additions to scope of work at time of inspection will require prior approval from Company representative, Overhaul Coordinator via EWAR process
4. Contractor to have start of the workday, and end of the workday meetings with Company on site overhaul point person to discuss daily activities and work progress.
5. Contractor to supply all hand tools, precision measurement tools, impact guns, large and small to perform scope of work.
6. Good housing keeping practices must be followed.
7. Contractor to abide by all Company safety regulations as delivered in first day of work safety orientation.
8. Project schedule showing key milestones for completion of subject engine and weekly update schedule showing a 3-week look ahead until completion.
9. Submit all rebuilt procedures and data sheets for OCSD review and comment.
10. Contractor and its personnel assigned to this Contract shall have adequate direct experience for work, with direct experience in overhauls of similar Cooper-Bessemer engines. Any personnel substitutions after award shall be done with advanced written approval by OCSD.
11. Contractor shall complete the Scope of Work as described and supply all parts required.
12. Contractor is responsible to provide all materials and/or equipment, which are specified or otherwise, implied as required materials by this Scope of Work and its Reference Drawings

and specifications unless stated otherwise herein, as OCSD Furnished Parts/Equipment.

13. Contractor is responsible to provide all consumable supplies, transportation, testing, safety equipment and personnel protection equipment.
14. Contractor shall be solely responsible for installing and maintaining all items in accordance with the manufacturer instructions until turnover of the work to OCSD at the time of Mechanical Completion and Acceptance.
15. Contractor shall be responsible for the repair or replacement of any item damaged by Contractor or Contractor's subcontractor without any cost or schedule impact to OCSD until turnover of the Work to OCSD at the time of Mechanical Completion and Acceptance.
16. Contractor is responsible to provide all tools including lifting ones required to complete the Scope of Work. OCSD will only provide engine special tools, as noted in Section 4 - Resources Available. Contractor shall request this list prior to Notice to Proceed (NTP).
17. Contractor is responsible to provide all packaging and shipping for movement of parts and material to and from the job site.
18. Final report for the completed engine generator
19. Contractor shall torque all bolts and nuts to OEM Specifications and Contractor to physically mark the bolt head's or nut position to ensure the bolt or nut has not move during startup.
20. Contractor shall take measurements and record all Hot and Cold web deflections and provide these measurements in a report to OCSD. Contractor to be advised, that these cold web deflections will require the engine to be shut down and cooled for three (3) days or seventy-two (72) hours. One example of Hot and Cold web deflections is the Engine Base Shims, which measurement shall be taken and recorded.
21. All critical engine parts/components shall be borescoped, i.e., the oil passages for the wrist pins. Master rods, articulating rods, crankshaft.
22. Contractor shall submit all critical parts/components installation procedures to OCSD prior to their commencement of work through the formal submittal process. i.e., piston bushing installation, master rods and articulating rod bushings, fitting of wrist pins to bushings. List of critical components to be finalized before start of work.

**Company Responsibilities**

1. Site specific safety orientation.
2. Provide all required permits.
3. Lock out equipment per Company policy.
4. Secure all Company owned tools.
5. Any required asbestos remediation.
6. Any required lead paint remediation.
7. Special tools: lifting brackets, rod wrenches, etc.
8. Provide an overhead rail and hoist, and all utilities needed to perform scope of work.
9. Onsite overhaul point person
10. Location for protected storage of new and repaired parts
11. Communicate plans for parts removed that will not be reused.

12. Fill unit with proper fluids – Contractor will inspect for leak.
13. Fill unit with proper oil
14. Remove any blinds installed for LOTO of unit
15. Pressure up compressors to check for leaks
16. Prepare unit for start up
17. Required operator during commissioning of the unit.

