Exhibit A

SPOKANE CONSTRUCTION AGREEMENT

INDEX

CONSTRUCTION CONTRACT

THIS CONTRACT is made and entered into as of the ___th day of _____, 198_, by and between Wheelabrator Spokane Inc. (the "COMPANY"), and Clark-Kenith, Inc., (the "CONTRACTOR"). Including: Article 1 through 10 inclusive and enclosed.

Exhibit A through Q inclusive and attached.

W I T N E S S E T H :

WHEREAS, COMPANY entered into an agreement (the "Design/Construct contract") with the City of Spokane, Washington (the "City"), dated as of _____, 198_ pursuant to which COMPANY agreed to permit for construction, design, construct, equip, commission and operate a solid waste refuse-to-energy facility to be located in Spokane, Washington (the "Facility"); and

WHEREAS, in furtherance of the Design/Construct Contract, COMPANY wishes to engage CONTRACTOR to construct and equip the Facility in accordance with the terms of this Contract including providing of all material, labor, equipment, tools and accepting full quantity responsibility of materials and labor, construction costs limited to a similar design of WESI Millbury and Concord design of a general comparison, and the Request For Quote of Spokane, dated September 22, 1988, except for certain items of major equipment to be procured by the COMPANY as specified herein and installed by the CONTRACTOR;

WHEREAS, CONTRACTOR desires to provide such construction and equipping services in accordance with the terms and conditions set forth herein;

NOW, THEREFORE, in consideration of the premises and the mutual promises, covenants and conditions herein contained, the parties agree as follows:

ARTICLE 1

DEFINITIONS

For all purposes hereof, unless the context indicates otherwise, the following capitalized terms shall have the following meanings:

1.1 COMPANY shall mean Wheelabrator Spokane Inc., a limited partnership organized under the laws of the State of Washington, and its permitted successors or assigns.

1.2 COMPANY-Furnished Equipment shall mean the equipment, systems, supplies, services and designs specified in Exhibit G.

1.3 CONTRACTOR 3.3 shall mean as described in Section 3.3.

1.3A CONTRACTOR 3.6 shall mean as described in Section 3.6

1.5 Certificate of CONTRACTOR Mechanical Completion shall have the meaning set forth in Section 3.3.

1.6 Certificate of CONTRACTOR Final Completion shall have the meaning set forth in Section 3.6.

1.7 Change Order shall have the meaning set forth in Section 7.1.

1.8 CITY shall mean the City of Spokane, Washington.

1.9 CITY Dispute shall have the meaning set forth in Section 9.1.

1.10 Contract shall mean this construction contract, all exhibits attached hereto, as it shall be amended, modified or supplemented from time to time, including any and all Change Orders which have been executed by COMPANY and CONTRACTOR.

1.11 Contract Price shall mean the fixed price specified in Section 4.1, as adjusted in accordance with this Contract.

1.12 Contract Time shall mean the period of time prescribed in Section 3.3.

1.13 CONTRACTOR shall mean CLARK-KENITH, INC., a Nevada corporation, and its permitted successors and assigns.

1.14 Deleted

1.15 Deleted

1.16 Days shall mean calendar days unless otherwise specified.

1.17 Design/Construct Contract shall mean the agreement entered into between COMPANY and the CITY (including all schedules thereto), pursuant to which COMPANY has agreed to permit for environmental, design, construct, equip, commission and operate the Facility.

1.18 Design Engineer shall mean such engineer(s) as the COMPANY may designate from time to time, who shall prepare and furnish the Detailed Plans and Specifications and Final Plans and Specifications.

1.19 Detailed Plans and Specifications shall have the meaning set forth in Section 2.12.

1.20 Dispute shall mean any claim, controversy, disagreement or other matter in question between the parties that arises out of or relates to the terms and conditions of the Contract or with respect to the performances by the parties of their respective obligations under the Contract, including any claim for breach or repudiation thereof.

1.21 Facility shall mean the solid waste refuse to energy facility to be located in Spokane, Washington.

1.22 Final Payment Invoice shall have the meaning set forth in Section 4.4.

1.23 Final Plans and Specifications shall mean the final revision of the Detailed Plans and specifications which allow the Facility to be completed.

1.24 Uncontrolled Circumstances shall have the meaning set forth in Section 8.1

1.25 Hazardous Waste shall mean any material which by reason of its composition or characteristics is (a) hazardous waste as defined in the Solid Waste Disposal Act, 42 U.S.C. § § 6901 et seq., and the regulations thereunder or in any state law or regulations promulgated thereunder, and any succeeding legislation or regulations or amendments to the foregoing; (b) any materials which are classified as

"hazardous substance" as defined in Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended from time to time; (c) any other materials which any governmental agency or unit having appropriate jurisdiction shall determine from time to time is harmful, toxic or dangerous or is required to be removed from the Site, or otherwise ineligible for disposal through the Project: and (d) any material which would result in residue being Hazardous Waste Under (a), (b) or (c) above.

1.26 Deleted

1.27 Notice To Proceed shall have the meaning set forth in Section 3.1.

1.28 Progress Payment Invoice shall have the meaning set forth in Section 4.2.

1.29 Project Site shall have the meaning set forth in Section 2.2.

1.30 Schedule of Values shall mean the allocation of the Contract Price as specified in Exhibit A.

1.31 Schedule of Work shall have the meaning set forth in Section 2.3.

1.32 Scope of Work shall mean the description of Work attached hereto as Exhibit B, Exhibit C and Exhibit K.

1.33 Separate Contractor shall mean all entities performing work at the Facility except CONTRACTOR and Subcontractors (including, but not limited to, Design Engineer).

1.34 Startup shall mean the initial engagement by COMPANY or CITY of any system for any use or purpose.

1.35 Subcontractor shall mean any Person at any tier who performs any of the Work or supplies any material or equipment for CONTRACTOR or for another Subcontractor of CONTRACTOR.

1.36 Technical Plans and Specifications shall mean the plans and specifications attached hereto as Exhibit C on which CONTRACTOR based its Contract Price and Contract Time and from which the Design Engineer will develop the Detailed Plans and Specifications.

1.37 Work shall mean construction of the Facility by CONTRACTOR as described in Exhibit B, the Technical Plans and Specifications, the Detailed Plans and Specifications and the Final Plans and Specifications, excepting COMPANY Furnished Equipment, and duties performed by Design Engineer and Separate Contractors.

1.38 Exhibit shall mean identified portion of agreement.

1.39 "Week" means a period commencing Sunday at 12:01 a.m. and ending midnight of the following Saturday.

ARTICLE 2

SCOPE OF WORK

2.1 CONTRACTOR's Responsibilities: COMPANY has provided CONTRACTOR with a copy of the Scope Of Work, as defined herein and attached hereto as Exhibit B, C, and K from which the CONTRACTOR and COMPANY agreed upon the Contract Price and Contract Time as defined in Exhibit B. CONTRACTOR agrees to perform the Work as defined in Exhibit B within the Contract Price and Contract Time, and shall furnish to the COMPANY all vendor supplied drawings and other information required to complete design by the COMPANY within 30 days of specification dates shown in Exhibit H.

Detailed Plans and Specifications, as defined herein, will be provided by COMPANY to CONTRACTOR under the conditions set forth herein. These Detailed Plans and Specifications shall govern the work to be performed under the terms and conditions set forth herein for the Contract Price and Contract Time unless adjusted in accordance with the terms and conditions of this Contract. The COMPANY and CONTRACTOR specifically contemplate and affirm that the intention of this Contract is that these Detailed Plans and Specifications will be consistent with the Technical

Plans and Specifications and will permit the Work to be performed without adjustment to Contract Price or Contract Time and they agree to use their best efforts to work toward that goal, TIME BEING THE ESSENCE OF THIS CONTRACT.

As more fully set forth herein, CONTRACTOR agrees, at its sole cost and expense (except as otherwise provided herein), to perform all work and furnish all supervision, labor, new materials, tools, new equipment (with the exception of the items expressly specified and defined in Exhibit G) and all things necessary for the performance of the Work in accordance with the terms, covenants and conditions of this Contract.

CONTRACTOR shall:

(i) compare the Detailed Plans and Specifications Information and shall at once report to COMPANY any error, inconsistency or omission he may discover. The CONTRACTOR shall not be liable to COMPANY for damage resulting from errors, inconsistencies or omissions unless CONTRACTOR recognized such error, inconsistency or omission and failed to report it to COMPANY.

(ii) furnish the services of all supervisors, foremen, skilled and unskilled labor and all other personnel necessary for the completion of the Work, all such personnel to be appropriately trained and qualified to perform their assigned tasks;

(iii) subject to Section 2.2, supply all construction and process equipment, materials and expendable items and supplies necessary for the Work except COMPANY Furnished Equipment;

(iv) prepare of a Schedule of Work in accordance with Section 2.3. and further define in the detailed Plans and Specifications.

(v) furnish site security (including but not limited to, the construction of an 8-foot tall fence around the perimeter of the Project and the posting of guards, as necessary, and signs) as is prudent and necessary for the safety of the Work. The permanent plant fence is expressly considered an acceptable security fence;

(vi) comply with all applicable laws, rules and regulations applicable to or governing the performance of Work which are legally enacted as of the date of this Contract; and

(vii) subject to Section 2.2.(i), construct and maintain until CONTRACTOR Mechanical Completion all roads as identified in the Technical Plans and Specifications within the Project Site and those necessary to connect the Project Site to existing roads;

(viii) provide snow removal and weather protection necessary to protect the Work until CONTRACTOR Mechanical Completion;

(ix) perform an ongoing cost and schedule review of the Detailed Plans and Specifications as produced by the Design Engineer as set forth in Section 2.12. The COMPANY acknowledges that, notwithstanding any other provision of this Contract, such review services are advisory and are not to be considered professional design services. COMPANY will refer such matters to its own design professionals for professional guidance, and accordingly, the CONTRACTOR shall have no liability to the COMPANY with respect to any such professional design services;

(x) handle, remove and properly dispose of all excess soil, gravel and other similar materials for the Work, unless such material contains Hazardous Waste

not generated by CONTRACTOR or Subcontractors. Such Hazardous Waste shall be the responsibility of the COMPANY per Section 2.16.

(xi) furnish COMPANY's office with utilities hookup and monthly services except telephone and maintain a complete set of detailed plans and specifications updated by CONTRACTOR that have received approval by local agencies;

(xii) consult with COMPANY on the Scope of the Work to be included in the COMPANY Furnished Equipment and as specified in Exhibit G and H.

(xiii) copy COMPANY with priced Purchase Orders on all Contractor Furnished Equipment. (CONTRACTOR to receive approval of purchases by COMPANY prior to issuance of final Purchase Orders.

(xiv) procure the building permit for the Work.

(xv) Provide monthly detailed reports to the COMPANY prior to Progress Payments being processed. Reports shall be separate, and consist of: Schedule Updates, Status of Project, Procurement, Costs To Date, Percent Complete, Budget Overruns and Costs Per Month.

2.2 COMPANY's Responsibilities. Subject to the terms and conditions of this Contract, COMPANY agrees to assume the following responsibilities in a timely manner so as not to delay the progress of the Work; TIME BEING OF THE ESSENCE OF THIS CONTRACT:

(i) provide the Project Site for the Work, including right of way for suitable access thereto, per Design/Construct Contract;

(ii) provide reasonable assistance to CONTRACTOR in obtaining building permits;

(iii) obtain permits necessary for the performance of the Work except the building permit;

(iv) pay all property, sales and use taxes assessed against the Work, expressly excluding Business and Operating Taxes;

(v) comply with all laws, rules and regulations applicable to it with respect to the Facility or the Work;

(vi) make payments to CONTRACTOR in a timely manner in accordance with this Agreement;

(vii) consult with CONTRACTOR as to the scope of COMPANY Furnished Equipment and reach agreement prior to commitment;

(viii) conduct the Start-up, Commissioning and Acceptance testing of the Facility;

(ix) furnish all utilities in accordance with Section 2.10;

(x) provide CONTRACTOR in a timely manner consistent with the Schedule of Work Detailed Plans and Specifications and Final Plans and Specifications and other engineering data which is consistent with the Scope Of Work and COMPANY Furnished Equipment.

(xi) provide CONTRACTOR with opportunity to review the Detailed Plans and Specifications and COMPANY Furnished Equipment and shop drawings.

(xii) act in good faith in cooperation with CONTRACTOR in the performance of CONTRACTOR's obligations hereunder, including providing CONTRACTOR with relevant documents and information;

(xiii) provide certified survey to establish a reference point for CONTRACTOR to establish column lines and bench marks;

(xiv) provide all necessary geotechnical studies and investigations with regard to the subsurface physical conditions of the Project Site;

(xv) purchase, expedite, and deliver all items of COMPANY Furnished Equipment and in accordance with the Schedule Of Work.

(xvi) Deleted

2.3 Schedule of Work. Within thirty (30) Days of the later of (i) receipt of the Notice To Proceed, CONTRACTOR shall present to COMPANY a CPM schedule providing for CONTRACTOR Mechanical Completion of the Work in accordance with the Contract Time ("Schedule of Work") and Contract Price. It being hereby agreed and understood that time is of the essence for completion of the Work, and except as may otherwise be permitted hereunder, no change shall be made in the Contract Time or Contract Price without the agreement of COMPANY. Delays to the Schedule of Work due to delays in COMPANY Furnished Equipment, and/or COMPANY's Separate Contractors shall be treated as Uncontrolled Circumstance.

2.4 Construction Tools. CONTRACTOR shall furnish all falsework, erection tools, hoists, rigging, skids, cribbing, blocking, scaffolding, equipment, appliances, materials and supplies that may be required to accomplish

the Work. Such equipment, materials and supplies shall be adequate and serviceable and in good working condition.

2.5 CONTRACTOR's Supervision and Employees: CONTRACTOR shall, at all times, have an appointed Project Manager in charge of the Work. CONTRACTOR shall employ only competent workmen, experienced and skilled in the type of work they are to perform, except where common labor may be utilized by the custom of the construction industry. CONTRACTOR shall at all times enforce strict discipline, site safety and good order among its employees and those of its Subcontractors and shall not employ or allow to be employed on the Work any unfit person or anyone not skilled in the task assigned to him.

2.6 COMPANY's Supervision: COMPANY will, at all times, have COMPANY's Project Manager to confer with CONTRACTOR, to act for COMPANY in connection with the Contract and to examine the Work and perform such other actions, rights and duties as are to be performed by COMPANY hereunder. COMPANY shall be solely responsible for all Separate Contractors.

2.7 Permits; Compliance With The Law: CONTRACTOR shall give all notices, make all filings, take all other actions required with respect to the building permit

and shall observe and abide by all laws, regulations, ordinances and other rules of the government of the United States, the state or any political subdivision thereof or any other duly constituted public authority wherein the Work is done relating to the performance of the Work and which are legally enacted as of the date of the Contract.

2.8 Independent Contractor: CONTRACTOR shall perform the Work as an independent contractor, with exclusive control of the manner and means of performing the Work, subject only to the rights of the COMPANY under this Contract. Anything herein to the contrary notwithstanding, no person engaged in the Work, whether on behalf of CONTRACTOR or any Subcontractor, shall be considered for any purpose to be an employee, agent or representative of COMPANY.

2.9 Subcontract Prior Review: CONTRACTOR may subcontract for the performance of any of its obligations under the Contract. CONTRACTOR shall provide to COMPANY from time to time, lists of Subcontractors it is considering to perform major portions of the Work. COMPANY shall retain the right to approve or reject prospective subcontractors identified on such lists.

2.10 Utilities

Temporary Utilities: CONTRACTOR shall at its sole cost and expense install, and maintain during the performance of the Work all temporary utilities required on the Project Site for the performance of the Work, until Boil Out is attained.

Permanent Utilities: CONTRACTOR shall interconnect the Facility with the required utility services relating to water, sewer, natural gas and electricity. COMPANY shall pay directly all actual fees resulting from such utility interconnections assessed for the following:

(a) electricity;

(b) water;

(c) natural gas;

(d) sanitary sewer;

(e) storm sewer;

(f) other utilities.

2.11 Correction of Deficiencies: During the term of the Contract including the CONTRACTOR's warranty period, pursuant to Article 5, upon written notification by COMPANY to CONTRACTOR after the discovery of any defect in the Work, CONTRACTOR will, at its expense (but subject to CONTRACTOR's right to dispute the existence of or responsibility for such defect), correct, replace or re-perform all Work not conforming to the Contract, including substitutions not properly approved, promptly and within a reasonable time.

If, during the applicable warranty period or performance of the Work, CONTRACTOR fails to correct defective or nonconforming Work within a reasonable time after written notice from COMPANY, COMPANY may correct the same at CONTRACTOR's expense. CONTRACTOR's liability arising out of a breach of its warranties pursuant to Article 5 shall be limited to the cost of correcting defects in the Work, and upon the expiration of such warranty all such liability shall terminate.

2.12 Detailed Plans and Specifications: COMPANY will have prepared by the Design-Engineer such plans, specifications and other engineering data which are consistent with and developed from the Technical Plans and Specifications COMPANY Furnished Equipment and which shall conform to Scope Of Work. The Technical Plans and Specifications shall be superseded upon CONTRACTOR's and COMPANY's approval of the Detailed Plans and Specifications.

Sufficiently prior to Notice To Proceed and periodically thereafter, the COMPANY will provide the CONTRACTOR with the current issue of the Detailed Plans and Specifications. In the event CONTRACTOR believes that such Detailed Plans do not conform to the Scope Of Work, he shall so provide written notice within 21 days after receipt of that issue of the Detailed Plans and Specifications to the COMPANY setting forth reasons for his position.

COMPANY acknowledges that in order for CONTRACTOR to perform the Work within the Contract Time and for the Contract Price, the Detailed Plans and Specifications, as developed during the course of the Project, must comply with the following requirements, the fulfillment of which, if not agreed between COMPANY and CONTRACTOR, is subject to Dispute in accordance with Article: 9

(i) delivery of the Detailed Plans and Specifications must be timely in accordance with and in the sequence specified in Exhibit H so as to allow CONTRACTOR to proceed with the Work in an orderly and efficient manner, but in no event shall the Complete Plans and Specifications be delivered later than 427 Days after Notice To Proceed;

(ii) Detailed Plans and Specifications must be based upon certified vendor drawings;

(iii) Detailed Plans and Specifications shall become operative;

(a) 21 Days have passed after receipt by CONTRACTOR of the Detailed Plans and Specifications and CONTRACTOR has not notified COMPANY that such Detailed Plans and Specifications do not agree with the Scope Of Work or:

(b) if CONTRACTOR has given COMPANY the notice set forth in (a) above, CONTRACTOR has been issued a Change Order adjusting the Contract Price and/or the Contract Time on account of the Detailed Plans and Specifications.

(v) Detailed Plans and Specifications shall be stamped by an engineer registered in the State of Washington.

COMPANY agrees to use reasonable efforts to accommodate CONTRACTOR's recommended changes to the Detailed Plans and Specifications so as to promote the efficient, economical construction of the Facility, so long as such changes do not adversely affect the operation of the Facility and the liability of such recommendations are solely the responsibility of the CONTRACTOR.

In the event there is a dispute between COMPANY and CONTRACTOR as to whether the Detailed Plans and Specifications are in agreement with the Scope Of Work and a Change Order has not been issued, CONTRACTOR shall proceed in accordance with the Detailed Plans and Specifications, subject to Dispute as set forth in Article 9.

2.13 Safety Precautions. CONTRACTOR shall take all precautions necessary and shall be responsible for the safety of the Work or any component thereof, and shall maintain all lights, guards (as necessary), signs, temporary passages or other protection necessary for such purpose. COMPANY shall have no responsibility or liability for damage or loss of equipment, materials, tools or other articles of CONTRACTOR or Subcontractors except to the extent such damage or loss is caused

by the COMPANY's negligent or willful acts or omissions.

2.14 Clean-Up and Disposal. CONTRACTOR at all times, shall keep the Project Site free from accumulation of waste materials or rubbish caused by the Work. CONTRACTOR shall promptly dispose of all such waste materials and rubbish. All disposal shall be in accordance with applicable law. If CONTRACTOR fails to clean up or dispose of such waste materials and rubbish as required hereby, COMPANY may cause such clean-up or disposal to be performed and the cost thereof shall be for the account of CONTRACTOR.

2.15 Deleted

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2.16 Hazardous Waste: Prior to CONTRACTOR entering onto the Site, COMPANY shall be responsible for identifying and disposing of Hazardous Waste which may be on the Site. In the performance of its obligations under this Contract, CONTRACTOR shall not generate, discharge, store or dispose of any Hazardous Waste on or off the Site; provided that CONTRACTOR shall not be in breach of its obligations hereunder (but shall be solely responsible) if and to the extent that it utilizes or creates

Hazardous Waste which is necessary for the construction of the Project. In the event that CONTRACTOR discovers Hazardous Waste on the Site, CONTRACTOR shall immediately notify COMPANY. The discovery of Hazardous Waste on the Site not generated solely by the activities of CONTRACTOR or any of its Subcontractors shall constitute Uncontrolled Circumstances. COMPANY shall not be liable for Hazardous Waste generated solely from the activities of CONTRACTOR or any of its Subcontractors.

ARTICLE 3

COMPLETION OF THE WORK

3.1 Notice To Proceed: COMPANY shall issue CONTRACTOR a written Notice To Proceed with the Work within a reasonable period after COMPANY's receipt of Notice To Proceed from the CITY. Thereafter, CONTRACTOR shall be available to consult with COMPANY regarding development of Detailed Plans and Specifications.

Within 427 days after the Notice to Proceed, COMPANY shall cause the Design Engineer to complete and deliver to CONTRACTOR the Complete Plans and Specifications.

In the event COMPANY fails to issue and deliver to CONTRACTOR Complete Plans and Specifications within 427 Days of the Notice To Proceed, CONTRACTOR shall be entitled to a day-for-day time extension to the Contract Time for each day the Final Plans and Specifications are delayed beyond such 427 day period for completion of individual items not issued within 427 days only.

Mechanical and Electrical design by the COMPANY shall be of the government nature:

COMPANY shall provide detailed information to a point 5 feet from mechanical hook-up only. The final routing, and supporting will be field ran by the CONTRACTOR.

Conduit routing shall be designed from size 2 1/2" and above only by the COMPANY, with the exception that all sub-surface duct banks (2 or more conduit) shall be detailed by the COMPANY.

Pipe spool drawing will be the responsibility of the CONTRACTOR.

3.2 Partial Completion: It is envisioned that the Facility will be completed on a system basis. As such, the CONTRACTOR will notify the COMPANY when a system is complete per Exhibit I. All Maintenance Manuals and performance data necessary to operations must be issued to the COMPANY prior to any punch listing or turn over of systems will be considered. COMPANY shall immediately punchlist such system in accordance with the procedure set forth on Exhibit L. A system shall be deemed complete when:

(i) the requirements of Exhibit K have been fulfilled and the work associated therewith has been performed in accordance with the Detailed Plans and Specifications or Final Plans and Specifications, whichever is applicable, and punchlist items which will not allow the physical Startup of the system are corrected; or;

(ii) COMPANY initiates Startup of the system, whichever occurs earliest ("Partial Completion").

A disagreement between COMPANY and CONTRACTOR as to whether Completion has been met for any system will be subject to the Dispute provisions of Article 9. Upon Completion of a system, COMPANY will take possession, assume complete and total control of that system and be responsible for the operation and maintenance

thereof. COMPANY will also pay, in accordance with CONTRACTOR's Progress Payment Invoice, all monies due for such completed system during the processing of next Progress Payment due CONTRACTOR, less one hundred percent (100%) of the value of any punchlist items and retention. Notwithstanding Completion of a system as aforesaid, CONTRACTOR agrees that it will perform punchlist Work which is discovered during commissioning of such subsystem and which is not caused by COMPANY, CITY, Separate Contractors or their employees or agents. COMPANY acknowledges that after a system Completion, CONTRACTOR may require access to the system in order to complete warranty or repair Work. The right of access will include the right of CONTRACTOR to reasonably require that operation of the Facility be reduced to a level below its capacity or be shut down entirely, provided that CONTRACTOR shall use its best efforts to minimize any such interference and comply to all safety procedures as established by the COMPANY. Any reduction or shutdown of Facility operations shall be requested twenty-four (24) hours in advance in writing by CONTRACTOR. Subject to the conditions of this Section 3.2, COMPANY shall give CONTRACTOR reasonable access to

the Facility for the foregoing purposes.

3.3 CONTRACTOR Mechanical Completion: CONTRACTOR shall notify COMPANY in writing at least ten (10) Days prior to the date CONTRACTOR intends to have achieved CONTRACTOR Mechanical Completion. CONTRACTOR shall achieve CONTRACTOR Mechanical Completion when:

(i) Completion has been achieved on all systems; and

(ii) COMPANY is provided with notice of CONTRACTOR Mechanical Completion from CONTRACTOR ("Mechanical Completion Notice").

COMPANY shall issue a Certificate of Mechanical Completion if he agrees that CONTRACTOR has met the requirements of this Section. In the event he does not agree with the Mechanical Completion Notice, he shall notify CONTRACTOR within five (5) Days of the Mechanical Completion Notice. COMPANY's notice shall specifically identify what CONTRACTOR must do to achieve CONTRACTOR Mechanical Completion. If CONTRACTOR does not agree, it shall nevertheless perform such work, subject to its right to Dispute in accordance with Article 9.

CONTRACTOR shall achieve CONTRACTOR Mechanical Completion on the later to occur of 669 Days after receipt of Notice To Proceed or 241 Days after receipt of Complete Plans and Specifications (the "Contract Time").

3.4 Delay Damages For Late CONTRACTOR Mechanical Completion: In the event CONTRACTOR fails to achieve CONTRACTOR Mechanical Completion within the Contract Time as adjusted, it is hereby acknowledged that COMPANY will incur delay damages that would be difficult to ascertain and uncertain of measurement. Therefore, CONTRACTOR will pay COMPANY as liquidated damages for such failure the sum of Twelve Thousand Dollars ($12,000) for each calendar day after the Contract Time until CONTRACTOR has achieved CONTRACTOR Mechanical Completion. COMPANY shall not be entitled to damages for delay in excess of the amount payable under this Section 3.4. In no event shall liquidated damages exceed to Four Million Dollars ($4,000,000).

3.5 Bonus Payments For Early CONTRACTOR Final Mechanical Completion: In the event CONTRACTOR Final Mechanical Completion occurs before the Contract Time as adjusted, COMPANY shall pay the CONTRACTOR 50% of all revenue received from the CITY for early facility operation, unless such bonus is not received from the CITY because of negligence by the COMPANY at which time the CONTRACTOR will receive the equivalent of such bonus percentage. Bonus shall not exceed $150,000.

3.6 CONTRACTOR Final Completion: CONTRACTOR shall notify COMPANY in writing at least ten (10) Days prior to the date CONTRACTOR intends to achieve CONTRACTOR Final Completion ("Final Completion Notice"). CONTRACTOR shall have achieved CONTRACTOR Final Completion when:

(i) CONTRACTOR Mechanical Completion is achieved;

(ii) COMPANY is furnished with a set of "Red Line" record drawings consisting of Project P & ID's, Site Plan, Electrical (Schematics, Interconnects, One Lines, pipings and orthographics);

(iii) all system punchlists are complete;

(iv) all CONTRACTOR temporary facilities and rubbish are removed from the Project Site; and

(v) CONTRACTOR has provided COMPANY with notice of CONTRACTOR Final Completion ("Final Completion Notice").

COMPANY shall issue a Certificate of Final Completion if he agrees that CONTRACTOR has met the requirements of this Section. In the event he does not agree with the Final Completion Notice, he shall notify CONTRACTOR within five (5) days.

If CONTRACTOR does not agree, it shall nevertheless perform such Work, subject to its right to Dispute in accordance with Article 9.

ARTICLE 4

COMPENSATION

4.1 Contract Price. COMPANY and CONTRACTOR agree that the total fixed price to COMPANY for full and complete performance of the Work in accordance with the terms, conditions and provisions hereof, except for changes made in accordance herewith, shall be a cost plus/fixed fee basis with a guaranteed maximum price, any savings which would be realized within the established base cost number exclusive of fee shall be shared on an equal basis by COMPANY and CONTRACTOR. The base cost shall be the sum of_____Dollars ($_____) with the exclusive fee to the CONTRACTOR of _____Dollars ($_____). All costs associated with the project shall be approved by the COMPANY prior to issuance or will not be considered a portion of costs for the purpose of determining costs or savings.

The COMPANY recognizes that the Contract Price does not include any amounts for sales or use taxes. The COMPANY shall provide CONTRACTOR with all necessary documentation to take advantage of any tax exemption which may be available. To the extent CONTRACTOR is required to pay any sales, or use tax on any portion of the Work (not including taxes based on the income of CONTRACTOR or any employee withholding or similar taxes), CONTRACTOR shall be entitled to a Change

Order equal to an equivalent increase in the Contract Price.

4.2 Progress Payments. CONTRACTOR shall, on or before the last Day of each month, deliver to the COMPANY an itemized application for payment (the "Progress Payment Invoice"). The Progress Payment Invoice shall include only payments as allowed per CONTRACTOR draw down schedule, for work, materials and equipment which, on or prior to the billing date, have been:

(a) incorporated into the Facility;

(b) delivered and properly stored at the Project site;

(c) with COMPANY's prior approval properly stored at some other location;

(d) in progress on or off the Project Site for which CONTRACTOR or COMPANY have agreed to make progress payments; or

(e) with respect to work covered by COMPANY Negotiated Agreements, a proportionate fee in accordance with Work performed.

The Progress Payment Invoice shall be submitted to the COMPANY with, only as to items set forth in sections above, substantiating documentation for payment. The Progress Payment Invoice shall be made on the forms set forth in Exhibit A. In each Progress Payment Invoice, the CONTRACTOR shall certify that:

(i) the Work for which payment is sought has been performed to the extent indicated in the Progress Payment Invoice and in accordance with the Detailed Plans and Specifications, subject to minor deviations correctable prior to completion, and;

(ii) the insurance required hereunder is in full force and effect.

(iii) all required monthly reports have been submitted and accepted as required information by the COMPANY.

(iv) certification that no liens are filed or pending against the project or the CONTRACTOR.

4.3 Payment Of Progress Payments. Subject to Sections 4.5, and 4.6 below, COMPANY shall pay to CONTRACTOR the amounts due to CONTRACTOR as requested in each progress Payment Invoice on or before the thirtieth (30th) Day following the receipt of the Progress Payment Invoice; provided, however, that the amounts due to CONTRACTOR shall be reduced by a retainage of five percent (5%) of the portion of such requested amounts due to CONTRACTOR. An additional 5% retainage may be held so long as the CONTRACTOR is behind the latest CPM milestone dates for activities enumerated in Exhibit H provided however, there shall be no additional 5% retainage if the failure to achieve such milestone dates is due to Uncontrolled Circumstances, or any failure by the COMPANY, CITY, Separate Contractors, their agents or employees to fulfill their duties and obligations under this Contract. The portion of any Progress Payment Invoice due to Contractor, less retainage, not paid by COMPANY

on the date due, and subsequently determined to be wrongfully withheld shall be deemed delinquent, and shall bear interest from the date due until paid at the rate announced by Citibank, N.A. from time to time to be its so called "prime rate" in effect at its principal office in New York City ("Delinquency Rate").

Any remaining retention shall be released to CONTRACTOR at Contractor Final Mechanical Completion except for one hundred percent (100%) of the value of the punch list or the equal amount of claims dispute that may exist between COMPANY and CONTRACTOR.

4.4 Final Payment Invoice. Upon receipt by CONTRACTOR of COMPANY's Certificate of Final Completion, CONTRACTOR shall submit to COMPANY a statement summarizing and reconciling all previous invoices, payment retainers and changes to the Contract Price made pursuant to this Contract ("Final Payment Invoice"). Subject to Sections 4.6 and 4.7 below, COMPANY shall pay CONTRACTOR the balance of the Contract Price including sharing of savings, if any, remaining due after all prior payments hereunder within thirty (30) Days of the receipt of the Final Payment Invoice. The making of such final payment shall constitute a waiver by COMPANY of all claims against CONTRACTOR except those relating to:

(i) unsettled liens;

(ii) latent failures of the Work to comply with the Contract;

(iii) terms of the warranties set forth in Article 5;

(iv) matters identified by COMPANY as unsettled in a statement furnished with such final payment.

The acceptance of final payment by CONTRACTOR shall constitute a waiver of all claims against COMPANY except those previously or then made in writing and identified by CONTRACTOR as unsettled at the time of the Final Payment Invoice and claims made or which may be made by third parties against CONTRACTOR for which COMPANY may be responsible.

4.5 Disputed Invoices. In the event of a dispute between COMPANY and CONTRACTOR relating to any amount requested for payment in any Progress Payment Invoice or the Final Payment Invoice, the amount not in dispute shall be promptly paid as set forth above in this Article 4 and any disputed amount settled in the CONTRACTOR's favor and ultimately paid shall be paid with interest from the date payment on such invoice would otherwise have been due under this Contract to the date of payment, calculated at the Delinquency Rate set forth in Section 4.3. Any

dispute which is not resolved by the mutual agreement of the parties shall be settled in accordance with Article 9 of this Contract

4.6 Payments Withheld. COMPANY may withhold payment on a Progress Payment Invoice, or a portion thereof in an amount and to such extent as may be reasonably necessary to protect COMPANY from loss because of:

(i) uninsured third-party claims against COMPANY with regard to Work performed by CONTRACTOR; or

(ii) subject to Section 4.7, failure of CONTRACTOR to make payments properly to Subcontractors.

4.7 Liens and Encumbrances. If, during the progress of the Work, CONTRACTOR allows any lien to accrue to Subcontractors and shall fail to pay or discharge the same within ten (10) business days after demand by COMPANY, COMPANY may withhold the amount of any claim from any sum due CONTRACTOR until;

(i) such lien is paid, or;

(ii) if CONTRACTOR disputes such lien, until CONTRACTOR has caused the release of the lien by bond or otherwise, or has provided security, such as a letter of credit, to COMPANY for such indebtedness.

COMPANY may apply such withheld sums of security towards the discharge

of any claim only if CONTRACTOR has failed, by bond or otherwise, to cause the release of any lien against the Facility arising as a result of such claim.

4.8 Suspension of Work. If COMPANY fails to make any payments in a timely manner as required hereunder, CONTRACTOR may suspend Work in accordance with Section 10.6 below.

4.9 Title and Purchasing: Title to all materials, supplies, or equipment furnished hereunder shall pass to the COMPANY upon incorporation into the Facility or upon payment therefor by COMPANY, whichever first occurs. Subject to the limitation set forth in the succeeding sentence, CONTRACTOR will deliver to COMPANY as a condition of Final Payment, Subcontractors' lien releases for all items purchased in connection herewith and will otherwise insure that title to all equipment, materials and supplies purchased hereunder will pass to COMPANY in accordance with this Section. Lien releases shall not be required for Subcontracts or Purchase Orders less than $40,000. Where amounts are disputed, CONTRACTOR may provide security in lieu of lien releases. CONTRACTOR will obtain and maintain on file partial waivers of lien from

Subcontractors, and supply to COMPANY copies of any of these documents upon written request.

ARTICLE 5

WARRANTIES AND LIABILITIES

5.1 General Warranty. CONTRACTOR warrants and guarantees for a period of fourteen (14) months from CONTRACTOR Mechanical Completion that the Work shall:

(i) be of good quality and new;

(ii) be free from defects;

(iii) conform with the requirements of the Final Plans and Specifications and this Contract.

CONTRACTOR does not make any warranties with respect to:

(i) COMPANY Furnished Equipment beyond workmanship connected with proper installation;

(ii) Deleted

(iii) work performed by Separate Contractors; or

(v) services performed by Design Engineer.

5.2 LIMITATION ON WARRANTY. THE WARRANTIES IN SECTION 5.1 ABOVE ARE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, WHETHER STATUTORY, WRITTEN, ORAL, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. Neither party is liable for any loss of profit, loss of use or any consequential, indirect or punitive damages for any breach of warranty under this Article 5 or otherwise.

5.3 Improper Use Responsibility. CONTRACTOR shall not be responsible for any failure or damage to the extent caused by misuse or improper operation of the Facility or any part thereof by COMPANY, CITY, Separate Contractors, Design Engineer, any of their subcontractors, supplier, employees or agents.

ARTICLE 6

INSURANCE BONDS AND INDEMNITY

6.1 COMPANY Maintained Insurance. With respect to insurance which is required under Exhibit F

by the COMPANY or the Separate CONTRACTORS, CONTRACTOR shall be named as an additional insured. All policies shall be endorsed to provide that underwriters and insurance companies of COMPANY and Separate CONTRACTORS shall not have any right to subrogation against CONTRACTOR or any of its affiliates, agents, employees and

servants.

6.2 Bonds: CONTRACTOR shall deliver to COMPANY within ten (10) Days after receipt of Notice To Proceed, in a form reasonably acceptable to the COMPANY, payment and performance bonds, each in the full amount of the Contract Price.

6.3 Insurance of CONTRACTOR. CONTRACTOR, upon the commencement of construction until the issuance of the Certificate of Final Completion, shall provide and maintain in effect the types and amounts of insurance specified in Exhibit F. CONTRACTOR shall issue all sub-contractors' proof of insurance (certificate) to COMPANY for approval.

6.4 Additional Insured and Waiver of Subrogation. As to insurance set out in Exhibit F, except as to the Worker's Compensation and Employer's Liability Insurance, COMPANY, and where required, the CITY, shall be named as an additional insured. All policies shall be endorsed to provide that underwriters and insurance companies of CONTRACTOR shall not have any right to subrogation against COMPANY or CITY, and all of their affiliates, agents, employees, and servants. All insurance provided by CONTRACTOR shall be primary as to other insurances as it relates to the Work.

6.5 Certificates. CONTRACTOR and COMPANY shall furnish annual certificates of insurance evidencing the insurance required hereunder. Each certificate shall provide that thirty (30) Days prior written notice shall be given in the event of non-renewal, cancellation or material change in the policies, including all sub-contracts issued by the CONTRACTOR.

6.6 Premiums Responsibility. All policies provided by CONTRACTOR shall be endorsed to provide that there will be no recourse against COMPANY for payment of premium.

6.7 Insurance In Force. CONTRACTOR and its Subcontractors shall not commence the shipment of equipment or materials or commence Work at the Project site until all of the insurance that CONTRACTOR is required to provide is in full force and effect, the COMPANY has obtained All Risk Builder's Risk insurance in accordance with Exhibit F hereof, and the necessary certificates and statements as required in Section 5 above have been received by COMPANY.

6.8 General Indemnity. CONTRACTOR shall protect, indemnify and hold harmless COMPANY, any Persons comprising the COMPANY, his respective directors,

officers, employees, agents and Affiliates ("Indemnities") from and against all liabilities, actions, damages, claims, demands, judgements, losses, costs and expenses (including reasonable legal fees) and will defend the Indemnities in any suit, including appeals, arising out of or resulting from the performance of the Work provided such claim, damage, loss or expense is attributable to sickness or bodily injury or death to any person or persons, or loss or damage to property, provided that no such indemnity obligation shall exist to the extent that, such liability, action, damage, claim, demand, judgement, loss, cost or expense is caused by the negligence or willful misconduct of Indemnities. COMPANY shall promptly notify CONTRACTOR when it becomes aware of the assertion of any claim for which an Indemnities is indemnified hereunder, shall give CONTRACTOR the opportunity to defend such claim, and shall not settle such claim without the approval of CONTRACTOR (which

approval shall not be unreasonably withheld, conditioned or delayed). These indemnification provisions are for the protection of the Indemnities and shall not establish, or themselves, any liability to third parties.

To the fullest extent permitted by law, COMPANY shall protect, indemnify and hold CONTRACTOR harmless from and against claims, damages, losses, liabilities, actions, demands, judgement losses, cost and expenses including but not limited to attorneys fees arising out of the presence of any Hazardous Waste on the Site not generated or resulting from the operations of CONTRACTOR or any Subcontractors thereof.

COMPANY shall protect, indemnify and hold harmless CONTRACTOR, any Persons comprising the CONTRACTOR, its respective directors, officers, employees, agents and Affiliates and Subcontractors ("CONTRACTOR Indemnities") from and against all liabilities, actions, damages, claims, demand, judgements, losses, costs and expenses (including reasonable legal fees) and will defend the CONTRACTOR Indemnities in any suit, including appeals, arising out of or resulting from the acts or omissions of COMPANY hereunder or under the Design & Construction Agreement provided

such claim, damage, loss or expense is attributable to sickness, or bodily injury or death to, any person or persons, or loss or damage to property but only to the extent attributable to or resulting from the negligent or willful acts or omissions of COMPANY or a Separate Contractor, or agents, employees, representatives, or Affiliates of either or as a result of the sole negligence or willful misconduct of COMPANY hereunder and under the Service Agreement; provided that no such indemnity obligation shall exist to the extent that, such liability, action damage, claim, demand, judgement, loss, cost or expense is caused by the negligence or willful misconduct of CONTRACTOR. CONTRACTOR shall promptly notify COMPANY when it becomes aware of the assertion of any claim for which a CONTRACTOR Indemnities is indemnified hereunder, shall give COMPANY the opportunity to defend such claim, and shall not settle such claim without the approval of COMPANY (which approval shall not be unreasonably withheld, conditioned or delayed). These indemnification provisions are for the protection of the CONTRACTOR Indemnities and shall not establish, of themselves, any liability to third parties.

6.16 Effect Of Termination: Except as expressly set forth herein, the indemnities set forth in the Contract shall remain in full force and effect after termination of the Contract for any reason.

ARTICLE 7

CONTRACT CHANGES

7.1 Change Orders. COMPANY may make changes in the Scope Of Work within the scope of this Contract in any one or more of the following as defined below:

(i) Detailed Plans and Specifications;

(ii) Company Furnished Equipment

(iii) the method or manner of performing the Work;

(iv) the Project Site, or;

(v) directing acceleration in the performance of the Work;

with the Contract Price and Contract Time being adjusted accordingly. Any written order (which shall include a direction, instruction, determination or interpretation) from COMPANY which causes a change in the Work shall be treated as a Change Order, subject to the notice provisions of Section 7.2 below. CONTRACTOR, within

fourteen (14) Days after receipt of the written proposal from the COMPANY with respect to a change or such other period of time as the parties agree upon, shall provide a detailed estimate of the change in the Contract Price and the Contract Time and the effect of such change upon performance of the Work, warranties or construction practices. Such estimate shall constitute an offer by CONTRACTOR to perform the change in accordance with the estimate. Such offer shall remain in effect for at least ten (10) business days. If COMPANY accepts such detailed estimate, it shall issue a written order authorizing CONTRACTOR to proceed with the Work, as changed, in accordance therewith (a "Change Order"). If COMPANY does not accept such estimates, it may withdraw its order to perform the change or may issue a Change Order with the equitable adjustment in the Contract Price to be determined on a cost plus 7.5% fee basis.

7.2 Written Directives Not Designated As Change Orders. If CONTRACTOR believes that any written order, directive, or determination or interpretation of COMPANY not denominated as a Change Order constitutes a change, it shall notify COMPANY prior to performing the Work in accordance with such order, directive,

determination or interpretation and shall provide a detailed estimate as if the COMPANY had at the time made a written proposal therefor pursuant to Section 7.1. If, after such notice, COMPANY refuses to issue a Change Order for the work covered by such written order, directive, determination or interpretation, CONTRACTOR shall, in an expeditious fashion, proceed with the Work as ordered by the COMPANY and CONTRACTOR's right to an increase in Contract Price and Contract Time shall be subject to Dispute in accordance with Article 9.

7.3 Change In Contract Price. If any Change Order issued pursuant to Section 7.1, or written order, directive, determination or interpretation determined to constitute a Change Order within the meaning of Section 7.2, causes an increase or decrease in CONTRACTOR's cost of the performance of any part of the Work under this Contract, and the same has not been agreed upon in accordance with Section 7.1, an equitable adjustment shall be made in the Contract Price and Contract Time. CONTRACTOR shall include in its Progress Payment Invoice amounts on account of Work performed as Change Orders as such changes are performed. Each Change Order which adjusts the contract Price shall be separately identified on the Progress Payment

Invoice pertaining to it. The cost to COMPANY resulting from a Change Order shall be determined on the basis of the direct and indirect (excluding certain home office overhead) costs for performing the Work attributable to the change, and an allowance of seven and one-half percent (7 1/2%) for fee and home office overhead which has been determined not to be part of job costs. For purposes of this Section 7.3, the following costs and expenses shall be charged to COMPANY as part of any Change Order: costs. CONTRACTOR shall keep and, upon request by COMPANY present to COMPANY an itemized accounting together with appropriate supporting data detailing costs incurred in connection with the change. Such costs shall include, costs of materials, (including sales, use, or other similar tax, if any) and cost of delivery; payments to Subcontractors; cost of labor, including Social Security, old age and unemployment insurance, and other fringe benefits; worker's or workmen's compensation insurance; bond premiums; rental value of equipment and machinery; as established in Rental actual cost for this local area, and costs of supervision and field and home office personnel directly

attributable to the change. Pending final determination of cost to COMPANY, partial payments on account shall be made in accordance with a reasonable estimate of the final cost.

7.4 CONTRACTOR's Changes. If CONTRACTOR wishes to make a change in the Work, he shall give COMPANY written notice of such request. No change shall be made without a Change Order executed by COMPANY, except that in any emergency affecting the safety of persons or property, CONTRACTOR shall act, at his discretion, to prevent threatened damage, injury or loss.

7.5 Differing Site Conditions: CONTRACTOR has inspected the Project Site and reviewed the Soils Report provided by COMPANY at Exhibit J. CONTRACTOR shall not be responsible for any obstruction, feature or condition with respect to the Project Site or the access thereto ("Obstructions") except such Obstructions as would have been discoverable during a reasonable Project Site inspection and or from a review of Exhibit J. If an Obstruction is discovered for which the CONTRACTOR is not responsible under the preceding sentence, then such Obstruction shall be treated as an event of Uncontrolled Circumstances under Article 8. Any disagreement with

respect to the existence of such Obstructions, the responsibility therefore, or the equitable adjustment as a result thereof shall be resolved in accordance with the Dispute provision set forth in Article 9.

ARTICLE 8

UNCONTROLLABLE CIRCUMSTANCE

8.1 "Uncontrolled Circumstance" means any act or event that has had or may reasonably be expected to have a material adverse effect on the rights or obligations of the Company or the CONTRACTOR under this Contract Agreement or a material adverse effect on the Facility (or any essential element thereof), the Facility Site, or the construction, start-up, Acceptance Testing, operation, or possession of the Facility, if such act or event is beyond the reasonable control of the party relying thereon as justification for not performing an obligation or complying with any condition required of such party under this Construction Agreement. Such acts or events shall include, but are not limited to, the following:

(a) An act of God (except normal weather conditions for the geographic area of the Facility Site), hurricanes, tornados, epidemic, landslide, lightning, earthquake, volcano eruption, nuclear radiation, fire or explosion if not caused by COMPANY negligence or CONTRACTOR negligence, flood or similar occurrence, an act of public enemy, war, blockade, insurrection, riot, general arrest, or restraint of government and people, civil disturbance or similar occurrence;

(b) The order or judgement of any federal, state, or local court, administrative agency or governmental officer or body, if such order or judgement is not also the result of negligent or willful action or failure to act of the party relying thereon, provided that the contesting in good faith of any such order or judgement shall not constitute or be construed as a willful or negligent action of such party;

(c) Suspension, termination, interruption, denial, failure to issue or failure of renewal of any permit, license, consent, authorization or approval essential to the construction of the Facility, if such act or event is not also the result of negligent or willful action or failure to act of the party relying thereon, provided that the contesting in good faith of any such order shall not be construed as a negligent or willful action of such party;

(d) The failure of any appropriate Federal, State or local agency or public or private utility having operational jurisdiction in the area of location of the Facility, to provide and maintain and assure the maintenance of all utilities;

(e) A default by the Energy Purchaser under the Energy Purchase Agreement(s);

(f) A Change in Law; or

(g) A Non-Company Strike or strike against a subcontractor or supplier of Company other than an affiliate or subsidiary of the Company or WTI or Babcock & Wilcox or an affiliate or subsidiary of Babcock & Wilcox at a location other than the Facility Site, so long

as COMPANY is unable to obtain, after due diligence, a subcontractor or supplier to replace the affected subcontractors or suppliers.