# SECTION E: COST FILE

Bond Pricing – Not to exceed number. Actual cost will be billed at time of bond issue

| Contract phase | Description | Bond Price |
|---|---|---|
| Phase 1 | Plant 1 Generator #1 & Plant 2 Generator #5 | $29,226.90 |
| Phase 2 | Plant 2 Genset #3 | $134,002.06 |
| Phase 3 | Plant 2 – Engine #5 | $158,524.67 |
| Phase 4 | Plant 2 – Genset #1 | $181,074.49 |
| Phase 5 | Plant 2 – Genset #3 | $187,834.89 |

| Item | PLANT 1 – GENERATOR #1 2022 Price | Price |
|---|---|---|
| 1 | Material cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2 | $22,166.67 |
| 1A | Freight | $27,091.08 |
| 2A | Shop Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $265,680.00 |
| 2B | Field Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $247,292.06 |
| 3 | Submittals as detailed in the Scope of Work, Exhibit A-2 for the Generator | Included |
| 4 | California Sales Tax – Fountain Valley tax rate 8.75% | $22,308.12 |
| | **TOTAL LUMP SUM COST OF GENERATOR #1** | $584,537.92 |

| Item | PLANT 2 – GENERATOR #5 2022 Price | Price |
|---|---|---|
| 1 | Material cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2 | $22,166.67 |
| 1A | Freight | $27,091.08 |
| 2A | Shop Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $265,680.00 |
| 2B | Field Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $247,292.06 |
| 3 | Submittals as detailed in the Scope of Work, Exhibit A-2 for the Generator | Included |
| 4 | California Sales Tax – Fountain Valley tax rate 8.75% | $22,308.12 |
| | **TOTAL LUMP SUM COST OF GENERATOR #5** | $584,537.92 |

| Item | PLANT 1 – GENSET #3 2023 Price | Price |
|---|---|---|
| 1A | Material cost for all mechanical, electrical, and instrumentation components per Appendices A-2 & A-5 (including freight –F.O.B. Destination) for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1 | $1,274,064.57 |
| 1B | Shop Labor and Parts cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $670,154.24 |
| 1C | Field Labor cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $2,529,827.72 |

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| 1D | Freight Engine Components | $75,600.00 |
| 1E | Freight Engine Parts | $18,000.00 |
| 2A | Material cost per Appendices A-2 & A-5 (including freight – F.O.B. Destination) for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $23,275.00 |
| 2B | Shop Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $278,964.00 |
| 2C | Field Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $259,674.82 |
| 2D | Freight Generator | $33,957.00 |
| 3A | Submittals as detailed in the Scope of Work, Exhibit A-1 for the Engine | Included |
| 3B | Submittals as detailed in the Scope of Work, Exhibit A-2 for the Generator | Included |
| 4 | California Sales Tax – Fountain Valley tax rate 8.75% | $196,565.06 |
| | **TOTAL LUMP SUM COST OF PLANT #1 GENSET #3** | $5,360,082.40 |

| Item | PLANT 2 – Engine #5 2024 Price | Price |
|---|---|---|
| 1A | Material cost for all mechanical, electrical, and instrumentation components per Appendices A-2 & A-5 for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1 | $1,685,988.71 |
| 1B | Shop Labor and parts cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $887,123.73 |
| 1C | Field Labor cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $3,464,463.34 |
| 1D | Freight Engine Components | $85,995.00 |
| 1E | Freight Engine Parts | $18,000.00 |
| 3A | Submittals as detailed in the Scope of Work, Exhibit A-1 for the Engine | Included |
| 3B | Submittals as detailed in the Scope of Work, Exhibit A-2 for the Generator | Included |
| 4 | California Sales Tax – Huntington Beach tax rate 7.75% | $199,416.21 |
| | **TOTAL LUMP SUM COST OF PLANT # 2 Engine #5** | $6,340,986.99 |

| Item | PLANT 2 – GENSET #1 2025 Price | Price |
|---|---|---|
| 1A | Material cost for all mechanical, electrical, and instrumentation components per Appendices A-2 & A-5 for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1 | $1,685,988.71 |
| 1B | Shop Labor cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $931,479.91 |
| 1C | Field Labor cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $3,637,686.51 |
| 1D | Freight Engine Components | $90,294.75 |
| 1E | Freight Engine Parts | $18,000.00 |
| 2A | Material cost per Appendices A-2 & A-5 (including freight – F.O.B. Destination) for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $25,660.69 |
| 2B | Shop Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $307,557.81 |