Uncontrollable Circumstance shall not include a strike, work stoppage or any other industrial or labor action which is not specified in (g) above.

8.2 Equitable Adjustments For Uncontrolled Circumstance. CONTRACTOR shall be entitled to an equitable adjustment in the Contract Price and the Contract Time for uncontrolled events (regardless of whether such events excuse the CONTRACTOR's or the COMPANY's performance hereunder) as if such events of uncontrolled events constitute a change under Article 7 hereto. If CONTRACTOR believes that any event has occurred, it shall notify COMPANY and in no event later than thirty (30) Days following such event. Such notice shall include a statement of the impact of such event on the Contract Price and Contract Time.

ARTICLE 9

DISPUTE RESOLUTION

1.20 Dispute shall mean any claim, controversy, disagreement or other matter in question between the parties that arises out of or relates to the terms and conditions of the Contract or with respect to the performances by the parties of their respective obligations under the Contract, including any claim for breach or repudiation thereof.

Scope. To help bring about a quick and efficient resolution of disputes which may arise under this Construction Agreement, the parties do hereby establish this procedure. All claims, controversies and disputes arising out of or relating to this Construction Agreement, or the breach thereof ("claims"), shall be

decided by the following dispute resolution procedure unless the Construction Agreement specifically provides otherwise or the parties mutually agree in writing otherwise.

Dispute Resolution Procedure

(a) Initiation. Either party may initiate the dispute resolution by giving written notice of its claim to the other party within the time limits imposed by this Construction Agreement.

(b) Level I. Within five working days of the receipt of the written notice, the Project Manager of the COMPANY, the Consulting Engineer, and the Project Manager of the CONTRACTOR shall meet, confer, and attempt to resolve the claim within the next five working days.

(c) Level II. If the claim is not resolved within 48 hours of the close of the Level I meeting, an officer of the COMPANY and the CONTRACTOR shall meet, confer, and attempt to resolve the claim within the next five working days.

(d) Resolution. The terms of the resolution of all claims concluded in Level I or II, meetings shall be memorialized in writing and signed by each party.

(e) Arbitration. No claims may be pursued further unless such claims have been raised and considered in the above dispute resolution procedure. all claims which have not been resolved by the above dispute resolution procedure shall be finally settled by binding arbitration in accordance with the then applicable Construction Industry Arbitration Rules ("CIAR") of the American Arbitration Association and the following procedures. Judgement on the award rendered by the Arbitrators may be entered in any court having jurisdiction thereof. The parties acknowledge that this Construction Agreement is a contact affecting interstate

commerce and that this agreement to arbitrate is subject to and enforceable in accordance with the Federal Arbitration Act, 9 U.S.C. § 1 et seq.

Section 12.3 Arbitration Procedure.

(a) Either party may initiate arbitration proceedings by filing a notice of intent to arbitrate pursuant to the CIAR with the other party and the Regional Office of the AAA in Seattle, Washington.

(b) Each party shall select one arbitrator from the list submitted by the AAA, and the two so selected shall, within twenty (20) days after their selection, select the third arbitrator. If the two selected arbitrators are unable to agree upon the third arbitrator within the twenty (20) day period, the AAA shall submit a list of qualified arbitrators to the parties, and, within five (5) days after receiving the list, the parties shall confer and, COMPANY, alternatively strike names from the list until a single name remains, who shall be named the third arbitrator. In the event the designated third arbitrator declines or is unable to serve, the prior name stricken shall be the third arbitrator.

(c) No individual who is, or has at any time been, an officer, employee, representative, attorney, or consultant of the Company, an affiliate corporation, or the CONTRACTOR, shall be an arbitrator without the express written consent of the COMPANY and CONTRACTOR.

(d) Each party shall be entitled to join one or more third parties who are or may be liable to that party for all or part of the claim made in arbitration against that party.

(e) All arbitration hearings shall be held in Spokane, Washington, or such other place mutually agreeable to the parties.

(f) Each of the parties shall submit to such discovery and produce such documents at such times as the arbitrators may upon motion or sua sponte request.

(g) The arbitrators shall determine a fair, equitable, and binding allocation of the reasonable expenses of both parties incurred in connection with the arbitration of any dispute hereunder. Each party shall bear its own attorney's fees, unless the arbitrators shall determine that the nature of the action or defense of the losing party was frivolous, in which event the arbitrators shall determine a fair and equitable attorney's fee to be paid by the losing party to the prevailing party.

(h) Each party submits to the jurisdiction of the arbitrators appointed in accordance herewith. The determination of the arbitrators shall be final and binding upon the parties, shall be in the form of a written award of the arbitrators, with written findings of fact, and may be entered in and specifically enforced by any court of appropriate jurisdiction.

(i) All substantive and procedural aspects of the arbitration shall be governed by Washington Law.

Section 12.4 Technical Claims

The foregoing to the contrary notwithstanding, if a claim consists predominantly of matter(s) requiring the exercise of engineering judgement, skills, and/or knowledge, the CONTRACTOR and COMPANY may mutually agree, by written notice to the Independent Engineer, to bring the dispute exclusively to the Independent Engineer rather than through all or part of the dispute resolution procedure. The Independent Engineer shall then assume exclusive jurisdiction over such dispute and shall establish a schedule of written and/or oral submittals by each party to be completed within sixty (60) days.

The Independent Engineer shall make a final and binding determination, not subject to appeal, within twenty (20) days from the last submittal from both the parties. The determination by the Independent Engineer shall be made in writing, shall contain written findings of fact on which his decision is based, and may be entered in and shall be specifically enforceable by any court of competent jurisdiction. The Independent Engineer shall determine a fair and equitable allocation of the reasonable expenses both parties incurred in connection with the resolution of the dispute. Each party shall bear it's own attorney's fees, unless the Independent Engineer shall determine that the nature of the action or defense of the losing party was frivolous, in which event the Independent Engineer shall determine a fair and equitable attorney's fee to be paid by the losing party to the prevailing party.

Section 12.5 Covenant to Continue Work. During resolution of any dispute under this Article, the Company and the Contractor shall each continue to perform all of their skills, and/or knowledge, the Contractor and Company may mutually agree, by written notice the Independent Engineer, to bring the dispute exclusively to the Independent Engineer rather than through all or part of the dispute resolution procedure. The Independent Engineer shall then assume exclusive jurisdiction over such dispute and shall establish a schedule of written and/or oral submittals by each party to be completed within sixty (60) days. The Independent Engineer shall make a final and binding determination, not subject to appeal, within twenty (20) days from the last submittal from the parties. The determination by the Independent Engineer shall be made in writing, shall contain written findings of fact on which his decision is based, and may be entered in and shall be specifically enforceable by any court of competent jurisdiction. The Independent Engineer shall determine a fair and equitable allocation of the reasonable expenses both parties incurred in connection with the resolution of the dispute.

Each party shall bear it's own attorney's fees, unless the Independent Engineer shall determine that the nature of the action or defense of the losing party was frivolous, in which event the Independent Engineer shall determine a fair and equitable attorney's fee to be paid by the losing party to the prevailing party.

ARTICLE 10

GENERAL PROVISIONS

10.1 Patents. Except for work performed and equipment supplied by Separate , Contractors, CONTRACTOR shall assume all liability for, and fully indemnify and save the COMPANY harmless from and against all claims, demands, suits, proceedings, damages, losses, expenses, fees, including reasonable attorney's fees and costs, and royalties arising from any infringement, real or claimed, of any patent on any article, machine, manufacture, structural arrangement, design, device, method or process engineered, erected, installed or furnished by CONTRACTOR, or it's Subcontractors in the performance of this Contract. COMPANY shall give CONTRACTOR prompt written notice of all such claims and authority and assistance to enable CONTRACTOR to defend same. With regard to COMPANY Furnished and items specified by the Design Engineer, the COMPANY shall assume the same obligation to CONTRACTOR that CONTRACTOR assumes toward COMPANY under this paragraph on account of equipment furnished by CONTRACTOR.

10.2 Assignment

CONTRACTOR shall not assign this Contract to any person, partnership, company or corporation not satisfactory to COMPANY and no such assignment shall be valid until COMPANY has consented thereto in writing.

COMPANY shall have the right to assign this Contract and it's rights hereunder upon sixty (60) Days prior written notice to CONTRACTOR, but COMPANY shall not be released hereunder and shall remain liable to CONTRACTOR for all of COMPANY'S obligations under this Contract.

10.3 Visits and Examinations.

COMPANY and CITY shall have the right to conduct routine and normal visits and examinations of all Work performed and equipment and material furnished under this Contract, the COMPANY shall have access at all times to the Work and premises used by CONTRACTOR.

When finished Work is taken down or uncovered, or equipment or material furnished under this Contract is disassembled for the purpose of inspection, unless the work is performed outside of normal working hours with out notification to the COMPANY, CONTRACTOR shall stand all expense incident thereto if such Work is found to to be defective. The Contract Time shall be adjusted equitably, and COMPANY shall pay all costs incident thereto, in the event such Work is found to be in accordance with this Contract.

10.4 Discontinuance of Work. COMPANY shall have the right to order temporary discontinuance of the Work or any portion thereof when such Work is not being conducted in a safe manner or in accordance with this Contract until such time as corrections are put in place. All expenses incident to such temporary discontinuance shall be borne by CONTRACTOR.

10.5 COMPANY'S Right to Terminate Contract. If the Work to be done under the Contract shall be abandoned by CONTRACTOR, or if this Contract shall be assigned by CONTRACTOR without written consent of COMPANY, or if CONTRACTOR be placed in bankruptcy, or if a receiver be appointed for CONTRACTOR'S properties, or CONTRACTOR shall make an assignment for the benefit of creditors, or if at any time the Work is not being diligently prosecuted when COMPANY may give written notice of such default to CONTRACTOR. If such default is not corrected, or if good faith corrective action is not undertaken within five (5) days from the receipt of such notice, then COMPANY,

without prejudice to any other rights or remedies under this Contract, at law or in equity, shall have the right to terminate this Contract and complete the Work herein described by contract or otherwise, as it may determine, and CONTRACTOR agrees that COMPANY shall have the right to take possession of and use any of the materials, equipment, supplies provided by CONTRACTOR for the purpose of this Work. The expense (including any damages) of so completing the Work shall be charged to CONTRACTOR, and the expense so charged shall be deducted by COMPANY out of such monies as may be due, or may at any time thereafter become due, to CONTRACTOR. In case such expense is more than the sum which would otherwise have been payable under the Contract, then CONTRACTOR shall pay the amount of such excess to COMPANY upon notice from COMPANY of the excess so due.

10.6 Contractor's Right to Suspend or Terminate Contract. If COMPANY fails to make any payments in a timely manner as required hereunder, CONTRACTOR may notify COMPANY of it's intent to suspend Work pending such payments. If such default in payments (including interest thereon, if any) is not corrected within ten (10) days from the date of the receipt of such notice, CONTRACTOR may so suspend the Work pending the curing of such default in payment, and any resulting costs to CONTRACTOR

of such suspension of the Work, including demobilization, delay costs and remobilization, shall be the COMPANY's sole responsibility. No damages shall accrue under Section 3.5 hereof on account of such suspension, and there shall be an equitable adjustment of the Contract Price and Contract Time as a result thereof. Upon the curing of such default in payment, CONTRACTOR shall immediately thereupon recommence the Work; provided, however, that is such default in payment is not thereafter cured within thirty (30) days of such suspension of the Work, CONTRACTOR reserves the right, without prejudice to any other rights or remedies at law or in equity, to terminate the Contract for default.

10.7 Cancellation by COMPANY. COMPANY reserves the right to cancel the Contract, without cause, upon then (10) business days written notice to CONTRACTOR. In such case, COMPANY shall pay such proportion of the Contract Price as the work has been performed by CONTRACTOR as of the date of termination bears to the total Work

to be performed under this Contract from N.T.P., less all amounts previously paid to CONTRACTOR. In addition, COMPANY shall:

(i) pay CONTRACTOR a cancellation charge sufficient to cover all costs and expenses incurred by CONTRACTOR for the orderly and safe disengagement from and protection of the Work:

(ii) reimburse CONTRACTOR for all cancellation and disengaging charges for which CONTRACTOR may be liable to it's Subcontractors that COMPANY approved before termination.

10.8 No Waiver. The failure of COMPANY or CONTRACTOR to insist, in any one or more instances, upon strict performance of any of the terms of this Contract or to exercise any right herein conferred shall not be construed as a waiver or relinquishment to any extent of COMPANY's or contractor's right to assert or rely upon any such terms or rights in any other instance.

10.9 Notices. Notice under this Contract shall be deemed given when received by the notified party via certified mail, return receipt requested, addressed as follows:

As to COMPANY:

WESI Spokane Company, L.P.
W. 7106 Will D. Alton Lane
Building 1100, Suite 102
Spokane, Washington 99204
Attn: Mr. G. Darnell

As to CONTRACTOR:

Clark-Kenith, Incorporated
7500 Old Georgetown Road
Bethesda, MD 20814-6195
Attn: Mr. James R. Lamon

10.10 Entire Agreement. This Contract constitutes the entire agreement between the parties hereto relating to the subject matter hereof and supersedes any previous agreements or understandings.

10.11 Amendments and Waiver. This Contract may not be changed or amended orally, and no waiver hereunder may be oral, but any change or amendment hereto or any waiver hereunder must be in writing and signed by the party or parties against whom such change, amendment or waiver is sought to be enforced.

10.12 Governing Law. This Contract shall be governed by and construed in accordance with the laws of the State of Washington.

10.13 Guaranty. By joining in the execution of this Contract and as a material inducement to CONTRACTOR to execute this Contract, Wheelabrator Environmental Systems, Inc. hereby agrees to guarantee the payment by COMPANY of any amounts due and owing to CONTRACTOR hereunder in the form attached hereto as Exhibit I. Such Guaranty is for the benefit of CONTRACTOR only and may not be relied on by any third party.

10.14 Attorney's Fees. If any claim or action is commenced pursuant to this Contract, the prevailing party to such claim or action shall be entitled to reasonable attorney's fees and costs, whether such prevailing party's claim or action is the subject of a finding in arbitration or other proceeding.

10.15 Consequential Damages. In no case shall either party be liable to the other for loss of profit, loss of use or other consequential, indirect or punitive damages in connection with the performance of this Contract.

10.16 Severability. In the event that any of the provisions or portions, or applications thereof, of this Contract are held to be unenforceable or invalid by any court of competent jurisdictions, COMPANY and CONTRACTOR shall negotiate an equitable adjustment in the provisions of this Contract with a view toward effecting the purpose of this Contract, and the validity and enunciability of the remaining provisions or portions, or applications thereof, shall not be affected thereby.

10.17 Counterparts. This Contract may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute but one and the same instrument.

10.18 Conflicts. In the event of any conflict between the terms of this Contract, exclusive of Exhibits, and any Exhibits, this Contract shall govern. In the event of a conflict between Exhibit B and any other Exhibit, Exhibit B shall govern.

10.19 Limitation of Liability. No recourse for the payment of any amounts due by the COMPANY pursuant to this Contract or upon any representation, warranty, covenant, agreement or obligation contained in this Contract or contained in any

document, certificate or instrument that this Contract requires to be executed and delivered by the CONTRACTOR or the COMPANY in connection with the transactions contemplated therein, or for any claim based hereon or thereon shall be had by:

(a) the COMPANY against any incorporator, or against any past, present, or future stockholder, director or officer, as such, of the Contractor or of any affiliate of the Contractor; or

(b) the CONTRACTOR against any incorporator, or against any past, present, or future stockholder, director or officer, as such of the COMPANY or of any affiliate of the COMPANY (whether such recourse be sought by virtue of any constitutional provisions, statute, or rule of law, or by the enforcement of any assessment or penalty or limitation, any claim as a third party beneficiary of any contract or agreement between the Contractor or the COMPANY and such affiliates); provided, however, that nothing in this section shall prevent the recourse to, and the enforcement of the liability of, any stockholder or subscriber to the stock of the CONTRACTOR or the COMPANY not fully paid.

IN WITNESS WHEREOF, the parties have executed this Contract as of the date first above written.

WESI Spokane, L.P.

_____ By: _____

Witness Title

Wheelabrator Environmental Systems Inc.

_____ By: _____

Witness Title:

CLARK-KENITH, INCORPORATED

_____

Witness By:_____

W. Dennis Carroll

Executive Vice President

Spokane

Appendix B of Design + Construction Contract

INDEX

1.4 Receiving, Storage and Feed System

1.4.1 Design Criteria - Receiving and Storage

1.4.1.1 Density of Refuse
1.4.1.2 Refuse Receiving Pit
1.4.1.3 Refuse Storage Pit

1.4.2 Refuse Cranes
1.4.3 Refuse Feed Hopper and Chute
1.4.4 Refuse Feeder

1.5 Furnace and Grates

1.5.1 Refuse Stokers and Grates
1.5.2 Air System and Combustion
1.5.3 Auxiliary Burners
1.5.4 Furnace Requirements

1.6 Steam Generating Units

1.6.1 Refuse Fired Boilers
1.6.2 Superheater and Economizer Requirements
1.6.3 Additional Steam Generating Unit Preliminary Data
1.6.4 Boiler Feedwater Pumps
1.6.5 Deaerating Feedwater Heater and Storage Tank
1.6.6 Closed Feedwater Heaters

1.6.6.1 Additional minimum requirements of feedwater heaters follow:

1.6.7 Air Preheaters
1.6.8 Excess Steam
1.6.9 Tube Cleaning and Furnace Probes

1.7 Flue Gas Cleaning System

1.7.1 Air Pollution Control System
1.7.2 Concept of Operation
1.7.3 Spray Dryer Absorbers (SDAs)
1.7.4 Baghouses
1.7.5 Stack
1.7.6 Combustion Air and Flue Gas Ducts, Dampers and Expansion Joints

1.8 Ash Handling System

1.8.1 Design Criteria

1.8.1.1 Ash Deposition

1.8.2 Ash Removal System
1.8.3 Ash Handling System
1.8.4 Additional ash handling system requirements are as follows:

1.9 Turbine-Generator System

- 1.9.1 Turbine Lubricating Oil
- 1.9.2 Electrohydraulic Controls

1.10 Condensing System

- 1.10.1 Exhaust Steam Condensing System
- 1.10.2 Bypass Operation
- 1.10.3 Condensate Pumps

1.11 Auxiliary Cooling Water System

1.12 Water Treatment Systems

- 1.12.1 Potable Water
- 1.12.2 Boiler Feed Water Treatment
- 1.12.3 Boiler Water Chemical Feed Systems
- 1.12.4 Expanded Facility Sizing
- 1.12.5 Instrumentation and Controls

1.13 Wastewater Treatment System

- 1.13.1 Instrumentation

1.14 Miscellaneous Equipment

- 1.14.1 Scales
- 1.14.2 Miscellaneous Pumps
- 1.14.3 Air Compressors, Air Dryer and Accessories
- 1.14.4 Heat Exchangers
- 1.14.5 Tanks
- 1.14.6 Miscellaneous Cranes
- 1.14.7 Elevator (Future)
- 1.14.8 Miscellaneous Mechanical Specialties
- 1.14.9 Mobile Equipment

1.15 Electrical System

- 1.15.1 Electric Power Generation
- 1.15.2 Utility Coordination
- 1.15.3 Reactive Power
- 1.15.4 Plant Electric Power
- 1.15.5 Synchronizing
- 1.15.6 Transformers
- 1.15.7 Motor Control Centers
- 1.15.8 Electric Motors
- 1.15.9 Emergency and DC Power Systems
- 1.15.10 Lighting

1.16 Controls and Instrumentation

- 1.16.1 Central Control System
- 1.16.2 Instrumentation Housing

1.17 Heating, Ventilating and Air Conditioning (HVAC)

1.18 Piping

- 1.18.1 General
- 1.18.2 Plumbing
- 1.18.3 Valves

1.19 Fire Protection System

- 1.19.1 Design Criteria
- 1.19.2 Exterior Fire Protection
- 1.19.3 Interior Fire Protection
- 1.19.4 Fire Detection System
- 1.19.5 Materials
- 1.19.6 Equipment
- 1.19.7 Fire Walls

APPENDIX B

PLANS AND SPECIFICATIONS

The following descriptions on equipment designs are based on pre-engineering information. Final heads, flow rates, etc. could change after detail design is completed.

Exhibit 1 to this Appendix B is a list of acceptable manufacturers of major equipment items. Any substitutions from this list are subject to prior approval from the City.

SECTION 1 - SYSTEM DESCRIPTIONS

1.1 Site Layout and Development

1.1.1 Site Layout

The basic layout of the Facility shall be as shown in Drawing No. 01-32-001. The layout shall incorporate space requirements consistent with required building and equipment sizes, and shall incorporate proper engineering practices for safety, accessibility, maneuverability, maintenance and good housekeeping. The Facility shall include a recycling drop-off area as shown. The tipping area shall be arranged on the site such that the trucks enter the tipping area and are required to back while the driver looks over his left shoulder. Safe and suitably sized areas shall be provided for the queuing of incoming trucks and to prevent traffic backup from interfering with off-site traffic.

Traffic patterns and turning radii shall be designed to accommodate municipal collection vehicles, private packer trucks, and transfer tractor/trailer vehicles. Minimum outside turning radius for packer trucks and transfer vehicles shall be 55 feet. Inside radii shall be in accordance with AASHTO "Geometric Design of Highways and Streets." Inside turning radii shall conform to geometric standards of an SU design vehicle for packer trucks and a WB-50 design vehicle for transfer vehicles.

1.1.2 Geotechnical Investigation

A qualified geotechnical consultant shall be retained by the Company to obtain final geotechnical information sufficient to identify existing site conditions for the design of all structures of the Company's specific layout and load conditions and the extent of any archaeological finds which may be encountered in the performance of the Agreements. This effort in obtaining sufficient geotechnical information shall be consistent with generally accepted engineering investigative practices.

If, during the process of executing the Construction Agreement, archaeological finds or subsurface conditions are encountered that the Company had not foreseen because generally accepted practices of obtaining geotechnical information were not followed by the Company, then the Capital Construction Cost and Guaranteed Construction Period will not be adjusted and the Company shall absorb all costs and expenses of any change affecting the plans, specifications, and the construction of the Facility.

The geotechnical consultant shall be retained throughout the construction period to perform necessary evaluation and testing to assure compliance with design recommendations.

1.1.3 Survey

The Company shall provide all work and services necessary for or incidental to the performance and completion of survey work necessary for

the construction of site work, buildings, new utilities, and other new facilities, and establishment and maintenance of benchmarks, measurement to verify location of completed construction, and survey alignment to existing property boundaries. Existing benchmarks or property line monuments shall not be disturbed. A site coordinate system shall be established by the Company along with permanent benchmarks for project reference and future development. The surveyor shall be certified by the State of Washington.

1.1.4 Site Preparation

The Company shall perform work and services necessary for the completion of site clearing, grubbing, removal and disposing of brush, fences and debris. Materials shall be removed from site and disposed of at a location secured by the Company. No open burning will be allowed on the Facility Site.

1.1.5 Excavation, Filling, and Backfilling

The Company shall perform all operations in connection with excavation of materials including unsuitable materials as required, regardless of character of material, and obtain fill and backfill materials approved by Company's geotechnical consultant to produce final grade lines. On-site materials may be utilized for embankments and for structural backfill under buildings and roadways where material is approved by the soils engineer. Off-site materials shall be imported as required. Embankment material shall be compacted to a minimum density of

95 percent of maximum density as determined by ASTM D1557. In areas that are to receive pavement or building slabs, the top 12 inches shall be compacted to at least 98 percent of maximum density as determined by ASTM D1557.

Earthwork, including excavation, fill, backfilling, dewatering, subgrade preparation and stabilization, shoring, drainage, and frost protection shall comply with the geotechnical consultant's recommendations, applicable ASTM standards and provisions of local codes. The grading of embankments and ditches shall have a minimum of three horizontal to one vertical slope.

1.1.6 Utilities

All on-site above-ground and underground utilities required for service of natural gas, service water, potable water, sanitary sewers, electrical, telephone, storm drains, and any other type of utility required for Facility operation shall be furnished and installed by the Company. The utilities shall be sized for the expanded Facility (anticipated future construction of one additional 400 tpd unit). The Company shall coordinate with local utilities for temporary connection of utilities during construction. The City will provide permanent utility service to the Boundary Limits of the Facility Site. The Company shall provide all utility tie-ins to utilities required for Facility construction.

Sanitary sewers sized for the expanded Facility shall include all services on-site required to provide sanitary drainage and collection

and on-site drainage of all wastewaters. Sanitary sewer effluent shall be collected by a gravity sewer system from the truck scale building, administrative building, warehouse building, and the refuse building. The effluent shall be conveyed to the existing sanitary sewer system.

Installation of electrical utilities, service water, potable water, gas, storm and sanitary sewers, shall comply with applicable provisions of civil, mechanical and electrical requirements of these specifications and local, state, Federal and utility company's codes, standards, and specifications.

The City shall provide a potable water supply and electrical power service to a point on the site for the Company's use during construction. The City shall also provide connection and piping to natural gas supply. The Company shall be responsible for safe and adequate distribution of water, gas, and electricity over the construction site as required including fittings, piping, valves, cable, and transformers. Cost of utilities used during construction, start-up and testing shall be at the Company's expense.

1.1.7 Paving, Curb and Gutter, Sidewalk, and Surfacing

The Company shall furnish and install all pavements as required for construction of site roadways, parking areas, and unloading areas complete with curbing, sidewalks, steps, and other features. Roadways shall be provided for ingress and egress of refuse trucks, ash disposal trucks and plant employees. Primary roads shall be 24 feet wide

minimum, and one-way roads will be 15 feet wide minimum. Shoulder width shall be 4 feet minimum in both cases.

All roads and parking areas shall be constructed of a crushed aggregate base course and a bituminous concrete binder and surface course. Subbase, base course and surface course thickness shall be determined by anticipated traffic requirements, from test data from appropriate soil borings and from recommendations from the Soils Geotechnical Engineer, as well as state and local requirements. Pavements to be used by trucks shall be designed for axle loads of at least 20% above Washington legal axle load limits. Pavement sections shall be crowned or sloped to provide positive storm water or washdown drainage.

1.1.8 Storm Drainage

Storm drainage runnoff shall be collected by a system of open ditches where possible. Culverts shall be utilized under roadways or other obstructions. Where culverts are required, reinforced concrete or bituminous coated corrugated metal pipe shall be used. Yard and paved areas shall be graded and sloped to provide positive drainage. The storm water including that from building roofs, shall be routed to an on-site storage pond (existing quarry area) for disposition by evaporation and infiltration. The Company shall be responsible for proper drainage, soil erosion, and sedment control of site storm water discharged to the storage pond.

Work and services required for storm drainage systems shall be furnished in compliance with local, state, and federal codes. Local rainfall data along with stormwater management and drainage codes shall be used to design the site drainage. Design shall be based on the minimum standards of the local stormwater management agency and local codes, or on the basis of the runoff of a 10 year storm of 1-hour duration, whichever is more stringent. The effects of adjacent property which may drain onto the Facility site shall be included in the design.

The Company shall be responsible for proper drainage and soil erosion and sediment control during construction in areas affected by work activity. A soil erosion and sedimentation plan shall be submitted prior to construction for approval by the City. All sediment traps, stone filter perimeter swales, straw bales, perimeter dikes, interceptor dikes and other items required for soil erosion and sediment control shall be provided.

1.1.9 Finish Grading and Topsoil

All site grading shall be accomplished so as to ensure positive surface drainage at all times. During grading operations, temporary control measures shall be used as necessary to control erosion and/or sediments. Diversion structures, silt fences, sediment barriers and/or temporary grassing shall be installed, if required, as a means of control. Any off-site grading and seeding to minimize retaining walls and slopes will be permitted subject to City approval. Retaining walls shall be constructed of reinforced concrete.

All work and services necessary for or incidental to the topsoiling and finished grading of all areas within the limits of grading and for all areas outside the limits of grading disturbed in the course of work shall be furnished. Work shall consist of, but is not limited to correction, adjustment, and/or repair of the soil in areas to be seeded and sodded. All areas graded and all disturbed areas, with the exception of building sites and paved areas, shall receive a minimum of 4 inches of topsoil and be seeded or sodded to reduce erosion.

1.1.10 Security Fence

An eight (8) foot high galvanized chain link fence with 2 inch galvanized mesh, topped with barbed wire, shall be constructed to encompass the plant boundary area. An electrically operated slide type chain link gate with locks shall be provided at point of entry into the plant site. Chain link fences, with gates, shall also be provided for the electrical substation and the switchyard. A spare set of keys shall be provided to the City and fire department for all locks.

The Company shall provide work in accordance with provisions of American Society for Testing and Materials (ASTM), Procedures and Standard of Chain Link Manufacturers Institute, and Industrial Steel Specifications.

1.1.11 Signage

Identification signs, directional signs and traffic controls signs, signals, lane divider markings, and painted pavement marking within the

Boundary limits of the Facility Site for control of vehicles to and on the site shall be furnished and installed. A Facility identification sign shall be installed at the main entrance to the Facility. Type, design and location of the sign shall be approved by the City.

The site signage system shall direct all users of the Facility and visitors to the appropriate areas for their specific business at the site. The signage shall be designed to create a "campus" type sign system, tying the various graphic elements of the Facility into one visually contiguous group. All signage will be subject to the regulatory Agencies' and City's approval.

1.1.12 Landscaping

The appropriate landscape for the Facility shall be designed and furnished. Landscaping for the site shall include visual and acoustic buffers, trees, shrubs, and seeding or sod to provide a visually pleasing environment. All areas on the site which are non-paved and/or do not have buildings, shall be seeded or sodded and planted with trees and shrubs or covered by landscaping material. Ornamental shrubs and trees shall be planted around outdoor tank areas, main roads, and around buildings. Safety shall be a primary justification for vegetation placement to ensure clarity where visual access is required. Vegetation genus and species shall be carefully selected to adapt to the climatic conditions and the environment developed by activities on the site. Durability and adaptability to harsh conditions shall be the basis for selection criteria. All landscaping shall be approved by the City.

1.2 Process Description

The Facility shall be designed with a nominal capacity at maximum continuous rating (MCR) of 800 tons of municipal solid waste (MSW) per day. The Facility's annual minimum throughput capacity shall be 248,200 tons. Annual throughput is based upon allowances for scheduled and unscheduled Facility outages and the County's annual guaranteed quantities of acceptable waste.

Two weigh stations, each containing two weigh scales, shall be provided. The location of the weigh station shall allow for separation of traffic between the hand unloading and the self-unloading reception areas.

Self-unloading trucks will normally unload directly into the refuse storage pit. Hand unloading vehicles will discharge into the receiving pit. Refuse shall be pushed from the receiving pit to the storage pit by the Facility front-end loader. Provisions shall be made for removing refuse from the storage pit to transfer trailers.

Storage shall be provided for approximately four days of MSW throughput at the anticipated future 1,200 tons per day Facility capacity. This will be adequate to ensure continuous operation of the Facility and acceptance of refuse with minimal use of backup landfill during Facility outages.

Two refuse cranes will supply refuse to the charging hoppers. The refuse will be fed to the furnace by hydraulically driven ram feeders.

The furnace and boiler shall be designed for burning unprocessed refuse. The refuse shall be burned in two specially designed Signal Environmental Systems/Von Roll/Babcock & Wilcox furnaces with membrane waterwalls and pendant superheater platens.

Superheated steam will be produced and delivered to the turbine generators for electric power production and distribution to the utility's transmission network. Exhaust steam from the turbine generator will be condensed in an air-cooled condenser and the condensate returned to the boiler feedwater system.

Refuse receiving and storage areas shall be maintained under a negative pressure with the air from the receiving floor and pit serving as the source of combustion air for the furnace. In this way plant dust and odors are drawn into the furnaces and destroyed through exposure to temperatures exceeding 1800°F.

Flue gases from each boiler will be cooled, and acid gas and particulates will be removed by passing through the spray dryer/absorbers and baghouse and then discharged to the atmosphere through a 170 foot high chimney.

An ash handling system consisting of water-sealed ram type ash expellers and mechanical conveyors will be provided. Ash and inerts from the furnace, together with siftings from the grate system, will be quenched in the ash expellers, then discharged onto a vibrating conveyor. Fly

ash from spray dryers and the baghouse will be conveyed to the ash conditioners and then discharged onto the bottom ash conveyor system.

Moistened fly ash and bottom ash will be conveyed to the ash loadout and storage building. Ferrous metals will be recovered from the ash prior to transporting the remaining ash to the landfill. Necessary auxiliaries for water treatment and wastewater treatment will be provided with sufficient redundancy in design to allow normal plant operation despite any individual unit being temporarily out of service.

1.3 Facility Scope and Description

1.3.1 The Facility as a minimum shall include:

- Scale houses and scales, remote from building area
- Receiving area, refuse pit and overhead cranes
- Furnaces/boilers and auxiliary equipment
- Stack
- Air pollution control equipment; one (1) spray dryer/absorber and baghouse per furnace train
- Pollution control monitoring equipment
- Boiler feedwater treatment system
- Turbine generator
- Air-cooled condenser
- Residue handling
- Condensate system
- Wastewater treatment system
- Steam and condensate piping

- Auxiliary fuel gas system
- Monitoring, control, and security systems
- Other appurtenances, equipment and system components as required for an efficient operation
- Control room, offices, and equipment rooms
- Storage facilities, shops and maintenance areas
- Administration offices and public reception area

1.3.2 Facility Expansion

The Facility shall be designed for the future installation of a steam generating unit of equal capacity to those being installed. The Facility expansion is anticipated to include the steam generating unit, a turbine generator, and accessory equipment and systems.

The following systems shall be sized and designed for the expanded Facility:

a. All utilities.
b. Residue and fly ash removal and storage system.
c. The refuse receiving, storage, and feed system.
d. The stack shall include an additional flue.
e. Space shall be reserved on-site for future air-cooled condenser.
f. The fire protection system.
g. The HVAC systems.
h. The plumbing.

i. The water treatment systems shall be sized for the expanded Facility with the exception of the demineralizers which shall each be sized for a minimum make-up rate of 15% of the total initial Facility feedwater flow.

j. The auxilliary cooling water system.

k. The plant air system, and instrument air system.

l. Piping for all systems which will serve the future unit shall be sized for the expanded Facility and shall include capped stub-outs for connection of the future unit and accessories. The piping layout shall include space for future piping.

m. Space shall be provided for installation of condensate return pumps, condensate polishing, and condensate storage for return of 20,000 lb/hr of condensate in the event of future steam sales.

n. Other systems shall be sized as indicated.

1.3.3 Main Process Building

A main process building will house the refuse receiving, storage and handling area, refuse boilers, turbine generator, boiler feedwater system, air pollution control system, ash handling systems, warehouse, personnel, maintenance, and control systems.

The main plant building is divided into six areas: the refuse receiving area, boiler area, air pollution control area, ash handling area, water treatment area, and the turbine generator area. These areas are totally enclosed with metal siding and metal roofing, except where noted

otherwise. The building will generally be uninsulated, although insulation will be used where building space is heated and cooled.

Access stairs, ladders, and platforms shall be provided to all equipment requiring service and to test locations. All stairs, ladders and platforms shall be in accordance with the applicable OSHA regulations.

1.3.3.1 Refuse, Receiving and Handling Area. The refuse receiving and handling area consists of two refuse receiving areas (one for hand unloading and one for self-unloading), a receiving pit for hand unloading vehicles and the main storage pit which also serves as the receiving pit for the self-unloading vehicles. Skylights will be provided to allow daylighting of the receiving areas. The self-unloading, receiving and maneuvering floor area is approximately 142 feet by 240 feet by 45 feet high. The hand unloading receiving floor area is approximately 50 feet by 240 feet by 45 feet high. The receiving pit area is approximately 40 feet by 240 feet by 45 feet high. These areas will be completely enclosed with precast concrete panels and uninsulated standing seam roof.

The refuse storage pit shall be designed for a minimum of four days' storage at 1200 TPD. For calculation purposes, the storage capacity shall include, as a maximum, 100% of the volume of the pit below the tipping floor and 50% of the volume above the tipping floor to the level of the charging hoppers. The length of the storage pit used for calculation shall be reduced by the width of the receiving pit (i.e., no storage will be assumed between the receiving pit and the back wall of the storage pit). The maximum density of refuse below the tipping floor

level shall be assumed to be 600 lb/yd^3 and the maximum density above the tipping floor level shall be assumed to be 500 lb/yd^3. The refuse storage pit dimensions shall not be less than the following:

a.	minimum depth from the tipping floor elevation to the elevation of the bottom of the pit	40'-0"
b.	minimum width from the inside of the front wall to the inside of the back wall	50'-0"
c.	minimum effective length from inside of side wall to inside of opposite side wall not including the width of the receiving pit	142'-0"

The receiving pit dimensions shall not be less than the following:

a.	minimum depth from tipping floor elevation	
	at storage pit	16'9"
	at emergency loadout entrance	6'9"
b.	minimum width	40'
c.	minimum length	240'

The refuse storage pit building is approximately 78 feet by 244 feet by 120 feet high and will house the reinforced concrete storage pit and crane lay-down areas. The control room, water treatment facilities, laboratory, offices, toilets, MCC room, electrical equipment, HVAC equipment, and storage rooms will be located below the charging floor on the south side. The maintenance shop, warehouse, men and women's lockers, lunch room, E&I shop, MCC room, electrical equipment, HVAC equipment and storage room will be located below the charging floor on the north side.

Enclosed stairways will be located in the refuse receiving and handling area on the north and south side of the pit.

The refuse pit building will be enclosed with the uninsulated metal wall panels and will have an uninsulated standing seam metal roof.

1.3.3.2 Boiler Area. The boiler area will house the two refuse-fired boilers, complete with associated equipment. The boiler building is approximately 97' x 67' x 150'. Generally, the building exterior walls will be uninsulated metal siding, and the roof will be insulated standing seam type.

Interior walls and partitions will be masonry construction or drywall with view windows where required. These spaces will be insulated where heating and air conditioning are required.

Enclosed stairways will be located in the boiler building in the north and south sides.

1.3.3.3 Ash Handling Building. The ash handling area will house the conveyors, truck loadout station and truck lanes for ash removal. The building is approximately 80 feet by 90 feet by 55 feet high with uninsulated metal siding and will have an uninsulated standing seam roof.

The ash storage area shall be designed to provide three days' storage at guaranteed load of the expanded Facility capacity. The ash quantity shall be calculated on the basis of guaranteed load and the maximum

percentage of ash in the refuse. The density of the ash shall be assumed to be 50 lb/ft^3 for volumetric sizing and 100 lb/ft^3 for structural design. The ash storage area of the loadout building shall have walls constructed of reinforced concrete up to a minimum of six (6) feet above grade. The loadout building shall be equipped with roll-up doors to allow vehicle drive through.

1.3.3.4 Water Treatment Area. The water treatment equipment, except the chlorination equipment, will be located in the main building in the area below the charging floor in the pit building. Water distribution and treatment equipment, located outside of the main building, include the fire pumps and chlorination equipment. The fire pump house, valve house, and chlorine storage building will be constructed of load-bearing masonry with open web joists and insulated standing seam metal roof.

1.3.3.5 Turbine Generator Area. The turbine generator area will be adjacent to the boiler area. The building is approximately 60 feet by 55 feet by 65 feet high and will house the turbine generator switchgear, battery and UPS rooms and auxiliaries. The building will be enclosed with uninsulated metal siding and insulated standing seam roofing.

1.3.3.6 Air Pollution Control Area. The air pollution control equipment will be enclosed by a building. The building will house the spray dryer absorbers, baghouses, and I.D. fans. The building will have uninsulated metal wall panels and uninsulated standing seam roofing.

1.3.3.7 Materials of Construction:

• Foundation	Reinforced concrete.
• Floors on grade	Reinforced concrete with non-slip finish. Receiving pit floor and receiving floor areas subject to waste storage shall be topped with a heavy duty metallic aggregate topping.
• Floors (elevated)	Steel grating or reinforced concrete. Concrete required at turbine-generator operating floor and where necessary for equipment support.
• Platforms	Steel grating or checkered plate.
• Refuse pit	Reinforced concrete.
• Exterior walls	Precast concrete panels or uninsulated painted metal siding on steel support system.
• Interior walls and partitions	Concrete block, drywall partitions and fire rated partitions, batt insulation where heating and air-conditioning are required.
• Framing, boiler area	Structural steel.
• Reception building framing	Structural steel.

• Roof	Uninsulated painted metal roofing on structural steel frame.
• Stair towers	Masonry construction; steel stairs and fire door.

1.3.4 Administration Building

The Administration Building shall house all administrative and accounting offices, conference rooms, clerical areas and restrooms. The area shall include a visitor briefing and conference room, offices, storage areas, reception area and other spaces required for operations as determined by the Company. In addition to Company determined requirements, four offices shall be provided for City use. Restrooms shall be provided for visitors and office personnel which are separate from locker rooms. The area shall be heated and air-conditioned. The building will be approximately 75 feet by 45 feet by 15 feet high. The Administration Building will be a steel structure with metal siding and roofing. Walls and roof will be insulated with batt insulation. Interior partitions will be drywall on metal studs. The ceiling will be acoustical lay-in tiles. Flooring will be carpet, resilient tile and ceramic tile.

1.3.5 Scale Houses

The scale houses will each be a building approximately 22 feet by 10 feet by 12 feet high, and will consist of a scale operator room, operators toilet and driver's toilet. The buildings will be constructed

of light gage metal framing enclosed with metal siding and standing seam roof. Batt insulation will be provided in the walls and roof. The scale houses shall be heated and air-conditioned.

Materials of construction shall be as follows:

• Foundation and Floor slab	Reinforced concrete.
• Framing	Lightgage metal framing.
• Exterior walls	Painted uninsulted metal siding with batt insulation.
Roofing	Painted uninsulated standing seam with batt insulation.
• Interior walls	Gypsum board on metal studs.
• Flooring	Resilient tile and ceramic tile.
• Ceiling	2 feet by 4 feet modular lay-in acoustical tile.

1.3.6 Miscellaneous Structures

Other structures will be the fire pump house, valve house, scale houses and ash storage and reclamation building.

Materials of construction shall be as follows:

• Foundation and floor slab	Reinforced concrete spread footings.
• Exterior walls	Concrete block with loose fill insulation.

- Roof framing — Open web joists.
- Roofing — Insulated metal roofing.

1.3.7 Material Requirements

Structural steel design, fabrication and erection shall conform to AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings." Minimum thickness of structural steel member sections shall be 3/16 inch. Grating work shall conform to the National Association of Architectural Metals Manufacturers' requirements and shall include banded cutouts and clearance openings for all penetrations consisting of columns, pipes, ducts, conduits, and all other installations passing through the grating work. Grating sections shall be banded on ends. All grating shall be galvanized bar grating. Provide serrated grating for exterior platforms, stairs, and sloping walkways.

Reinforced concrete design and construction shall conform to ACI "Building Code Requirements for Reinforced Concrete" (ACI 318). All work and services necessary for concrete testing shall be provided by an approved independent testing agency retained by the Company. Testing shall include review and approval of proposed materials for mix design, mix-design, securing production samples of materials at plants for compliance with ACI and ASTM standards, conduct compressive strength tests, slump tests, air content, unit weight, and the Company shall submit to testing laboratory copies of mill test reports for all shipments of cement and reinforcing steel.

Metals shall have a protective coating that minimizes maintenance. All structural steel shall receive prime and finish paint coats. Metal panel siding shall be finished with premium baked on synthetic coatings.

All structures shall be constructed with roofs which meet U.L. Class A requirements.

Exterior doors, with the exception of special entrances, shall be painted, galvanized steel, insulated hollow metal in grouted hollow metal frames. Interior doors shall be hollow metal in hollow metal frames. Overhead doors shall be painted galvanized steel. Where safety concerns are evident, glazed daylights shall be provided.

Exterior window units shall be provided with minimum double thickness insulated glass in aluminum frames. Safety glazing shall be provided where required by NFPA and OSHA. All glass shall be capable of withstanding wind loads, solar loads, mechanical stresses and interior heat. Heat strengthened glass is required where compliance with safety code is not required.

Tempered or laminated glass shall be used to comply with codes. Certificates shall be provided during construction attesting that materials meet all tests and specified requirements.

Waterproofing and other protective coatings shall be provided to protect building materials and equipment from ash, dust, water infiltration, and deterioration caused by reactive agents.

1.3.8 Stairs

All areas shall, as a minimum, be accessible vertically by stairs. Stairs shall meet applicable codes. Stairs shall be enclosed where required by code. Stairs shall have solid treads in areas where office personnel and visitors will be present. Open grating treads and platforms may be used in equipment access areas. Applicable handicapped access requirements as determined by the building officials shall be incorporated into the design of the structures and site.

1.3.9 Exterior Lighting

The exterior of the buildings shall be provided with lights for night operations. At a minimum, each door, both overhead doors and personnel passage doors shall have artificial light for safety. Accent lighting on structures and/or landscaping should be considered in the development of the aesthetic nature of the Facility. All parking areas shall have artificial lighting to provide a minimum of 1.0 footcandles, and shall meet or exceed the recommendations of IES.

Site roadway lighting fixture type and light source shall be coordinated with lighting present and proposed for the area. Spacing and amount of light shall follow the local street lighting guidelines, and the Master Plan reports for the Spokane Airport Business Park.

1.3.10 Basis for Design

Company's design for the Facility shall be documented showing minimum design loads and shall conform to all applicable state and local building codes and Company's insurance carrier requirements.

Equipment loads shall be per equipment manufacturer's recommendations and shall be incorporated in the basic design. Structural design of equipment foundations and support shall limit deflections and vibrations to within manufacturer's specified tolerances and local, state and federal code requirements.

Although all applicable Codes and Standards may not be specifically shown or specified herein, the Company shall be responsible for determining applicable codes, acquiring copies at his sole expense, and complying with the applicable requirements of Codes and Standards.

The latest edition of Code or Standard in effect on the date of the Proposal shall apply. Adoption of any subsequent issues or case rulings will be in accordance with provisions of the Construction Agreement.

Company or his boiler subcontractor shall possess the requisite ASME Boiler Code symbol stamp and have a valid certificate of authorization form ASME.

Where the requirements of this specification differ from the requirements of the Codes and Standards or their proposed revisions referenced

herein, then the more stringent requirements shall apply as determined by the City.

1.4 Receiving, Storage and Feed System

1.4.1 Design Criteria - Receiving and Storage

The following criteria shall be used in the design of the refuse receiving and storage areas.

1.4.1.1 Density of Refuse:

Type of Refuse	Density (lb/cu. yd)
• Packer refuse (at discharge)	350
• Packer refuse (in truck)	580
• Oversize bulk materials	300
• Refuse in storage, below tipping floor	600
• Refuse in storage, above tipping floor	500

1.4.1.2 Refuse Receiving Pit

	Minimum Dimensions
• Width of pit (feet)	40
• Length of pit (feet)	240
• Height from tipping floor to pit bottom (feet)	Sloped from 6'9" @ west end to 16'-9" @ Storage Pit

1.4.1.3 Refuse Storage Pit — Minimum Dimensions

• Width of pit at bottom (feet)	50
• Length of pit storage area (feet)	142
• Height from tipping floor to pit bottom (feet)	40
• Height from charging floor to pit bottom (feet)	93
• Refuse storage reserve capacity	4,900/tons

1.4.2 Refuse Cranes

Refuse shall be reclaimed from the pit storage by two traveling, overhead, 9-ton capacity bridge cranes. Each crane shall be furnished with a 6 cubic yard capacity, orange peel type grapple.