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| 2C | Field Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $286,271.47 |
| 2D | Freight Generator | $31,361.32 |
| 3A | Submittals as detailed in the Scope of Work, Exhibit A-1 for the Engine | Included |
| 3B | Submittals as detailed in the Scope of Work, Exhibit A-2 for the Generator | Included |
| 4 | California Sales Tax – Huntington Beach tax rate 7.75% | $228,678.25 |
| | **TOTAL LUMP SUM COST OF PLANT #2 GENSET #1** | $7,242,979.41 |

| Item | PLANT 2 – GENSET #3 Completion year 2026 | Price |
|---|---|---|
| 1A | Material cost for all mechanical, electrical, and instrumentation components per Appendices A-2 & A-5 for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1 | $1,685,988.71 |
| 1B | Shop Labor cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $978,053.91 |
| 1C | Field Labor cost for the Overhaul of Engine in accordance with Scope of Work, Exhibit A-1. | $3,819,570.84 |
| 1D | Freight Engine Components | $94,809.49 |
| 1E | Freight Engine Parts | $18,000.00 |
| 2A | Material cost per Appendices A-2 & A-5 (including freight – F.O.B. Destination) for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $26,943.72 |
| 2B | Shop Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $322,935.70 |
| 2C | Field Labor cost for the Overhaul of Generator in accordance with Scope of Work, Exhibit A-2. | $300,585.04 |
| 2D | Freight Generator | $32,929.38 |
| 3A | Submittals as detailed in the Scope of Work, Exhibit A-1 for the Engine | Included |
| 3B | Submittals as detailed in the Scope of Work, Exhibit A-2 for the Generator | Included |
| 4 | California Sales Tax – Huntington Beach tax rate 7.75% | $233,578.96 |
| | **TOTAL LUMP SUM COST OF PLANT #2 GENSET #3** | $7,513,395.74 |

At Risk items: The following items will only be supplied/invoiced if required after final inspection. They are not anticipated to be needed.

**12 Cylinder Units**

| Qty | Part Number | Description | Price Each | Ext Price |
|---|---|---|---|---|
| 12 | ZLSVB-5-5B | POWER PISTON | $18,080.19 | $216,962.28 |
| 2 | TBD | CAMSHAFT NEW | $66,800.00 | $133,600.00 |
| 2 | TBD | CAMSHAFT Re-lobe | $51,800.00 | $103,600.00 |

**16 Cylinder Units**

| Qty | Part Number | Description | Price Each | Ext Price |
|---|---|---|---|---|
| 16 | ZLSVB-5-5B | POWER PISTON | $18,080.19 | $289,283.04 |

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|---|---|---|---|---|
| 2 | TBD | CAMSHAFT NEW | $79,200.00 | $158,400.00 |
| 2 | TBD | CAMSHAFT Re-lobe | $71,000.00 | $142,000.00 |

**Pricing for components above are for purchase in 2022 only. Price will increase 5% per year for any component purchased after 2022.**

**PRICE NOTES:**

- Pricing in US dollars
- Price escalation is based on a year over year price increase of 5% per year. Actual escalation will be calculated based on calendar year of phase completion.
- Pricing is valid for purchase of complete scope of work in proposal only.
- Price based on the purchase of the Scope or Work and Quantity contained in Seller's proposal.
- For any optional scope purchased, Seller reserves the right to adjust the delivery schedule of Base Scopes depending on options selected. The impact on price and delivery will be communicated to Buyer at time of order placement.

**EXTRA WORK:**

Any additional work outside this scope of work will be billed as extras work and would require approval from both Purchaser Project Manager and Seller's Project or Service Manager with an EWAR Document (Extra Work Approval Report) prior to any work performed. This pricing does not include applicable sales, or user taxes

- **PARTS:** Unless otherwise stated hereunder or mutually agreed in writing by Seller and Owner through an EWAR, Parts will be invoiced upon shipment.
- **SERVICES:** Unless otherwise stated hereunder or mutually agreed in writing by Seller and Owner through an EWAR, Field Service labor, expenses, sub-contracting and misc. will be invoiced monthly. Machine Shop will be invoiced upon shipment or as per schedule milestones.

**BID VALIDITY**

This Proposal is valid for 180 days from day of issue unless extended in writing by Seller.