Each crane shall be capable of continuous operation in the handling of solid waste consisting of light industrial, commercial, and household rubbish, ranging in weight from 300 to 700 lbs. per cubic yard. Each crane shall also be capable of re-handling (mixing and recasting) incoming material. The cranes shall be used to feed refuse to each steam generator and for refuse management in storing and receiving refuse. Each crane shall be designed for continuous feed operation to each steam generator for a total feed rating capacity of each crane equal to 1200 TPD. Each crane shall be designed to meet CMAA Specification No. 70 for Class F service and ANSI/ASME B30.2. The crane shall

perform these operations with a temperature rise not to exceed the specified rating of any motor. Minimum hoist lift shall be 98 feet.

Each crane shall be capable of operating with full load not exceeding the following speeds:

Hoisting	250 FPM maximum
Trolley	175 FPM maximum
Bridge	250 FPM maximum

The cranes shall be designed for indoor use under the following conditions:

Temperature

Minimum	-20 F
Maximum	120 F
Relative humidity	up to 100%

Heavy dust loading

Some of the features which will be incorporated into cranes are: hoist motors with separately powered constant speed cooling fans; Class H motor insulation for high temperature operation; motor over-temperature warning system; and arm chair mounted operator joysticks. The cranes will utilize AC motors with static stepless controls. The hoists will utilize eddy current brakes which give proportional speed control. Mechanical brakes will be utilized as holding brakes. All motors shall be totally enclosed fan cooled (TEFC), rated for crane service, designed

for ambient temperature of 120F, and provided with NEMA Class F insulation.

An anti-collision system shall be provided which utilizestelemetric devices to sense crane spacing, and automatically slows the cranes when they enter into a proximity zone. Both cranes shall utilize this system, preventing collisions.

Motions of the refuse cranes shall be individually governed by signals from a centrally located, remote operator's station. Two crane operators will be located in the stationary, heated, air-conditioned, glass paneled station on the charging floor side of the pit. The compartment shall be centrally located with respect to feed hoppers and will provide line-of-sight contact with boiler hoppers and all sections of the storage pit. From this vantage point, crane operators shall be able to observe the discharge of refuse from the refuse trucks on the tipping floor. Television monitoring of each refuse hopper shall be provided in the crane control room. The crane control room shall contain a two-way communication system for direct contact with the main control room, reception area, and other locations where required.

The overhead crane runway shall extend the full length of the refuse storage building to allow complete access by both cranes.

1.4.3 Refuse Feed Hopper and Chute

Each boiler shall be equipped with a refuse feed hopper and feed chute. Refuse will be transferred from the refuse storage pit by a traveling overhead crane and deposited in the furnace charging hopper. Each hopper shall be maintained at a pre-established minimum level to seal the feed chute to maintain furnace draft and minimize flash back and burn back.

The refuse feed hopper shall be steel, heavily reinforced unit incorporating a cut-off gate for boiler shut-down. It shall be designed to prevent refuse from bridging.

The refuse chute, located below the refuse feed hopper, shall be a water cooled, double walled design of carbon steel construction. The inside dimensions of the feed chute will allow objects as large as 3 feet wide x 3 feet long x 6 feet high to pass without jamming.

The chute dimensions shall be approximately 4'-6' x 13'-4". The refuse feed chute shall be of welded steel plate and provided with replaceable wear-resistant liners. The height of the chute shall be adequate to provide an air seal.

1.4.4 Refuse Feeder

Each furnace shall be equipped with a hydraulically-driven Von Roll ram feeder with a capacity of 19.2 tons per hour maximum. The feeder will

be driven by a reciprocating mechanism powered by three hydraulic cylinders. The forward stroke will push the refuse onto the drying zone of the grate system. The speed of the forward stroke will be continuously regulated by the control system, based on steam demand. The speed of the return stroke will be constant. The feeders shall be capable of transporting any item which passes through the chute.

1.5 Furnace and Grates

1.5.1 Refuse Stokers and Grates

Each furnace will have a hydraulically-driven Von Roll R-Grate system of the latest design. The stokers and grates shall be suitable for burning Acceptable Waste having a higher heating value between 3,800 and 5,500 Btu/lb. The R-Grate is a transverse reciprocating type, inclined at an angle of 18 degrees from the horizontal, with alternating stationary and reciprocating transverse grate rows.

The grate will consist of two parallel sections. Each parallel row will be built up of five connected grate block modules, each driven by two hydraulic cylinders, for a total of ten modules per grate system. Primary air flow and grate speed will be automatically controlled by steam demand.

The stoker and grates shall have a structural steel frame designed to assure permanent alignment of the grate surface. Structural supports shall be so located and protected such that they will not be overheated or damaged by either the furnace or ash chutes.

Each stoker unit shall be provided with necessary observation doors or ports of the self-closing, Pyrex-covered type. All access doors shall be equipped with quick-tightening clamp bolts.

Undergrate air seals shall be provided at both front and rear ends in close contact with the undersides of the grates. Side seals between the edge of stoker grates and boiler shall be the manufacturer's proven standard for this type unit.

The stokers and grates shall be designed in such a way as to provide an effective lifting and turning of the refuse. All stokers and grates throughout the grate area shall be designed for even distribution of the incoming waste and the stokers must provide for positive air distribution under the waste load regardless of waste composition. The stokers and grates shall be arranged for ash discharge opposite the fuel feed end.

The hollow grate block castings will be of special Von Roll chrome-steel material with cooling ribs which direct the flow of primary air through the casting for cooling, resulting in reduced wear and longer life for the grate blocks. The grate block design

will be a high-pressure drop type to ensure uniform air distribution throughout the fuel bed.

One 3' x4' access door on the furnace rear wall at grate level will provide access to the furnace.

The grate system includes a drying zone, a combustion zone and a burnout zone. Refuse will be fed onto the drying zone by ~~the~~ hydraulic ram feeder. The refuse will begin to dry and combustion will be initiated at this point. The major portion of the combustion process will take place in the combustion zone, and final burnout of the remaining material will be accomplished in the burnout zone. After final burnout, ash and inerts will be discharged into a bifurcated residue chute.

1.5.2 Air System and Combustion

Each steam generating unit shall be provided with a minimum of one (1) underfire air (FD) fan, one (1) secondary air (SA) fan and one (1) induced draft (ID) fan. The fans shall be furnished complete with all necessary accessory equipment.

Primary combustion air for each unit will be supplied by a forced draft fan through ducts to the ten modules which comprise the five primary air zones on the underside of the grate system. The primary combustion air supply to each zone will be automatically controlled to obtain the desired air distribution to ensure good

combustion and stable steam flow. Overfire air for each furnace will be supplied by a separate secondary air fan. This air will be introduced above the grates through a series of nozzles in the front and rear walls. The secondary air will promote turbulence and complete the combustion of the volatiles distilled from the drying and burning refuse.

Both the primary and secondary air supply will come from the refuse pit area, thereby maintaining that area under a negative pressure to prevent odors from escaping.

The fans shall be designed for combustion air flow requirements and ambient air conditions required and flue gas flow resulting from the combustion of solid waste as required. The total combustion airflow shall be based on the maximum total theoretical air required based on the reference fuel composition provided in the RFP and operating at 100% excess air. The SA fan shall have a design capacity equal to 40% of the total airflow and the FD fan shall have a design capacity equal to 70% of the total airflow. In addition, the design static pressure of the SA fan shall be sufficient to provide penetration into the furnace to achieve the turbulence and mixing required for this type of service. ID fan gas flow shall include excess air, water, steam, leakage allowance, and calculated flue gas flow. Overhung fan rotor design will not be acceptable. The following margins shall be used to determine the fan test block conditions above maximum continuous rating.

a.	Capacity Margin	Net +15%
b.	Static Pressure Margin	Net +32%
c.	Temperature Margin at Fan Inlet for FD and SA Fans	Net +15 F
d.	Temperature Margin at Fan Inlet for ID Fan	Net +50 F

Fan and Motor data shall conform to the following:

	Requirement	FD Fan	SA Fan	ID Fan
a.	Type of blades	CBI	CBI	Air Foil
b.	Net Operation Requirements:			
	Capacity, lb/hr, cfm	29,078	19,385	90,526
	Gas/Air temperature, F	80	80	230
	Static pressure, in H_2O	8.4	14.82	8.0
	Efficiency, %	57.1	49.3	41.5
	Power to fan coupling, hp	68	92	293
c.	Test Block Requirements:			
	Capacity, lb/hr, (cfm)	44500	31790	121,426
	Gas/Air temperature, F	95	95	280
	Static Pressure, in H_2O	19.08	33.66	14.40
	Efficiency, %	85.8	85.3	78.5
	Power to fan coupling, hp	157	198	368
d.	Motor Data:			
	Motor size, hp	200	200	400
	Enclosure Type	TEFC	TEFC	TEFC
	Service Factor	1.0	1.0	1.0
	Volts/phase/Hz	480/3/60	480/3/60	480/3/60
e.	Bearing Arrangement	Outboard	Outboard	Outboard
f.	Operating speed, rpm (max)	1800	1800	900

The hot products of combustion from the burning refuse will pass in sequence through the refractory-covered water-cooled membrane-wall furnace, the two stage parallel-flow/counter-flow superheater, the steam generating section, the economizer section, and then exit the unit.

1.5.3 Auxiliary Burners

Each boiler will be furnished with two natural-gas-fired auxiliary burners. These burners will be designed to achieve and maintain a minimum furnace gas temperature of 1,800^{0}F for at least a 1-second retention time during start-up and shutdown.

The auxiliary burners shall also be designed to preheat the furnace to 1800 $\pm$ 200F before lighting off waste and to maintain a temperature of 1800 $\pm$ 200F until the grate surface is empty upon shutdown.

Permanently installed thermocouples, located in the gas stream downstream of the superheater, will continuously monitor the furnace gas temperature during normal plant operation. These thermocouples are located outside of the slagging region of the furnace where the temperature readings are expected to be accurate and reliable.

During start-up testing, a correlation will be developed to establish a one-to-one correspondence between the permanent thermocouple

readings and the furnace temperature profile. It is expected that steam flow will also exhibit this one-to-one correspondence. This correlation will establish the minimum permanent thermocouple reading (or steam flow) at which the permit criteria are met.

During normal plant operation the thermocouples will be continuously monitored and a rolling average of the temperature will be calculated and compared to the minimum allowable temperature as determined by the correlation. When the rolling average falls below the minimum allowable, an alarm will be sounded in the control room to notify the operator to start the auxiliary burner or take other appropriate action to re-establish minimum temperatures.

1.5.4 Furnace Requirements

The furnace shall be gas-tight with an all welded tube, waterwall construction. Wall tubes shall be bent to accommodate access doors, observation doors, and sootblower and temperature probe ports. Buckstays shall be used to support and guide the walls. Access doors in the furnace enclosure shall be provided and arranged to facilitate inspection and maintenance.

Provision for control of furnace side-wall clinkers shall be included.

The furnace wall tubes will be studded and covered with 80 percent silicon carbide refractory to an elevation of approximately 30 ft.above grate midpoint. Stud density will be approximately 160 studs per square foot of flat projected wall area.

Additional furnace requirements are as follows:

• Furnace Volume, ft^3 (As defined in the RFP).	21,380
• Design gross furnace heat release per furnace volume $Btuh/ft^3$	8,575
• Plan area of grate as defined in the RFP.	512.1
• Gross heat release per plan area of grate, $Btuh/ft^2$	358,000

1.6 Steam Generating Units

1.6.1 Refuse Fired Boilers

Two Babcock & Wilcox mass-fired refuse burning steam generators nominally rated at 400 tons per day throughput will be provided. The boilers generate steam at 900 psig and 830°F at the superheater outlet header with boiler feedwater at 300°F. Drawing No. 03-49-004 shows a flow diagram of the main, extraction and auxiliary steam system. The two-stage superheater will be designed with an interstage of attemperation for superheat temperature control, where a controlled amount of boiler feedwater will be sprayed into the superheated steam to maintain the final steam temperature at the design point.

The steam drum shall be fusion welded to ASME Boiler Code specifications and all welds completely radiographed. The steam drums shall be approximately 60 in. ID.

The final steam drum shall be provided with a system of internal piping for feedwater, chemical feed, continuous blowdown, drum internals, separators, and scrubbers to effect positive separation of steam and water. Nozzles shall be fusion-welded radially to the drum with ends projecting beyond the drum insulation and casing.

1.6.2 Superheater and Economizer Requirements

The pressure parts of the superheater and economizer shall be designed in accordance with the ASME Boiler Code.

The superheater shall be arranged to promote a constant superheater temperature characteristic over the control range and to minimize the amount of desuperheating required. Superheater surface shall not be located in the radiant section of the boiler.

Tubes shall be spaced and arranged to minimize erosion, slagging, and fouling and to promote effective cleaning of tube surfaces with a rapper system.

Necessary equipment for maintaining superheater temperature over the control range shall be furnished as required for this type of service.

A continuous bare loop, horizontal tube economizer shall be provided. The economizer shall be arranged for counter flow of feedwater and flue gas.

The economizer support shall allow free expansion of the tubes and headers.

Boiler tubes shall have as a minimum the following wall thickness:

	Location	Tubes
a.	Secondary Superheater	0.040 inches above ASME Code Requirements
b.	Primary Superheater	0.040 inches above ASME Code Requirements
c.	Boiler	0.100 inches above ASME Code Requirements
d.	Economizer	0.100 inches above ASME Code Requirements
e.	Water Walls	0.100 inches above ASME Code Requirements

The maximum skin temperature to which the tube materials will be subjected shall not exceed the oxidation limits specified below. The limits for the more common materials are tabulated below, but the Company may select ASME Boiler Code materials equivalent to those tabulated in order to optimize his design.

Material	Section I Specification	Max Tube Wall Temp
ERW	SA-178 Gr C + A	825 F
Ferritic Alloys	SA-213 Grs T 11, T 22	1025 F

Above temperatures are based on average high velocity thermocouple (HVT) measurements.

All tubes shall be circular, free of blisters, scale and mechanical defects. Tubes shall conform to the requirements of the ASME Boiler Code, Section II. Selection of the tube wall thickness shall be based on maximum manufacturing tolerance taking into account all required temperature excursions. Tube connections at headers shall be so arranged as to permit full strength welding of all joints.

1.6.3 Additional steam generating unit preliminary data

		Guaranteed Load	Maximum Continuous Rating
1.6.3.1	Steam and Water Flows, lb/hr		
	Superheater outlet steam flow	94,400	111,300
	Boiler blowdown water flow	470	556
	Economizer inlet feedwater flow	91,100	105,200
1.6.3.2	Steam and Water Pressures, psig		
	Superheat outlet steam pressure	900	900
	Steam drum pressure	960	982
	Economizer inlet pressure	994	1,027
	Pressure drop from steam drum to superheater outlet	60	82
1.6.3.3	Steam and Water Temperatures, F		
	Superheater outlet temperature	830	830
	Economizer inlet feedwater temperature	300	300
1.6.3.4	Steam Purity		
	Average solids content in steam leaving boiler, ppm	1.0	1.0
1.6.3.5	Flue Gas Flows, lb/h		
	Leaving economizer	248,300	298,820
1.6.3.6	Average Flue Gas Temperatures, F		
	Superheater (inlet)	1,298	1,392
	Economizer exit	412	430
	Dry scrubber exit	260	260
	Precipitator/baghouse outlet	250	250
	Stack exit	240	240

1.6.3.7	Average Flue Gas Velocities, ft/sec		
	Through furnace pass	13	16
	Through superheater section	10	12
	Through Boiler section	25	30
	Through economizer	26	30
	Through precipitator/baghouse	3.22	4.00
	Stack exit	63.5	80.8
1.6.3.8	Air Flows, lb/h		
	Secondary air to furnace	87,480	107,440
	Primary air to furnace	131,240	161,160
	Excess air for fan sizing, %	100	100
1.6.3.9	Air Pressures, in. H_2O		
	FD fan outlet	7.6	13.0
	Pressure drop through grate without refuse load	4.5	7.0
	Secondary fan outlet	13.9	24.0
1.6.3.10	Air Temperature, F		
	Design ambient, min.	-20	-20
	Air temperature to forced draft fan and secondary air fan, F (for boiler performance evaluation)	80	80
	Design humidity, % RH	60	60
	Primary air heater inlet, F	80	80
	Primary air heater outlet, F	80	80
1.6.3.11	Heat Balance, %		
	Excess air leaving economizer (for boiler performance evaluation)	100	100
	Dry gas loss	11.5	12.6
	Loss due to H_2 and H_2O in fuel	14.4	13.9
	Loss due to H_2O in air	0.3	0.3
	Loss due to unburned combustibles	3.0	2.0
	Radiation loss	0.5	0.5
	Unaccounted for and manufacturer's margin	1.5	1.5
	Total losses	31.2	30.8
	Efficiency	68.8	69.2
1.6.3.12	Boiler Data		
	Inside diameter of Steam drum, in.	60	
	Boiler section heat transfer surface area, ft^2	30,500	
	Boiler tube diam/wall thickness, in.	2.5/0.203	
	Boiler tube clear side spacing, in.	3.5	
	Waterwall tube diam/wall thickness, in.	2.5/0.203	
	Total Furnace water surface (inside furnace volume as defined in		

	RFP) including screen sections in furnace passes	5,703
	Steam drum design pressure, (psig)	1,050
1.6.3.13	Superheater Data	
	Design pressure, psig	1,050
	Total superheater surface, ft^2	12,200
	Superheater tube diam/wall thickness, in.	2.5/0.203
	Superheater tube clear side spacing, in.	3.5
	Superheater pressure drop at VWO and over pressure flow, psi	82
	Superheater arranged for parallel flow (yes/no)	No
1.6.3.14	Economizer Data	
	Type of economizer	Continuous Bare Tube
	Design pressure, psig	1,100
	Effective heating surface, ft^2	15,898
	Tube diam/wall thickness, in.	2.0/0.18
	Economizer tube clear side spacing, in.	2.0
1.6.3.15	Main steam line pressure drop at VWO and over pressure flow, psi (excluding boiler stop check valve)	50
1.6.3.16	Boiler stop check valve pressure drop at VWO and over pressure flow, psi	10

1.6.4 Boiler feedwater pumps

The boiler feedwater system design will include two 50 percent initial facility capacity electric driven and one 100 percent initial facility capacity turbine-driven boiler feedwater pumps. Drawing No. 03-49-005 shows a flow diagram of the feedwater and condensate systems. The boiler feedwater discharge header shall be sized for the expanded Facility and shall include a capped stub-out for connection of the future unit.

A minimum additional 10% head (above guarantee point) shall be achievable by replacing impellers with maximum diameter impellers as the sole modification.

Pumps shall be designed as a minimum for the following conditions downstream of the deaerator:

a. Design flow: turbine VWO and 5% OP conditions plus 10% flow margin.

b. Design head: 5% OP plus 10% margin.

c. Pumps (if required) shall be capable of providing attemperator water for steam temperature control.

The turbine drive shall be furnished and designed for primary operation at constant load. Several hand valves to change the arc of admission and thereby enable operation with a minimum pressure drop across throttle valve shall be provided.

The turbine shall be capable of at least a 15% increase in power above that required by pump at design conditions by increasing steam flow at expansion nozzle hand valves only.

Turbine driven pump will be required to start up automatically with constant speed governor control. Therefore, governor, trip, and throttle valves shall be provided with all control devices required to enable automatic start-up without manual action of any type when in auto start mode, maintained in warm condition.

The boiler feedwater pumps shall also conform to the following minimum requirements:

a.	Quantity	2	1
b.	Design capacity, gpm	272	544
c.	Design total dynamic head, ft	3250	3250
d.	Drive horsepower, hp	300	600
e.	NPSHR	To be provided later.	

1.6.5 Deaerating feedwater heater and storage tank

A deaerating feedwater heater shall be provided in accordance with HEI standards. The deaerator will provide a 10-minute storage capacity at the maximum continuous rating boilers. Steam required for the deaerator is provided by uncontrolled extraction from the turbine generator, with make-up water being introduced to the condenser hot well from the demineralizer system.

The deaerating feedwater heater shall be furnished complete with all appurtenances including the following:

a. Storage tank.
b. Support legs and saddles or brackets, platform support and insulation clips and angles and other attachments.
c. Steam, water, drip, drain, vent, instrument, and control connections.
d. Manholes and access doors.
e. Relief valves.

f. Vent valve with suitable orifice drilled in disc.

g. Platform and ladder for servicing the deaerator.

The residual oxygen content in the effluent feedwater leaving the storage tank shall not exceed 0.005 ml/l as determined by the HEI Method and Procedure for the Determination of Dissolved Oxygen.

The total carbon dioxide content in the effluent feedwater shall be zero ppm as determined by the titration method of the American Public Health Association (APHA).

For design purposes, all water entering the deaerator is to be considered as saturated with oxygen and carbon dioxide at the entering temperature and pressure.

The deaerator storage tank shall be stress relieved.

1.6.5.1 Minimum requirements of deaerating feedwater heater and storage tank

a. Tray material (if used) 430 SS

b. Storage tank capacity, gallons 5,000

c. Outlet capacity, lbs/hr 250,000

d. Oxygen content of water, cc/L 0.005

e. Operating pressure, psig 52

1.6.6 Closed Feedwater Heaters

The Company shall furnish and install low and/or high pressure closed feedwater heaters and associated accessories, as required by Company system design. The closed feedwater heaters shall be complete and operational, and furnished with the following items:

a. Shell, head, tube sheet, and complete tube bundle with stainless steel tubes.

b. Tube and shell side pressure and thermal relief valves.

c. Nozzles and connections on head and shell sides, including those for feedwater and condensate inlet and outlet, extraction steam inlet, drips inlet and outlet, emergency shell dump, relief valves, level controls, monitoring instrumentation, vents, bottom drains, isolation valves and feedwater bypass, chemical cleaning, and nitrogen blanketing.

d. Supports and pulling lugs, including lifting lugs for loading and unloading of heaters.

e. Individual flow orifice for each vent connection.

Shell side noncondensible gases shall be vented to the deaerator or main condenser.

Fluid velocities through tubes shall not exceed ten (10) ft/sec during normal operating conditions, calculated using the specific gravity of feedwater corresponding to the average of the inlet and outlet operating temperatures.

Feedwater heaters shall conform to the reuirements of the HEI Standards for Closed Feedwater Heaters, except as amended herein. Feedwater heaters shall also comply with the requirements of ASME Boiler and Pressure Vessel Code, Section VIII, Division I.

1.6.6.1 Additional minimum requirements of feedwater heaters follows:

a.	Quantity	2
b.	Heater terminal temperature difference, F	5
c.	Heater drain cooler approach, F	10
d.	Tube material/type/no. passes	SB-395 / NEU/ 2

1.6.7 Air Preheaters

The Company shall furnish and install a steam coil air heater between the FD fan and the air plenum(s) on each steam generator. Coils shall be designed with sufficient capacity to maintain a minimum conbustion air temperature of 250F under all weather conditions. Coil shall be designed and controlled for protection from freezing. If finned tubes are required, no more than four fins per inch shall be used.

Further minimum requirements are as follows:

a.	Duty, Btu/Hr	11,880,000
b.	Design Conditions	
c.	Inlet air temperature, F	-20
d.	Outlet air temperature, F	250

1.6.8 Excess Steam

An automatic valve shall be provided for each boiler to vent excess steam to the atmosphere. This valve will protect the boilers from

excess pressure buildup in the event that the steam load is decreased suddenly when the furnaces are operating at a high burning rate. Steam vent valves will be sound attenuated for noise control.

In the event of a prolonged turbine generator outage, excess steam shall be dumped to the air-cooled condenser through a pressure reducing valve and desuperheating station while processing of refuse continues.

1.6.9 Tube Cleaning and Furnace Probes

Cleaning of the superheater section will be accomplished by mechanical rapping. The steam generating section will have independent rapping systems. This arrangement will permit cleaning each section as required. The mechanical cleaning system shall be electrically driven and controlled, and designed to effectively clean the superheater and boiler sections of the unit. The system shall comprise totally enclosed drives, circuit breakers, power and control quick disconnect plugs, local pushbutton stations, programmable control system with safeguards and interlocks, graphic insert type control panel, and all other equipment required for a complete operating system.

A complete, automatic, sequential, steam blowing, electrically-driven and controlled, sootblowing system designed to effectively clean the economizer shall be furnished for each unit. The system

shall comprise fixed-position blowers, hangers, totally enclosed motor drives, programmable control system with safeguards and interlocks, graphic insert type control panel, and all other equipment required for a complete, operating system.

Retractable furnace temperature probes for monitoring the gas temperature entering the superheater during start-up shall be provided for each unit. Probes shall be furnished complete with totally-enclosed motor drives, limit switches, power and control quick disconnect plugs, position transmitters, dual-element, Type E, chromel-constantan thermocouples, temperature and position indicator for remote mounting, remote control station, and local push-button station.

Retractable furnace temperature probes for monitoring gas temperature entering the superheater shall be designed to monitor across the full furnace width. Probe control shall provide for automatic continuous running of temperature profiles, indexed high-speed traversing, and positioning of the probe in an extended fixed position. Probes shall be suitable for operation in a refuse fired boiler environment of 1500F. Probes shall be arranged for air cooling.

In addition to the retractable temperature probes, means to continuously monitor furnace flue gas temperature of 1800F for the purpose of guaranteeing minimum furnace temperature for one (1) second shall be provided.

1.7 Flue Gas Cleaning System

1.7.1 Air Pollution Control System

The boiler flue gas air pollution control system battery limits begin at the economizer outlet of each boiler and end at the stack discharge. The major components of the system are:

- Two spray dryer/absorber's (SDA's)
- Two fabric filter baghouses.
- Two induced draft fans.
- One stack with three flues (includes one flue for future boiler).
- Two environmental test stations located at the induced draft fan inlet.
- One continuous emission monitoring system (CEMS) with sample points located at each induced draft fan inlet and at the SDA inlet. Two sets of analyzers will be provided (one set for each boiler) to transmit data to a single environmental-report-generating computer and to the slurry control system for each SDA.

Drawing No. 03-47-011 shows a flow diagram of the flue gas cleaning system.

The maximum flue gas flow rate from each boiler will be 132,000 ACFM at 480^{o}F and 100% excess air. These gases will be cooled to 250-320^{o}F in the spray dryer and will exit the stack at 240-310^{o}F having decreased to a maximum volume of 125,000 ACFM at 320F.

Approach to water dew point is 115 to 190F at SDA outlet temperatures of 250 and 320F, respectively.

Anticipated emission rates for criteria pollutants shall be as listed below (all values adjusted to 7% O_2):

		Average	Max
a.	Particulate Matter (solid and condensible) (excludes sulfate, chloride and ammonium salts)	.015	0.02 gr/dscf
b.	Sulfur Dioxide (ppmdv)	50	87(1)
c.	Nitrogen Dioxide (ppmdv)(30 day average)	300	381(2)
d.	Carbon Monoxide (ppmdv)	60	100(3)
e.	Carbon Monoxide (ppmdv)	60	400(4)
f.	Total Hydrocarbons as CH_4 (ppmdv) (Gaseous Non-Methane) (annual average)	3	18(2)
g.	Lead (gr/dscf)	0.00075	0.001
h.	Opacity of Stack (percent)	5	10
i.	Chlorides (ppmdv) as HCl	50	163(1)
j.	PCDD/PCDF Tetra-hepta chlorinated isomers (ng/Nm^3) - EPA Toxic Equivalents	4	4(5)

(1) One-hour average

(2) Three-hour average

(3) Eight-hour average

(4) Four-day average

(5) 12/24-hour average, per 1984 Environmental Workshop Test Method

Anticipated emission rates for elements and compounds shall be as follows (3-hour average basis):

	gr/dscf	ppmdv
Arsenic	1.0 E-5	
Asbestos	(very small depending on presence in refuse)	
Beryllium	2.0 E-7	
Cadmium	6.0 E-5	
Chromium	6.0 E-5	
Hexavalent Chromium	1.8 E-6	
Copper	5.0 E-5	
Manganese	2.7 E-5	
Nickel	4.0 E-5	
Selenium	2.0 E-6	
Sulfuric Acid Mist		5.4
Reduced Sulfur	(insignificant)	
Tin	2.4 E-4	
Vanadium	3.0 E-6	
Vinyl Chloride	5.3 E-7	
Zinc	2.0 E-3	
PAH	6.2 E-6	
PCB	5.7 E-8	

1.7.2 Concept of Operation

Hot flue gases exit each boiler economizer and are ducted to the SDA. The flue gases enter the vertical cylindrical SDA chamber through a top gas flow distributor. Aqueous slaked lime slurry is sprayed into the SDAs using compressed air atomizing nozzles located downstream of the gas distributor. Water in the droplets evaporates quickly

cooling the gases. The acid gases react with the reagent to form a collectible dry powder, a portion of which falls to the bottom of the SDA where it is removed. Treated cooled flue gas containing a substantial fraction of entering fly ash and dried acid gas reaction products (powder) flows to the baghouse where the fly ash and powder mixture is collected and removed from the flue gas.

From the baghouse, the flue gases flow past an environmental test station and the CEMS sample probe to the induced draft fan. A 170 foot high stack discharges the cleaned flue gases to the atmosphere.

The lime storage and slurry preparation facility will receive pebble lime (calcium oxide) via pneumatic-self-unloading truck and store it in a vertical cylindrical silo with a conical bottom. Lime from the silo will be metered to a slaker, where it will be mixed with water to form aqueous lime slurry. The slurry will be screened for grit removal, stored in an agitated tank, diluted with water and pumped to the SDAs for atomization and reaction with acid acid gases. A Continuous Emissions Monitoring System (CEMS) with sample points located at the SDA inlet and the baghouse outlet will be provided. The system will consist of field mounted analyzers, one set per boiler, and one emission report generating system. The report generating system will consist of a computer, printer, alarms and a cathode ray tube (CRT) readout. The CEMS will measure the concentration of controlled pollutants and prepare an excess emissions report for the Department of Ecology and/or SCAPCA. The excess emissions report will include:

- Excess emissions, duration and magnitude.
- Reason for the excess emissions.
- Calibration events (the CEMS checks its own calibration on a daily basis).
- Quality of operation (in operation off line, how long, etc.)

Excess emissions will be reported from each boiler. CO_2 and/or O_2 will also be measured at the SDA inlet for use in correcting flue gas concentrations to normalized units. Opacity and SO_2 will be measured at the baghouse outlet. Each SO_2 analyzer will generate a signal that will be used to control the lime absorbent flow to the respective SDA.

1.7.3 Spray Dryer Absorbers (SDA's)

Each SDA will be a steel vessel 20 feet in diameter by 84 feet high from the gas inlet at the top to dust outlet at the bottom. The SDA vessel shall be constructed of A36 carbon steel, 1/4 in. thick as a minimum or as required by the manufacturer. The bottom of the SDA vessel shall have a sloped cone hopper with angle of the cone selected to prevent build-up of solids on the hopper walls and also to avoid bridging over all discharge points. Flue gas residence time is approximately 10 seconds. Lime slurry will be sprayed into the hot flue gas through multiple two-fluid nozzles using compressed air for atomization. Spare nozzles shall be kept on site at all times. The atomization system shall be designed and constructed so that the

spares can be installed with the steam generator operating at name-plate capacity.

The SDAs shall be insulated and shall utilize a conical bottom with double flap valve for flyash collection. All hoppers shall be equipped with anvil striking plates, vibrators, access doors, poke holes and blanket-type heaters to reduce heat loss. Blanket-type heaters shall be applied over a minimum of the lower one-third of the hopper. The flyash conveyor system shall incorporate double flap valve air locks to minimize air in-leakage from the conveyor system.

The SDAs shall include a flyash and reacted & unreacted particle collection and handling system with minimum requirements as described under Section 1.9.

The lime slurry preparation system shall consist of two lime feeders (1 operating; 1 spare), two lime slakers (1 operating; 1 spare) with grit removal, slurry tank with mixer, two (1 operating, 1 spare) lime slurry pumps, dilution water tank and two water booster pumps (1 operating; 1 spare), piping, instrumentation, controls, foundations, and other auxiliaries as required for complete and operating systems.

The slurry preparation system will be fed from an 80 ton capacity pebble lime storage bin. Two lime slakers each with a capacity of 2,500 pounds per hour will be supplied. The second slaker is an installed spare. An agitated 8-hour capacity lime slurry storage tank will be provided. One dilution water tank will be included. All

pumps in the lime slurry system will have installed spares to ensure continuity of slurry flow to the spray dryers.

Additional requirements of the SDA's are as follows:

a.	Number of Units	2
b.	Flue Gas Data (per unit)	
	1. Maximum Flow, ACFM @ boiler outlet	132,000 @ 480F
	2. Maximum Temperature, F*	485
	3. Maximum SDA Outlet Temperature, F*	320
	4. Minimum Outlet Temperature, F*	250
	5. Average Outlet Temperature, F*	270
	* with SDA in service	
c.	Removal Efficiencies	
	1. HCl	
	a. Efficiency, %	90
	b. Inlet Concentration at 7% O_2 PPMDV	1632 (max 1-hour)
	c. Outlet Concentration at 7% O_2 PPMDV	163 (max)
	2. SO_2	
	a. Efficiency, %	80
	b. Inlet Concentration at 7% O_2 PPMDV	435 (max 1-hour)
	c. Outlet Concentration at 7% O_2 PPMDV	87 (max)

d.	Chemical Used for Neutralization	Lime Slurry (C_a $(OH)_2$)
e.	Average Neutralization Chemical (per unit), lbs/hr	620 lb. lime (CaO)*
f.	Average Water Use (per unit), GPM	32
g.	Atomization System	
	1. Type	two fluid nozzles
	2. Manufacturer	turbotac

* Annual average based on 876-hr. (10%) at maximum 3-hour concentrations (1305 and 326 ppmdv at 7% O_2 for HCl and SO_2, respectively) and 7884-hr (90%) at average inlet conditions (430 and 163 ppmdv, same basis). Lime consumptions are 1260 lb/hr at 3-hour maximum conditions and 550 lb/hr at average conditions.

1.7.4 Baghouses

One baghouse shall be provided for each combustion/steam generator/dry scrubber in the Facility. The baghouses shall be designed to meet the performance requirements at all loads when treating the flue gas produced from the burning of Acceptable Waste.

Fabric material shall be fiberglass with the weave or felt design and any fabric coatings selected for the intended service. Net air-to-cloth ratios shall not exceed 4.0:1.0 for pulse jet with SDA operating. The net condition is when the baghouse is operating with one compartment out of service for maintenance.

The baghouses shall be complete with inlet and outlet manifolds, internal dampers for compartment isolation, controls and instrumentation, structural support, access stairways and platforms and bag cleaning system. The baghouse compartments shall be insulated and have hopper accessories at least equal to those described in Section 1.7.3. The Company shall have available on-site a complete spare set of bags. The baghouse shall include a fly ash collection and handling system with minimum requirements as described in Section 1.9.

Additional requirements of the baghouses are as follows:

a.	Type (Pulse jet or Reverse Air)	Pulse Jet
b.	Manufacturer	Wheelabrator Air Pollution Control
c.	Flue Gas Data (Per Unit)	
	1. Maximum Flow, ACFM	125,000
	2. Maximum Temperature, F	310^{o}F
	3. Air-to-Cloth Ratio (with SDA operating)	
	net	3.97
	gross	3.31
	4. Number of Compartments	6
d.	Particulates Removal Efficiency	
	1. Efficiency, %	99.68
	2. Inlet loading at 7% O_2, GR/DSCF, maximum	6.2
	3. Outlet Loading at 7% O_2, GR/DSCF, maximum	0.02

e.	Bag Material	Woven glass with Acid-Resistant finish
f.	Insulation	
	1. Materials	Fiberglass
	2. Thickness, in	4
	3. Cladding	Aluminum

1.7.5 Stack

One (1) rectangular concrete shell stack with acid brick flues shall be furnished and installed. The stack will disperse flue gases from the furnace units that burn Acceptable Waste. The flues shall be cylindrical. The stack shall be provided with one flue for each steam generating unit and an additional flue for a future unit. The stack shall be aesthetically treated to conform to the theme of the Facility.

Design conditions for the stack are as follows:

Stack height	170 ft.*
Diameter of flues	5 ft. 6 in.
Gas Velocity at MCR, fps, max.	60

*Based on FAA requirements.

Stack shall be designed for all conditions, loads, and effects to which it may be subjected, including basic design, corrosion, wind loading, thermal load, earthquake loading, dead loading, reaction forces, and vibration effects from vortices produced.

The Company shall provide stack liners constructed of ASTM C980 acid resistant brick. Other materials shall conform to ASTM specifications and have demonstrated compatibility with, and suit-ability for, design requirements.

An access door shall be provided in the stack to permit access to the base of the stack under the flues and to the base of the flues. Access shall be provided from ground level to the upper level maintenance platform, sampling platforms, and CEM. All ladders, walkways and platforms shall be designed and installed in accordance with OSHA standards. The entire length of any ladder shall be enclosed in a safety cage or OSHA approved safety climb device. Two capped sampling ports shall be installed in accordance with EPA Regulations, Appendix A, 40 CFR60.

Continuous emissions monitors (CEMs) shall also be provided for continuous monitoring of oxygen, carbon monoxide, carbon dioxide, opacity, temperature, particulate control device temperature, and SO_2. The CEMs shall meet the requirements of CFR 40 Part 60 Appendix B. CEM for opacity shall be in accordance with performance Specification 1. CEMs for SO_2, CO_2, and O_2 shall be in accordance with Performance Specifications 2 and 3. CEM for CO shall be in accordance with Performance Specification 4. The CEM's sampling probes and test ports shall be located on the duct between the fabric filters and ID fans.

Obstruction marking and strobe lighting shall be provided in accordance with FAA regulations.

1.7.6 Combustion Air and Flue Gas Ducts, Dampers, and Expansion Joints

The combustion air and flue-gas duct system shall comprise (1) the flue-gas ducts from the economizer outlet to the air pollution control equipment and from the air pollution control equipment to the stack including all necessary attachments to and from the ID fan; (2) the FD fan suction ducts; (3) the under-fire air ductwork from the FD fan to the under-fire air plenum; (4) the SA fan suction ductwork to the SA fan; and (5) the SA supply ductwork from the SA fan to the nozzles.

Ductwork shall be welded steel plate construction. Ductwork and supports shall be designed and fabricated in accordance with the applicable rules of AISC; welding shall be in accordance with the requirements of the AWS.

Hoppers shall be provided at the economizer outlet, and at other locations as required by Company's ductwork arrangement to collect fly ash. Hoppers shall be of pyramidal shape with a valley angle of not less than 55 degrees to the horizontal.

Access doors shall be provided in each run of ductwork of 24 in. square or round diameter or greater. Doors shall be located on both sides of turning vanes and between each piece of equipment. Hand

holds shall be provided outside of the ductwork as required for the safe entry to and exit from the ductwork. Access doors shall be equipped with quick tightening clamp bolts.

Expansion joints shall be provided to permit thermal expansion of the ductwork system without skewing and imposing excessive reactions on the ductwork, the supporting structures, or the connected equipment. Expansion joints shall be of the bellows-type, with elements of sufficient membrane strength to withstand the internal design pressure and temperature over the life of the plant. Expansion joints shall be provided with integral insulation and sliding liner plates, fitted to overlap in the direction of flow.

Opacity shall be continuously monitored and recorded in an appropriate location downstream of the fabric filter.

1.8 Ash Handling System

The ash handling system includes the facilities, equipment and operational concepts required for the collection and handling of grate riddlings and bottom ash residue, as well as for recovery of flyash from boiler convection sections and air pollution control equipment. Methods for storage and transport of ash from the plant are described.

1.8.1 Design Criteria

The following design data are based on recovery of ash in a wet state. Ash quantities will result from the firing of two boilers at a combined initial rate of 800 tons of refuse per day with capacity to handle three boilers at a combined rate of 1200 tons per day. Moisture content of the bottom ash will be about 18 percent by weight. Flyash will be mixed with water to control dusting and be combined with the bottom ash on the bottom ash vibrating conveyor.

1.8.1.1 Ash Deposition

	Guaranteed Load	Maximum continuous Rating
a. Fraction of ash leaving boiler with flue gas including ash collected in boiler fly ash hoppers, %	19.3	33.8
b. Fraction of ash leaving boiler as bottom ash and siftings, %	80.7	66.2
c. Total quantity of ash (including) bottom ash, siftings, and flyash), lb/hr	15,421	13,990
d. Typical size of particulate in flue gas, %		
• 0-5 microns	36	36
• 5-10 microns	10	10
• 10-20 microns	10	10
• larger than 20 microns	44	44
e. Bottom ash and residue, lb/hr (dry)	12,652	9,456

f.	Fly ash, lb/hr (dry)	2,769	4,534
g.	Percent moisture of bottom ash to landfill	18.4	18

1.8.2 Ash Removal System

A system of 8 hoppers for each furnace, plus 2 for the ram feeders, will receive the gravity flow of grate riddlings. Primary air for combustion will be ducted to each riddlings hopper. Each hopper will be fitted with a hinged inspection door.

The hopper discharge outlets will be fitted with chutes which discharge into a sifting drag conveyor. Flyash will be fed into one boiler ash expeller through the boiler ash chute.

Bottom ash from the grates of each furnace will be quenched and combined with the boiler flyash in the ram type ash expeller. Each water-filled ash expeller will push bottom ash up an inclined section to be dewatered. Ash will exit the dischargers at a moisture content of approximately 18 percent.

1.8.3 Ash handling system

At each of the two baghouses, collecting screw conveyors will receive flyash from each unit. The screw conveyors will discharge through seal valves to a common transfer drag conveyor which will convey the baghouse flyash and the SDA flyash to the flyash conditioners.

A seal valve and a drag conveyor will be located below each of the two SDAs. The SDA conveyors will discharge to their respective boiler's flyash transfer drag conveyor.

The fly ash from the transfer drag conveyors will discharge into the ash conditioners. In the ash conditioners, the dry fly ash will be dampened to eliminate dust, then will discharge by gravity onto the bottom ash vibrating conveyor.

Minimum width for vibrating and belt bottom ash conveyors shall be 4'-0". Maximum speed of belt conveyors for ash shall be 100 fpm.

Bottom ash from the ash expeller will be discharged onto the bottom ash vibrating conveyor. The bottom ash vibrating conveyor will feed an inclined belt conveyor which transports the ash to a grizzly scalper. The grizzly scalper will remove the +10 inch material (mostly metal) from the bottom ash. The -10 inch material (mostly ash) will pass through the grizzly deck onto a vibrating conveyor. A drum magnetic separator located above the vibrating conveyor will remove magnetic ferrous metal from the minus 10 inch ash. Magnetic ferrous metal and grizzly overs will be loaded directly into the ash truck, or discharged onto the floor in the storage area for subsequent loading via front-end loaders. Three days storage (at the expanded Facility capacity) are provided. The ash storage area shall be completely enclosed with a ventilation system. The ash storage building shall not be connected to any other structures in such a fashion as to enable dust to infiltrate to other parts of the plant.

1.8.4 Additional ash handling system requirements are as follows:

A. Bottom Ash System

1.	Type	Wet Ram Ash Expellers
2.	Capacity, tons/hr	in excess of 15
3.	Ash Storage Dimensions, (LxWxD from bottom ash inlet point)	Ash: 90' x 28' x 15' Metal: 90' x 30' x 15'
4.	Design density of ash for storage/structural design, lb/ft^3	Metal: 30 / 120 Ash: 70 / 120
5.	Size of largest item passable through system, LxWxH, ft	3' x 3' x 6'

B. Fly Ash System (Screw and Drag Conveyors)

1.	Type	Mechanical
2.	Capacity, tons/hr	1 ton/hr per boiler

1.9 Turbine - Generator System

The Facility will be constructed with a turbine-driven electric power generator. The turbine will be designed to operate as a straight condensing unit with uncontrolled extractions. All electric power not used by the plant will be sold. The turbine generator will be controlled to maximize the power supplied to the transmission system.

In the event of a turbine shutdown, the steam from the boilers will be directed through a pressure-reducing valve and desuperheating station to the air-cooled condenser which will condense the steam for

return to the condensate system. An isolation valve shall be provided in the turbine exhaust duct.

The turbine generator and auxiliaries will be designed for continuous operation, 24 hours a day, 365 days a year. The turbine generator will be designed to operate with throttle steam of 850 PSIG/825°F under normal conditions, with the capability of operating at a 5% overpressure with valves wide open (VWO).

Steam from the refuse-fired boilers will be combined and piped to the inlet trip valve of the turbine. The turbine will have four uncontrolled extractions and will be arranged for exhaust to an air-cooled condenser.

The following heat balance diagrams are provided:

- MCR steam flow VWO 5% op, 2.0 in HgA exhaust — Dwg. No. 03-49-001
- GL steam flow, normal throttle pressure and temperature, 2 in HgA exhaust — Dwg. No. 03-49-002
- CP steam flow, normal throttle pressure and temperature 2 in HgA exhaust — Dwg. No. 03-49-003

The turbine generator shall be supported on a separate reinforced foundation system to isolate it from the building and associated foundations and shall be designed in accordance with the manufacturer's recommendations.

The turbine-generator and accessories shall be designed for the following operating conditions:

a. Turbine

1.	Nameplate Capacity, Mw	26
2.	Throttle Flow at Nameplate Capacity, lbs/hr	224,000
3.	VWOP and Over Pressure Flow, lb/hr	224,000
4.	Throttle Steam Pressure, psig	850
5.	Maximum Throttle Steam Pressure, psig	900
6.	Throttle Steam Temperature, F	825
7.	Turbine Exhaust Pressure at 47F DB ambient, in. Hg abs	2.0 @ 159,000 pph
8.	Governing System Type	EHC
9.	Turbine Speed, RPM	3,600

b. Governor and Controls

1. The governor and turbine controls shall have the capacity to hold turbine speed below the overspeed trip setting following local separation under isochronous conditions (instantaneous loss of electrical load), while initially operating with the steam valve wide open.

c. Generator

1.	Model	Air cooled
2.	Capacity, Mw	26
3.	Power Factor	0.9
4.	Voltage (kv)	13.8
5.	Speed, RPM	3,600
6.	Frequency/Short Circuit Ratio	60/0.58
7.	Insulation Class	F
8.	Overspeed Limitation	110%
9.	No. Terminal Leads	3
10.	Type Fire Protection	CO_2
11.	Energy Characteristics	3 phase, 60 Hz

12.	Minimum net continuous capability at generator terminals at 0.90 power factor, KVA	Match turbine output at VWO and 5% over-pressure with zero auxiliary steam loads.
13.	Generator Protective Relays (Type and Model)	Relays as shown on Dwg. No. 10-49-002. Type & Model varies as to device function.

The electric generator shall be manufactured in accordance with all applicable ANSI, IEEE and NEMA standards and recommendations and these specifications. The turbine generator shall include the following minimal supplemental provisions in addition to any and all requirements established by WWP or as may be recommended by good engineering design practices:

a. Provide complete CO_2 fire protection and alarm system for each generator exciter combination.

b. Provide brushless exciters with 100% redundant silicon type diodes and matched to the generator so as to maintain as a minimum:

   1. 105% rated voltage

   2. Bolted fault at generator bus

   3. Sustained 130% full load generator current for one minute.

c. Provide voltage control for

   1. Single machine and parallel operation

   2. Automatic control, no load to full load

   3. Voltage range, $\pm$ 10% rated voltage

   4. Response ratio of 0.5 per ANSI Standards

The generator surge protection and neutral grounding equipment shall be provided in accordance with WWP requirements, generator

manufacturer's recommendations, and all appropriate codes and industry accepted design standards.

Turbine heat rate shall be calculated in accordance with the following formula:

$$HR_G = \frac{QT}{PG}$$

where:

HR_G = Gross heat rate, Btu/kWhr
QT = Heat supplies to turbine, Btu/hr
PG = Gross generator output measured at generator terminals, kW

and:

1. Seal steam and other steam leakages shall be the maximum expected after 5 years' operation with quoted clearances.

2. Assume no blowdown or sootblowing.

3. Feedwater flow equals main steam flow, at 1.25 times turbine throttle pressure, and makeup for steam loses shall be assumed to enter hotwell.