**TERMS AND CONDITIONS**

Per mutually agreed upon Terms & Conditions

**PAYMENT SCHEDULE PER UNIT**

**All values below include taxes and freight.**

All field engine overhaul parts will be ordered upon receipt of purchase order. Upon availability by unit parts will be shipped and stored at Purchaser facility and title transferred. Seller will arrange for storage containers and warranty period will begin upon installation on the units.

Material to be invoiced per the following schedule:

40% of engine material value upon issue of detailed project schedule – Value $2,763,001.49

Engine material by unit invoiced upon notice of availability and title transfer

PLANT 1 – GENSET #3 - Value $842,127.12

PLANT 2 – GENSET #5 - $1,100,791.70

PLANT 2 – GENSET #1 - $1,100,791.70

PLANT 2 – GENSET #3 - $1,100,791.70

REMAINING BALANCE INVOICED PER BELOW SCHEDULE

**PLANT 1 GENERATOR #1**

| Percent | Milestone | Value |
|---|---|---|
| 40% | Upon mobilization to site | $233,815.17 |
| 20% | Upon shipment of all machine shop components | $116,907.58 |
| 25% | Upon major mechanical completion | $146,134.48 |
| 15% | Upon final start-up commissioning | $87,680.69 |

**PLANT 2 GENERATOR #5**

| Percent | Milestone | Value |
|---|---|---|
| 40% | Upon mobilization to site | $233,815.17 |
| 20% | Upon shipment of all machine shop components | $116,907.58 |
| 25% | Upon major mechanical completion | $146,134.48 |
| 15% | Upon final start-up commissioning | $87,680.69 |

**PLANT 1 – GENSET #3**

| Percent | Milestone | Value |
|---|---|---|
| 40% | Upon mobilization to site | $1,582,614.87 |
| 20% | Upon shipment of all machine shop components | $791,307.44 |
| 25% | Upon major mechanical completion | $989,134.29 |
| 15% | Upon final start-up commissioning | $593,480.58 |

**PLANT 2 – Engine #5**

| Percent | Milestone | Value |
|---|---|---|
| 40% | Upon mobilization to site | $1,809,733.66 |
| 20% | Upon shipment of all machine shop components | $904,866.83 |
| 25% | Upon major mechanical completion | $1,131,083.54 |
| 15% | Upon final start-up commissioning | $678,650.12 |

**PLANT 2 – GENSET #1**

| Percent | Milestone | Value |
|---|---|---|
| 40% | Upon mobilization to site | $2,163,330.63 |
| 20% | Upon shipment of all machine shop components | $1,081,665.32 |
| 25% | Upon major mechanical completion | $1,352,081.64 |
| 15% | Upon final start-up commissioning | $811,248.99 |

**PLANT 2 – GENSET #3**

| Percent | Milestone | Value |
|---|---|---|
| 40% | Upon mobilization to site | $2,271,497.16 |
| 20% | Upon shipment of all machine shop components | $1,135,748.58 |
| 25% | Upon major mechanical completion | $1,419,685.73 |
| 15% | Upon final start-up commissioning | $851,811.44 |

**ORDER ACCEPTANCE:**

Upon the Purchaser's decision to submit a purchase order, please address the purchase order to the following Cooper Machinery Services legal entity:

Cooper Machinery Services
16250 Port Northwest Drive
Houston, TX 77041

- Purchase Order shall conform to and reference Proposal No. 220419-225 rev 3

- Deviations from this document (scope, price, payment schedule, terms and conditions, shipment cycle, or installation cycle) may cause delays or non-acceptance of the purchase order.

## SECTION F EXCEPTIONS

1. Workday – Pricing is based on Field Crew working 10 hours per day 6 days per week (Monday-Saturday)
2. Crane Liability - Agreement Attached (Attachement 1) is the mutually agreed crane agreement, where both parties agreed to make changes to the language (RFQ contains language that both parties agreed to change)
3. Insurance Coverages - Attached are the insurance limits and policy coverage (Attachement 2) for the engine overhaul
4. Cooper requests that changed included in Amendment No 1 (Attachement 3) be incorporated in final contract language
5. LD's to be capped at 5% of total unit value. Liquitaded Damages are the sole and exclusive remedy for such events.