The turbine shall be designed to withstand throttle steam temperatures in excess of the specified rated temperatures as follows:

a. +15 F, provided the 12-month average is not greater than throttle steam temperature +5F.

b. +25 F, during abnormal conditions for operating periods not more than 400 hours in a 12-month period.

c. +50 F, for swings of 15-minute duration or less, aggregating not more than 80 hours per 12-month period.

The turbine-generator and condenser unit shall be complete with all related accessories including, but not limited to, the following major items:

a. Extraction nozzles for feedwater heating steam to closed heaters (if required), and deaerating heater.

b. Capped extraction nozzle located to provide approximately 20,000 lb/hr of steam at approximately 200 psig with GL throttle flow for possible future steam sales.

c. Turbine inlet steam stop and control valves, extraction nonreturn and motor operated block valves.

d. Complete console type hydraulic and lubricating oil system(s) designed for the turbine-generator unit. Lube oil pumps shall include main and auxiliary lube oil pumps driven by AC motors and a DC motor driven emergency lube oil pump.

e. Means of isolation of stop valve during chemical cleaning and steam blowing.

f. A DC motor driven turning gear system shall be provided to assure a reliable system when unit is disconnected from the outside power grid.

g. Complete steam sealing and gland steam exhausting and cooling systems.

h. Internal moisture separators and drainage for all turbine stages where moisture quantity could result in excessive blade erosion.

i. Prefabricated thermal and safety insulation for turbine.

j. Turbine casing drain traps with piping, valves, and piping manifold. Casing drain valves shall be equipped with pneumatic or motor operators and position switches for either manual or manual and remote automatic operation.

k. A grounding device between the stationary and rotating parts of the turbine to prevent the flow of turbine shaft currents between the rotor and the bearings.

l. Complete turbine control system and instrumentation for safe, reliable operation.

m. The generator shall be a revolving field, 13.8 kV, synchronous type, air cooled generator.

n. Special tools, including the turbine and generator rotor lifting equipment and all other special lifting slings, wrenches, and tools, including any metric tools, required for repair, maintenance, and overhaul.

o. Special devices and equipment to ensure protection of the turbine generator set during hydrostatic test.

1.9.1 Turbine Lubricating Oil

A turbine lubrication oil system will furnish bearing lubrication for each turbine generator unit by means of a central oil system with

redundant features and emergency capabilities. Each system will include two full capacity AC motor-driven pumps and a DC motor-driven emergency oil pump. The DC-powered pump will permit the turbine to be brought to a safe stop in the event of the loss of AC power. The DC motor will be powered from the 125-volt station battery.

The turbine lube oil will be continuously filtered and polished in a recirculating turbine oil conditioner designed to treat the entire oil charge five times a day.

1.9.2 Electrohydraulic Controls

A separate high-pressure non-flammable oil system with redundant features will be supplied to actuate the turbine control.

1.10 Condensing System

1.10.1 Exhaust Steam Condensing System

The exhaust steam from the turbine will be ducted to an air-cooed condenser. An A-frame type air cooled condenser shall be provided for condensing the turbine exhaust steam at Facility MCR boiler conditions with turbine VWO and 5% over pressure. The services of the manufacturer's representative shall be available during start-up and testing. The air-cooled condenser shall be designed to operate over a range of temperature of -10°F to 100°F. The heat exchanger bundles shall be of all welded carbon steel fin tubes with welded

carbon steel fin tubes with welded tube sheet joints. The heat exchanger bundles shall be arranged to minimize subcooling of condensate. A steam jet air ejector and hogging system will be supplied to remove the noncondensibles. The condensed steam from the steam jet air ejector system will be discharged to the condenser hotwell tank.

The condensate system is designed with two full-capacity condensate pumps for condensed steam from the air-cooled condenser. The condensate will circulate through the inter-condenser and after-condenser of the steam jet air ejector, and will be pumped to the deaerating heater and feedwater storage tank.

Steam duct shall be of all welded carbon steel construction designed and supported to accommodate pressures, temperatures, thermal movements, and stresses occurring in the system. A means of isolating the turbine shall be provided to allow operation as a dump condenser.

Level glasses with integral gauge cocks and check valves shall be provided for the hotwell tank. Gauge glass shall be flat and transparent with illuminators.

A rupture disc or relief valves shall be provided for the air-cooled condenser.

Vacuum gauges shall be furnished and installed in conspicuous, accessible locations.

The hotwell tank shall have drains to provide ease of clean-out. The minimum storage volume, when operating at normal level, shall be of sufficient capacity to retain the total quantity of steam condensed at maximum load for a period of 5 minutes.

Air removal equipment shall include one completely assembled package consisting of but not limited to:

a. Steam supply piping including automatic pressure control valve, strainer, block valves, and pressure and temperature gauges.

b. Hogging ejector elements consisting of two stages with two 100-percent capacity elements for each stage.

c. One atmospheric hogging element.

d. Surface type inter and after condensers with 304 or 316 stainless steel tubes and stainless steel tube sheets.

e. Interconnecting noncondensibles, steam and condensate piping and fittings including valves, traps and instrumentation.

f. Design, construction and testing in accordance with HEI standards.

Additional condenser minimum design requirements are as follows:

a.	Operating pressure at 47 F DB ambient, . Hg abs	2.0
b.	Design steam flow, lb/hr	159,000
c.	Design duty, MBtu/hr	
d.	Operating pressure at less than 47 F DB ambient, in Hg abs	2.0

1.10.2 Bypass Operation

In the event of shutdown of turbine or partial shutdown of air cooler for maintenance, refuse burning and boiler operation will be continued. The steam will be by-passed to a PRV and desuperheating station, where the pressure is reduced to 15 PSIG with approximately 30 degrees of superheat. The condensed by passed steam is collected and pumped directly to the deaerator. Pressure design shall be determined by system configuration. Relief valves or a rupture disc, nozzles, instrumentation and intervals shall be furnished and installed.

Additional steam by-pass minimum design requirements are as follows:

a.	Operating pressure, psig	914.7
b.	Design steam flow, lb/hr	263,600

1.10.3 Condensate Pumps

Two (2) 100% initial Facility capacity vertical turbine canned condensate pumps and motor drives, and associated accessories shall be provided for each condensate system.

Pumps shall be designed to take suction from condenser hotwell tank and delivering to the deaerator as a minimum for the following conditions:

a. Design flow: turbine VWO and 5% OP plus a flow margin of 10%.
b. Design head: capable of supplying the deaerator at 5% OP plus 10% and, in addition, filling the boilers for initial operating after drainage.

Additional minimum design requirements are as follows:

a.	Quantity	2
b.	Design capacity, gpm	500
c.	Design total dynamic head, ft	455
d.	Motor horsepower, hp	100

1.11 Auxiliary Cooling Water System

The auxiliary cooling water heat exchanger will be a separate air cooler and will be provided for rejecting heat from miscellaneous loads in the Facility.

1.11.1 The auxiliary air cooler will be designed to cool approximately 1400 gpm.

1.11.2 Auxiliary Cooling Water Pumps (Bearing Cooling Water Pump)

Minimum design requirements are as follows:

a.	Quantity	2
b.	Design capacity, gpm	1400

1.11.3
1.11.4

1.12 Water Treatment Systems

1.12.1 Potable Water

A potable water distribution system is provided for drinking and sanitary purposes. Water fountains and sanitary facilities are included.

1.12.2 Boiler Feed Water Treatment

A boiler feed water treatment system (two trains) is provided to treat water for the boilers. All condensate is returned except for miscellaneous uses. No condensate polishing equipment is included. The concept of operation for the boiler feed water treatment system includes demineralization and storage.

A two-train demineralizer system is provided to remove minerals from the water supply. The system includes acid and caustic storage tanks and pumps for regenerating the anion and cation resins. The waste regenerate is stored in the neutralization tank until both anion and cation resins are regenerated. After mixing the two wastes, the mixture is neutralized and metered to the wastewater system for reuse.

The two skid-mounted demineralizers shall each be capable of producing the required quality of make-up water at a minimum rate of 15% of the total initial Facility capacity feedwater flow. The demineralized water shall meet the boiler and turbine manufacturer's requirements.

Service water will be supplied through Company's piping connection, to Company's water treatment system. The demineralizer system shall be designed for pushbutton automatic operation. The demineralizer regenerant system shall be capable of adding chemicals to the neutralization basin to control pH.

Demineralized water is stored in a tank sized for one boiler fill. Normal make-up to the boilers is to the hot well of the surface condenser. Demineralized water pumps provide boiler fill water, make-up water to the deaerators as required, and water for other miscellaneous uses. The pumps are sized to quickly fill the boiler to minimize fill time and to provide water for boiler upset conditions.

1.12.3 Boiler Water Chemical Feed Systems

Three skid-mounted chemical feed systems are included for treatment of boiler water. Two of the systems include one tank for each feed system and one pump for each boiler plus an installed pump for the future boiler. The third system includes one tank and two pumps which feed the deaerator.

Either dry or liquid chemicals are diluted with demineralized water in a mix-and-use tank for each chemical feed system. The diluted mixture is then pumped to separate injection points for each boiler or deaerator. The capacity of each pump is manually adjustable to vary the chemical supply as determined by boiler water analyses.

Chemical solution makeup and feed tanks along with positive displacement pumps shall be provided. The chemical feeders shall be designed to operate essentially unattended, except for periodic inspection, manual change of feed rates, replenishment of required bulk chemicals and solution makeup.

The boiler water chemical feed system shall be suitable for feeding diluted chemicals on a continuous basis under flow proportioned control for oxygen scavenging, pH and hardness control. Necessary analytical equipment to run regular tests which will provide the basis for changes in pumping rate or product solution concentration shall be provided.

1.12.4 Expanded Facility Sizing

All water treatment chemical storage tanks and pumps shall be sized for the expanded Facility and provided complete. Capped connections shall be provided at all required points for future installation of an additional steam generating unit.

1.12.5 Instrumentation and Controls

a. Potable Water. All potable water including that used for process, except fire water, is metered. Detection check valves are provided for potable water fire lines.

b. Boiler Feed Water Treatment. The flow rate of potable water through the demineralizer is controlled by the water level in the demineralized water storage tank. The set point level normally keeps the storage tank at a predetermined level. The demineralized water pumps are started on system demand.

c. Boiler Chemical Feed Systems. All boiler chemical feed pump capacities are manually adjustable. Pressure indicators are provided for pump discharges.

1.13 Wastewater Treatment System

Wastewater treatment system shall be sized for the expanded facility and include the neutralization sump, wastewater sump, two (2) sump pumps, wastewater treatment equipment as required, acid and caustic injection pumps and system (may be spare identical demineralizer regeneration pumps), and lined and/or nonmetallic piping and accessories. The Company shall determine the wastewater discharge requirements and provide a lift station if required.

The wastewater treatment system includes collection and to the maximum extent possible, reuse of all wastewater with the exception of sanitary waste. Sanitary wastewater is collected separately and flows to the County sanitary sewer. Any excess process wastewater is discharged to the sewer. All process areas are under roof; therefore, stormwater run-off from the plant site is uncontaminated and does not require containment or treatment.

The concept of operation for wastewater treatment is to collect both contact and non-contact wastewaters separately and reuse all water in cooling and wetting the bottom ash, and as dilution water for the spray dryer absorber. Contact wastewater, specifically, is water which has either been in contact with ash, scrubber chemicals, or used to clean the fire side of the boiler tubes, and is high in solids content. Non-contact wastewater is all other wastewater from the facility except storm and sanitary.

The non-contact wastewater includes neutralized demineralizer regenerate, cooling tower blowdown, condensate, boiler blowdown and drainage, and floor drains from non-contact areas.

The contact wastewater is collected from the various areas of the facility and conveyed to a sump where solids settle. Overflow from the sump is then pumped to a large storage tank where it is neutralized and used as a make-up to the ash expeller units and spray dryer absorber. Solids which settle in the contact wastewater sump are periodically removed and landfilled with the bottom and fly ash.

When contact wastewater is not available as make-up, non-contact wastewater or raw water is used.

The non-contact wastewaters are collected in a sump and are normally pumped to the contact wastewater holding tank. If the non-contact wastewater is not needed, the wastewater is pumped to the sanitary sewer.

1.13.1 Instrumentation

a. Contact Wastewater. Wastewater which overflows the weir in the settling area of the contact water sump is automatically pumped to the wastewater holding tank. The pumps are controlled with a level switch and the wastewater is neutralized with caustic and lime before storage in the wastewater holding tank.

b. Non-Contact Wastewater. The non-contact water sump is basically a sump with minimum water storage. The non-contact water is automatically pumped to the contact sump for use when the water level allows.

1.14 Miscellaneous Equipment

1.14.1 Scales

Complete electronic inbound and outbound scales including four complete motor truck scales with foundations and load cells. Digital weight indicators to be displayed to driver on exterior display and to scale operator shall be provided on site. Displays shall, as a minimum, include gross wt. tare wt, and net wt. Traffic signals and all conduit and wiring up to the computer monitoring and recording hardware shall be provided.

Load cells shall be designed to withstand damage from water and/or dust and shall be capable of accepting 200% shock loading (twice nominal load capacity of the load cell).

All scale systems shall be furnished complete with all components including ground rods, lightning protection system, ground cable instrumentation and control conduit and wire with disconnects.

The scales shall be a self-contained, fully electronic motor truck scale. The scales shall be constructed with concrete deck and shall nominally be 70 feet long by 10 feet wide with a capacity of 60 tons. If the scale has

a pit, permanent electric lighting shall be provided for and drains shall be provided at bottom of pit.

Each scale shall have two sets of red and green traffic lights in each direction to control the trucks on the scales and immediately behind the scales.

Scales shall conform to and shall be calibrated to be in compliance with the latest edition of United States Bureau of Standards Book Number 44 and in compliance with state standards.

The scalehouse computer hardware will be provided by the City.

1.14.2 Miscellaneous Pumps

All miscellaneous pumps and accessories (if applicable) to be furnished and installed by the Company shall include, but not necessarily be limited, to the following:

a. Neutralization basin (sump) pumps sized for the expanded Facility.
b. Boiler chemical feed pumps.
c. Fire pumps sized for the expanded Facility.
d. Plant sump pumps sized for the expanded Facility.
e. Auxiliary cooling water pumps sized for the expanded Facility.
f. Service water pumps (if required).
g. Condensate transfer pump sized for the expanded Facility.
h. Desuperheater booster pump (if required).
i. Ashwater pump sized for the expanded Facility (if required).

j. Wastewater collection sump pumps sized for the expanded Facility.

k. Forced and gravity main wastewater pumps sized for the expanded Facility.

l. Motors, couplings, coupling guards and baseplates for the above pumps as applicable.

m. Special tools required for maintenance and installation.

Pump capacities and heads for all pumps shall include, as a minimum, a 10% and 10% margin respectively based on the Company's final piping arrangement.

Pumps shall be designed, as a minimum, in accordance with the manufacturer's standard for the service intended.

Selected pump minimum requirements are as follows:

		City Water Booster	Demin. Water
a.	Quantity	2	2
b.	Design capacity, gpm	300	200
c.	Design total dynamic head, ft	140	330
d.	Motor horsepower, hp	25	40

1.14.3 Air Compressors, Air Dryer and Accessories

A minimum of two (2) full capacity air compressors with aftercoolers, two (2) air receivers, one (1) air dryer, and associated accessories shall be provided.

Compressors and compressor motors shall be provided with a control system which will load and unload the compressors during operation. Compressor operation shall alternate between the two compressors during normal operation. The control system shall be the compressor manufacturer's standard offering for this type of service.

The air compressor system shall be designed to provide plant air and instrument air for the expanded Facility.

Additional minimum air compressor requirements are as follows:

a.	Quantity	2 @ 1800 SCFM each 1 @ 650 SCFM
b.	Operating/design pressure, psig	100
c.	Air Dryer, Manufacturer, Model	Anderson or equal
d.	Receiver pressure, psig	125
e.	Receiver capacity, ft^3	Instr. Air-85, Process Air-148
f.	System air flow requirements, SCFM	Instr. Air 650 Process Air 1,800
g.	Air Compressor design airflow, SCFM	Instr. Air 1 @ 650 Process Air 2 @ 1,800

1.14.4 Heat Exchangers

All miscellaneous heat exchangers for boiler blowdown, auxiliary cooling water, and similar services shall be provided. Heat exchangers shall be designed for the service intended. The blowdown heat exchanger tube material shall be carbon steel.

1.14.5 Tanks

A condensate storage tank, demineralized water storage tank, auxiliary cooling water head tank (if required), and any other miscellaneous tanks necessary to Company's design shall be provided. The tanks shall be sized for the expanded Facility.

Some specific tanks and minimum requirements are as follows:

a. Tanks, Demineralized Water and Condensate Storage

	1. Service	Demineralized Water	Miscl. Condensate Storage
2.	Size, gal	24,000	3,000
3.	Material	Lined Steel	CS

b. Tanks, Other

1. Service	Wastewater Storage	Demin. Regenerant Neutralization
2. Design pressure, temperature	ATM/110°F	ATM/110°F
3. Size, gallons	200,000	18,000
4. Material	Lined Steel	Lined Steel

1.14.6 Miscellaneous Cranes

The Company shall furnish and install miscellaneous monorail hoists, and cranes with associated accessories.

As a minimum, turbine building and maintenance shop cranes, and boiler feed pump aisle hoists shall be furnished, sized for Company's maximum maintenance loads. Turbine building crane shall be furnished and installed with controls and accessories as required for installation and maintenance of the turbine-generator in strict accordance with manufacturer's requirements and instructions.

Additional crane minimum requirements are as follows:

a. Turbine room crane

Hoist ratings	
Main hoist rating, tons	15
Auxiliary hoist rating, tons	N/A

Maximum hoist lift, ft	45
Controls, type	AC/Stepped
CMAA rating	A

b. Miscellaneous Hoists and Cranes

Location	Refuse Pit
Type and function	Service Hoist for Crane
Capacity, tons	6

1.14.7 Elevator (Future)

a.	Location	boiler bldg
b.	Type and function	Passenger/Freight
c.	Capacities, tons	2 1/4

1.14.8 Miscellaneous Mechanical Specialities

All various miscellaneous mechanical specialty equipment including but not limited to the following shall be designed, furnished, installed and tested:

a. Steam Traps
b. Boiler Drain Flash Tank
c. Expansion Joints
d. Strainers
e. Safety and Relief Valves
f. Sample Coolers
g. Silencers

All specialties shall be designed for the service intended and installed in accordance with manufacturer's recommendations.

1.14.9 Mobile Equipment

The following shall be provided:

a. four door sedan

b. one ton flatbed truck

c. Front end loader

d. Forklift

e. "Bobcat" loader

f. Crane/cherry picker

Other vehicles necessary for the maintenance of the facility will be rented on an as-needed basis.

1.15 Electrical System

The electrical system will be designed, and equipment and materials will be specified, in accordance with applicable sections of the following current codes and standards:

- National Electrical Code (NEC).
- National Electrical Safety Code (NESC).
- National Fire Protection Association (NFPA).
- State Building Codes.
- Local Municipal Ordinances and Codes.

- Public Utility Regulations.
- Underwriters' Laboratories, Inc. (UL).
- National Electrical Manufacturers Association (NEMA).
- American National Standards Institute (ANSI).
- Institute of Electrical and Electronic Engineers (IEEE).
- Insulated Cable Engineers Association (ICEA).

The complete electrical system must conform to Washington Water Power Company (WWP) requirements. The company shall be totally responsible for designing and providing an electrical system in complete compliance with WWP requirements, and must obtain WWP approvals of the production Facility, the related interconnection, operation and protective equipment.

All equipment shall be sized for initial and future thermal and fault duties.

All circuit breakers and protective relaying shall provide selective coordination in isolating faulted or overloaded circuits or equipment and shall conform to WWP's requirements.

1.15.1 Electric Power Generation

Electrical power will be generated at 13.8 KV on site by a 26 MW turbine driving a 29 MVA synchronous generator. All electrical energy generated by the Facility turbine driven generator in excess

of the station auxiliary and Facility administrative loads will be marketed to WWP.

The plant electrical system shall consist of an electrically interconnected power generation and distribution system such that the Facility may:

a. Purchase power from the electric utility through the main step-up transformer during:
   1. Start-up conditions
   2. Generator outage conditions
   3. Any other preselected time.

b. Market excess generated electrical energy through the main step-up transformer with provisions to allow all Facility auxiliaries to be supplied from the Facility's main distribution bus.

1.15.2 Utility Coordination

The plant will interconnect to Washington Water Power Company at the 115 KV pull-off structure located inside the plant substation. The Project will provide the Facility step-up transformer and substation including all WWP-required substation metering, relaying, and control equipment. Protection is shown on drawing 10-25-103, and as shown in Appendix C.

The Company shall provide all in-plant protective relaying, controls, and instrumentation required by Appendix C.

1.15.3 Reactive Power

Plant power factor will be controlled so that any power purchased from the utility will be at or near unit power factor. The plant generator may, however, furnish reactive power to the utility, but that will be controlled with a voltage regulator.

1.15.4 Plant Electric Power

Plant electric power will be supplied from the 13.8 KV generator to 13.8 KV metal-clad switchgear located in the switchgear building. The 13.8 KV plant distribution metal-clad switchgear will include one generator breaker, one utility tie breaker and one feeder unit to supply power to plant unit substations. The system is described on Drawing No. 10-25-101.

The 13.8 KV metal-clad switchgear will be constructed for indoor service and suitable for use on a 13.8 KV, three-phase, three-wire,

60 Hz system with a basic insulation level of 95 KV. Breakers will be metal enclosed, drawout vacuum type, operated by an electrically charged, mechanically and electrically trip-free, stored-energy-operated mechanism. The breaker control voltage will be 125 volts DC, supplied by storage batteries located in the turbine generator building. Breakers will be rated at 15 KV maximum RMS voltage, with short circuit and continuous current ratings to match system requirements.

A 4.16 KV plant system will be provided to support large motor loads and will be derived from the 13.8 KV system via step-down transformers.

The 4.16 KV switchgear will have the general attributes of the 15 KV equipment, will be suitable for use on a 4.16 KV, 3 phase 3-wire system, and will have a basic insulation level of 60 KV with maximum operating voltage of 4.76 KV. Motors with 4000 volt nominal rating will be controlled by 4160 volt switchgear.

A 480 volt plant distribution system will be provided to serve motors below 250 HP, lighting and building services, and miscellaneous non-motor loads. Switchgear utilized for 480 Volt, 3 phase, systems shall consist of electrically and manually operated power air circuit breakers in drawout construction, with fully insulated copper bus and silver plated bolted connections. One metering system will meter the energy supplied by the generator. A second metering system will

measure the energy flow in the utility tie. A third metering system will be used to measure the plant load.

1.15.5 Synchronizing

The plant will be brought on line by means of the 13.8 KV interconnection with system through the 13.8 KV utility tie breaker. The turbine generator will then be brought up to speed and synchronized with the generator breaker. In case the plant is running while isolated from the Washington Water Power Company system, resynchronization will take place across the 13.8 KV utility tie breaker.

1.15.6 Transformers

All load center transformers will be silicone or oil insulated and will be located outdoors.

Additional transformer minimum requirements are as follows:

		5 kV	480 V
a.	Service	4160V MCC	480V MCC
b.	Type, KVA Rating	see dwg 10-25-101	
c.	Voltage, No. Phases	13.8-4.16KV/3	13.8-0.48 KV/3
d.	Taps	H.V. No Load ±2 - 2 1/2%	H.V. No Load ±2 - 2 1/2%
e.	Impedance	5.5%	5.75%
f.	Protective Relays (Type, Manufacturer, Model)	Phase-Westinghouse CO-9 or equal Ground-Westinghouse ITH or equal	

1.15.7 Motor Control Centers

Motor control centers utilized for 480 Volt, 3 phase, systems shall be designed, fabricated and applied in accordance with applicable NEMA standards, shall contain rodent barriers to close all openings and shall utilize fully barriered copper bus.

1.15.8 Electric Motors

Electric motors shall be full voltage starting, squirrel-cage, 60 Hz, NEMA design B, induction type (except for special application) designed and built in accordance with applicable ANSI, ASTM, IEEE and NEMA standards.

All process electric motors shall be provided with epoxy sealed insulation and sized such that the maximum driven load under normal operating range shall not exceed 95% of rated motor horsepower and utilizing motor service factor only for abnormal operating conditions.

1.15.9 Emergency and DC Power Systems

An uninterruptible power supply will be supplied to furnish power to instrumentation and other critical loads. System will include rectifier, batteries and chargers, inverter, automatic switching and regulating equipment.

Additional requirements are as follows:

a. DC System

1.	Batteries (Type, Manufacturer, Model)	Lead Cadmium
2.	Description	125V DC (60 Cells) w/Rack

b. Essential AC System.

1.	Description	30 KVA UPS (0.8 PF)

1.15.10 Lighting

The Facility lighting shall include complete interior and exterior site lighting in accordance with IES Recommended Lighting Levels for Control Stations and section 1.1 of this specification.

Indoor lighting systems shall include emergency lighting and exit lighting as required. Fluorescent fixtures will be provided in offices. Indoor and outdoor lighting will be high pressure sodium.

1.16 Controls and Instrumentation

The instrumentation and control systems will be selected on an individual basis, with each component being reviewed for suitability for the defined application. Control systems selected will exhibit stability during normal operation, and will have inherent automatic corrective features during upset conditions. Vendor system will be reviewed to determine compatibility with the overall control strategy and instrumentation components selected.

Interlocks will be provided in accordance with personnel and equipment safety practices and permissive start-and-trip logic.

A solid state microprocessor digital logic based distributed control system shall be provided as a minimum for all combustion controls, boiler drum level controls, deaerator storage tank level and pressure control, and generator temperature controls. Electronic transmitters shall be used for control room data acquisition and intelligence required for alarm, indication, and control.

1.16.1 Central Control System

The refuse-burning facility will be controlled from a central control room using a solid-state microprocessor-based distributed control system. Operator interface will be by means of cathode ray tube (CRT) operator work stations with keyboard. This system will enable the operator to maintain close control over the installation. Process and alarm set points will be contained in the software.

The system will be designed to be operated and monitored from operator's work stations. The stations will also include:

- Interactive process graphics capability.
- Printers for alarms, operational messages, and actions and changes logging.
- Color printers for hard copying of CRT displays.
- Strip chart recorders for certain operator selected variables, such as drum level, steam output, etc.

- On-line trend recording capability to provide a 26-hour record of up to 32 system process variables.

An auxiliary panel will be provided as part of the operator's station and will include the following:

- Turbine generator control insert.
- Turbine generator auxiliary motor controls.
- Deaerator level indicator.
- CCTV-pan-tilt control.
- Auxiliary burners gas shutdown.
- Miscellaneous process control pushbutton switches.

Control algorithms will reside in software. Algorithm changes, including alterations in control strategy, can be made from the keyboards. The loop displays and graphics will be displayed on the CRT.

Motor controls will also be included in the distributed control system. These will include start-stop controls and motor run/stop status indication. In general, all motors will be provided with locally mounted "Hand-Off-Auto" selector switches.

All necessary field instrumentation will be terminated in the distributed control system input/output racks. These racks will be located in the motor control center rooms.

The analog inputs and outputs will be conventional 4-20 MA DC signals. Discrete inputs will use 24V DC interrogation voltage. Discrete outputs will use 100 Volts AC.

Motor control inputs and outputs will be terminated in MCC compartments with multiconductor cables running to the distributed control system racks. Motor control discrete inputs and outputs will be 110 volt AC with power furnished from individual motor starters.

Two television monitors will be provided in the crane control pulpit from which either the refuse feed hoppers or the truck entrance ramp can be seen. A monitor will be located in the scale house from which entering trucks can be viewed. A monitor, from which the plant entrance, feed hoppers or the truck entrance can be viewed, will be located in the control room.

The overall distributed control system installation will be configured for an "operate by exception" philosophy. The operator will be able to continuously observe the operating parameters of all areas, but under normal ("up and running") conditions, all continuous processes will be under automatic control. Intervention in the automatic control will only be required in the event of upset conditions.

All control functions will be provided with a manual feature that the operator may use for direct manipulation of the subject variable.

The distributed control system will contain controls for all functions which require continuous operator surveillance, including, but not limited to, the following subsystems:

a. Boiler Feedwater

Each boiler will be equipped with an independent drum level indicator located on the auxiliary panel in the control room. An additional indicator will be located at each feedwater control valve station to allow manual feedwater control in the event of an emergency. Each boiler will be equipped with a three- element feedwater control system that meters and controls feedwater flow in response to drum level and main stream flow.

b. Steam Temperature

Each boiler will be equipped with an automatic steam temperature control system, utilizing an attemperator in the superheater system. The steam temperature will be automatically controlled at a specified setpoint at all normal steaming rates.

c. Main Steam Header Pressure

Pressure will be controlled automatically by the turbine governor through manipulation of the turbine throttle valves.

d. Combustion Controls

The refuse boilers are normally loaded (refuse feed rate) on boiler steam output flow control. The speed of operation of the refuse-feed ram is automatically controlled by an

electrohydraulic system to manipulate the fuel feed to meet the required steam flow. All gas burner flame-safety systems and igniters will have a hard wired safety shut-down feature mounted on the auxiliary panel in the central control room.

e. Combustion Air System

The combustion air will be automatically proportioned to the fuel feed. Underfire air will be automatically controlled to the volume of refuse feed. Oxygen in the flue gas will be monitored, and the excess oxygen control will automatically trim the underfire air to maintain complete burnout of the refuse on the grates to maximize combustion efficiency. In order to do this, the air flow to each individual undergrate air zone will be individually flow controlled by means of air flow measurements. The quantity of overfire air, above the grate, will be controlled to maintain proper furnace penetration and to provide turbulence for mixing of volatiles and air.

f. Grate Speed

Grate speed will be automatically ratio controlled to the refuse feed rate. Under normal conditions, the set point will be near maximum speed with small variations depending upon the BTU release of the refuse.

g. Blackout Control

Under some conditions, such as when feeding a large volume of very wet refuse, it will be possible to extinguish, or at least

to diminish the intensity of, the fire on the grate. To prevent this, an automatic blackout control will be installed for each boiler to alert the operator to this condition. This system will operate by comparing the fuel demand rate with the boiler output steam rate and the flue gas oxygen content.

h. Steam Distribution

Steam flows from each boiler will be metered and recorded. Steam flow to the turbine generator will be metered for flow, temperature, and pressure. Steam pressure reducing stations, steam conditioning valves, etc., will be installed as required for all reduced pressure users within the Facility.

i. Furnace Pressure

Furnace pressure in each boiler will be measured and automatically controlled by manipulating the ID fan inlet damper.

1.16.2 Instrumentation Housing

a. Field-Mounted Instruments

The electrical classification of these instruments will be dictated by each process requirement. Each instrument for outdoor service will have freeze protection enclosures.

Level instruments will generally be differential pressure transmitters, flanged type, with steel bodies and stainless steel elements. In areas where corrosion may occur, the piping

specification will govern the type of materials specified for instruments.

Flow instruments will generally be differential pressure type, with carbon steel bodies and stainless steel elements.

In areas where corrosion may occur, the piping specification will govern materials specification.

Thermowells will be provided for liquid service where corrosive conditions exist. Resistance bulbs will be included for low-temperature service and thermocouples for high-temperature service. Boiler-tube temperature monitoring and flue-gas monitoring will require special consideration of sheathing and methods of attachment or insertion.

Orifice plates will be square edge and fabricated from type 316 stainless steel. Flow nozzles will be used for main steam and feedwater flows.

Pressure instruments will utilize direct pressure taps for clean applications and sealed connections for slurries. Sensing elements will be stainless steel.

Measuring devices for physical properties, such as density, specific gravity, opacity, viscosity, conductivity, feedwater analysis, etc., will be selected based on performance history

and experience. Regulatory requirements will be taken into account in the selection of such devices.

Valve positioners will be used where necessary. Actuators will be the diaphragm type, sized to meet pressure requirements with a 3 to 15 PSIG air signal.

For general water and other non-corrosive services, carbon steel bodies with stainless steel trim will be used. Where pressure drops dictate, special alloy trim will be used.

For low pressure (up to 300 PSIG) services, flanged bodies will be used. For pressure above 300 PSIG, piping specifications will be consulted for end connections.

For chemical services, alloy bodies and trim will be used, based on corrosive properties of the material to be handled.

When required, damper operators will be pneumatic with a "lock-in last position" on air failure.

b. Control Panels

Control panels will be fabricated from mild steel sheet and painted. They will be of the console or vertical type.

Where the panels are subject to weather or corrosion, the panel material will be stainless steel or an approved substitute,

suitable for outdoor use. Nameplates on the front of panels will be white with black engraving.

c. Central Control Room

The central control room will be air conditioned, and the air will be filtered. The control room will be constructed to allow the use of general purpose electrical classification for instruments. All wiring and piping to and from the control system will enter through the floor.

d. Local Control Room

Local control rooms will be provided for the boiler feed-water demineralizers and the chlorination system. Controls will, in part, be bought with these systems. Operation of these controls will be monitored from the central control room. The local control room controls will be designed for unattended operations.

e. Rack Rooms

I/O racks will be located in their respective MCC rooms, negating the need for separate rack rooms.

f. Ash Handling System

The ash handling system will be controlled from the distributed control system. All conveyors and other equipment will be interlocked for sequential startups; each conveyor will have a local "Hand-Off-Auto" selector switch.

g. Transmission Lines

Single tubing for local pneumatic loops will be PVC-coated 1/4-inch copper tubing. All tubing will be supported in aluminum tube trays or raceways.

Instrument air headers 1/2-inch and larger will be galvanized steel with block valves as defined in the piping requirements.

Electronic transmission wire will be No.16 AWG, twin conductor, with aluminum mylar shield, copper drain wire, and PVC jacket.

Thermocouple extension wire will be No. 18 gauge twisted-wire conductor, teflon-over-single conductor and teflon overall. Extension wire will be of the same type as the thermocouple to which it is connected.

1.17 Heating, Ventilating, and Air Conditioning (HVAC)

This section covers the plant requirements for heating, ventilating, and air conditioning in designated areas for personnel safety and comfort, equipment protection, general ventilation,and freeze protection.

All air conditioning, heating and ventilation equipment, systems and accessories shall be provided, cleaned, tested and balanced. HVAC design outdoor conditions shall be 2-1/2% design dry bulb temperature

and mean coincident wet bulb temperature as reported in ASHRAE Fundamentals or other equally reliable weather data source.

Equipment of major manufacturers with reputation for quality and energy efficiency shall be provided. Low-leak dampers, and high EER compressors shall be furnished. Systems shall be designed and equipped in accordance with ASHRAE guidelines.

Heating, ventilating, and cooling systems will be provided for year round personnel comfort, consisting primarily of packaged air conditioners, filters, heating coils, ductwork, grilles, registers, controls, and exhaust systems as required, and will be located in the following areas:

- Administrative and plant offices, lunchroom and locker rooms.
- Control room.
- Scale house.

Similar heating, ventilating, and cooling systems, sized to provided 90 degree F maximum space temperature, will be provided for equipment protection in the following areas:

- MCC room
- UPS room

The control room shall be heated, cooled and ventilated by two 100% redundant air handling units. The cooling load calculation shall include 150% of the equipment load to provide cooling capacity for

the expanded Facility. Humidification shall be provided. Design indoor conditions for control room shall be:

Temperature 72F

Rel. Humidity 50%

Offices, restrooms, locker rooms, scale operations facilities, reception area, laboratory electrical and instrumentation shop, and plan room shall be heated, cooled and ventilated. Design indoor temperatures for administrative areas shall be as follows:

Winter 68F

Summer 78F

Heat removal systems will be provided in rooms or buildings where switchgear or transformer equipment is located. These systems will consist of filtered supply fans, louvers, exhaust fans, and gravity shutters. These systems will be provided in the following areas:

- Switchgear rooms.
- Transformer room.

Heating and ventilating systems will be provided for areas and rooms requiring year around ventilation and/or freeze protection.

Year around ventilation systems will consist of gas fired or steam make-up air units with filters, louvers, ductwork, grilles, registers, and controls. Relief air will be exhausted as necessary using roof and/or wall exhaust fans. This type of system will be provided for the following areas:

- Boiler house.
- Turbine building.
- Maintenance shop.
- Warehouse.
- Water treatment area.

Systems providing summer ventilation and winter freeze protection will consist of exhaust fans, intake louvers, unit heaters, and controls. This type of system will be provided for the following areas.

- Ash handling building.
- Fire pump house.

The boiler building, turbine building, heater bay, and ash building shall be heated to a minimum of 50F and ventilated with a minimum of five air changes per hour. The air pollution control equipment enclosure will be ventilated with a minimum of five air changes per hour.

Under normal operation, the refuse tipping and storage building shall be ventilated by drawing air from the refuse pit for boiler combustion air.

The battery room and hydrogen storage room will be ventilated to remove battery acid fumes and hydrogen vapors. Corrosion-resistant and explosion-proof materials will be used to construct the exhaust fan and ductwork.

Enclosed stairwells will be pressurized utilizing supply fans and pressure-relief dampers.

Additional minimum HVAC requirements are listed below:

Building or Area	Capacity CFM	MBTU/hr	Description
Boiler (below El.42)	60,000	4MM	Gas Fired Make-Up
Boiler (above El.42)	220,000	--	Roof Exhaust Only
Turbine	40,000	26MM	Gas Make-up, Roof Exhaust, Primary and Secondary
Reception Area	97,000	---	Fan Suctions
Air Pollution Enclosure	100,000		Exhaust Fans
Administration Building	20 Tons A/C		Roof Top Air Cooled

1.18 Piping

1.18.1 General

All piping design and construction will be in accordance with the requirements of the local, state, federal, and national codes ad standards.

The main steam header, the boiler feed pump discharge header, and other points of connection including but not limited to water treatment system, auxiliary cooling water, boiler blowdown, and compressed air shall include capped stub-outs for future installation of an

additional steam generating unit. Piping required for the Facility expansion shall be considered when the piping layout is developed.

Fabrication and erection procedures shall conform to the requirements of this specification with regard to materials, welding, heat treatment, tests and inspection, welding operator and procedure qualifications and alignment such that the installed systems comply with ANSI B31.1 and/or ASME Section 1, as applicable, and ANSI material and fabrication standards. Steam piping shall be designed and installed in accordance with the recommendations contained in ASME No. TWDPS-1 "Recommended Practices for Prevention of Water Damage to Steam Turbines" and turbine manufacturer's instructions.

Piping shall be designed, installed tested, and inspected in accordance with the ASME Boiler Code and the Power Piping Code, ANSI B31.1.

Specific items included are:

- Systems will be designed with proper allowances for corrosion and erosion.

- Weather protection will be provided on appropriate piping systems.

- Company shall furnish and install electrical temperature controlled heat tracing and insulation on all caustic piping and

any water piping exposed to outdoor temperatures such as tank external piping, wet-pipe fire protection, and service water washdown and dust suppression piping.

- Access platforms with ladders will be provided for all frequently operated valves or other piping components not readily accessible from floor level.

- A stress report will be provided for appropriate piping systems to establish that the design complies with the requirements of the codes.

- Piping supporting elements will be designed by a professional Engineer. These elements will conform to the latest requirements of ASME, ANSI B31.1, and MSS standard SP-58. Supporting elements will be designed based on maximum combined loading on the piping system.

- All equipment requiring insulation will be insulated with an appropriate type of specified insulation.

- All pipe welds will be made with a qualified welding procedure specification in accordance with ASME ad ANSI codes and by qualified welders.

- The quality control requirements of Section 1 of the ASME Code will apply to all piping being constructed to the ASME ad ANSI B31.1 codes.

1.18.2 Plumbing

The design will be based on the requirements of applicable city, county, and state codes. Where no such codes apply, design will be based on requirements of the Uniform Building Code in effect and as published by the International Conference Building Office (ICBO).

All facility restroom sanitary wastes within the Facility shall flow to the sanitary sewer.

Floor drains in the water treatment area of the Facility, a drain from the bulk acid and caustic tanks, sump drains from water treatment equipment, and a chemical cleaning drain shall permit flow of these fluids to the neutralization sump.

Facility roof drains shall be PVC pipe to carry rain water from the roof of the plant to the storm drain system. Roof drainage system will be based on a rainfall rate as described in the U.S. Department of Commerce Weather Bureau Technical Paper No. 2.

Facility floor drains and bell-ups for equipment drains shall provide drainage throughout the plant. The drains shall flow via grease and grit and oil traps to the waste sump.

The potable water system shall be thoroughly flushed and disinfected in accordance with Code requirements and protected by reduced pressure principle backflow preventers.

1.18.3 Valves

All valves and accessories, including motor and pneumatic operators as required by Company's system design shall be provided. As a minimum isolation valves shall be provided to facilitate repair of all equipment. All valves shall be designed for the service intended.

End connections shall conform to the requirements of the applicable ANSI Standards.

1.19 Fire Protection System

The fire protection systems, interior sprinkler systems, exterior fire mains, fire pumps, equipment and installations will be governed by the applicable sections of the following regulations, codes or standards:

- State and Local Codes where existing, or underwriters requirements.

- National Fire Protection Association Standards (NFPA)
  - NFPA No. 10 - Fire Extinguishers, Portable

- NFPA No. 12A - Halon, 1301 Fire Extinguishing Systems
- NFPA No. 13 - Installation of Sprinkler Systems
- NFPA No. 14 - Standpipe and Hose Systems
- NFPA No. 15 - Water Spray Fixed Systems for Fire Protection
- NFPA No. 20 - Centrifugal Fire Pumps
- NFPA No. 24 - Outside Protection

- Occupational Safety and Health Act of 1970, including addendums to date (OSHA).

- Underwriters' Laboratories Fire Protection Equipment List and Factory Mutual Approval Guide.

- National Board of Fire Underwriters (NBFU)

- Factory Mutual (FM) requirements

1.19.1 Design Criteria

The maximum water demand for the system will be determined. Maximum pressure demand will be determined and could occur when the sprinklers over the refuse pit operate.

Two approved fire pumps will be verified and furnished. The primary pump will be an electric motor-driven pump capable of pumping

required GPM at required PSI. The secondary pump will be diesel-engine driven and will pump required GPM at required PSI. A jockey pump will maintain loop pressure, keeping the fire pumps ready for service if an emergency situation occurs.

1.19.2 Exterior Fire Protection

An underground fire loop will be installed around the plant, and will include hydrants spaced at approximately 300 foot intervals. The loop will consist of pipe sized as required with laterals to various sprinkler areas, post indicator valves, sectional control valves, and fire hydrants with a fully equipped fire hose house at each hydrant. Fire hose house equipment includes:

- 200 feet of 2 1/2 inch diameter cotton-rubber lined fire hose in 50 foot sections.
- One fire ax.
- One crowbar.
- Two gaskets.
- Two 2-1/2 inch diameter adjustable fog nozzles.
- 100 feet of 1-1/2 inch diameter cotton-rubber lined fire hose in 50 foot sections.
- One gate wye.
- One 1-1/2 inch diameter adjustable fog nozzle.
- One hydrant wrench.
- Four 2-1/2 inch spanner wrenches.
- Two hose ladder straps.

1.19.3 Interior Fire Protection

Fire protection will be provided where required for the buildings and systems as described below.

a. Reception Building--Dry Pipe System:

An automatic sprinkler system extending 40 feet out from the refuse pit wall will be installed in the tipping floor area. Small hose stations, supplied by a sprinkler dry pipe valve, will be located around the perimeter of the tipping floor.

b. Refuse Pit Area--Pre-Action Systems:

A pre-action sprinkler system will be installed at the roof over the refuse pit area. An electric rate-of-rise detection system will actuate the pre-action valve.

Manually operated monitor nozzles will be located on the charging floor around the refuse pit area.

Small hose stations will be located near the charging openings, and at 10,000 square foot intervals.

c. Turbine Generator--Wet Pipe System:

Sprinklers will be installed beneath the entire operating floor and any floor on mezzanines between operating floor and basement.

An automatically reaction fused head system will be provided to protect the turbine bearings, oil reservoir, lube oil piping, hydrogen seal unit, and hydrogen cylinders if located nearby. Actuation will be by rate-of-rise detection system.

Small hose stations will be located on the operating floor and in the basement.

d. Boiler Complex--Fire Hose Stations--Wet Pipe System:
Small hose stations will be installed at various levels of the boiler building complex. Sprinkler protection will be provided where required for electrical cable trays located between the boilers and refuse wall and in areas where storage of flammable hydraulic oil is considerable.

e. Control Room--Halon:
A Halon 1301 extinguishing system including fire detection will be provided for the control room including the raised floor space. Halon hand extinguishers will be provided outside all room exits.

f. Administration Building--Extinguishers:
Portable (hand) fire extinguishers will be installed in the administrative building.

1.19.4 Fire Detection System

The system will meet or exceed the requirements and recommendations of the NFPA, UBC, and State codes. The system will have the following features:

- The control console will have solid state components throughout. The signaling loop will meet NFPA requirements for Class A operation. The console front will have 40 zone alarms.

- The system will monitor smoke and water flow for the following areas:

  - Offices
  - Control room
  - Refuse pit
  - Electrical equipment rooms
  - Refuse crane control room
  - Turbine lube oil area
  - Reception area

1.19.5 Materials

Unless specified otherwise by applicable codes, all underground and exterior pipe and fittings will be in accordance with NFPA No. 24 and all interior pipe and fittings will be in accordance with NFPA No.

13; fittings for deluge systems will be in accordance with NFPA No. 15. Pumphouse piping will be designed and installed per NFPA No. 20.

1.19.6 Equipment

All equipment will be of a type and quality suitable for the service intended and will be FM approved.

1.19.7 Fire Walls

Unless specified otherwise by applicable codes, two-hour fire rated walls will be provided for the battery room, control room, maintenance shop, and all other electrical rooms.

The turbine generator will be separated from the boiler and switchgear by two-hour fire rated walls up to the roof level.

The refuse crane pulpit will have fire rated construction, including passageway from pulpit to boiler building.

All openings through fire rated wall will have the same fire rating.

EXHIBIT 1

ACCEPTABLE EQUIPMENT LIST

CRANES, OVERHEAD

P & H (Harnischfeger Corp.)
Whiting Corporation
Kranco Cranes, Inc.
KONE

GRAPPLES, REFUSE CRANE

Hawco Manufacturing Company
Mack manufacturing, Inc.
Peiner
P & H

FEED HOPPER & CHUTE

Von Roll

FD FAN

TLT Babcock

SA FAN

TLT Babcock

ID FAN

TLT babcock

MOTORS

General Electric Company
Siemens - Allis
Louis - Allis
Westinghouse

STEAM GENERATORS

Babcock & Wilcox

MISCELLANEOUS HOISTS AND CRANES

Yale
P & H
Kranco

SWITCHGEAR

Siemens - Allis
General Electric Company
Westinghouse
Powell Electric Mfg. Co.

TRANSFORMERS

McGraw - Edison
General Electric Company
H. K. Porter
Westinghouse

DISTRIBUTED CONTROL SYSTEM

Bailey Controls Company

ESSENTIAL A.C. SYSTEM

Carrier
Trane
Pomona

CONVEYORS, BELT

Vulcan Engineering Co.
Young and Vann
Linder Industrial Machinery
Process Equipment

CONVEYORS, DRAG

Vulcan Engineering
Process Equipment
Ash-Tech
Patterson
Beaumont Birch
TLT Babcock

WATER TREATMENT

Aquatech
GLEGG
HOH Systems
Anderson
GACO Systems

TRUCK SCALES

C.M.I. Corporation
Colt Industries
Fairbanks-Morse
Toledo Scale Company

MISCELLANEOUS PUMPS

Worthington Group
Allis-Chalmers
Goulds Pumps, Inc.
Ingersoll Rand Company
Durco
Aurora Pump
Peerless Pump (FMC)
Fairbanks Morse Pump Division
Warren Pumps
Lawrence Pumps
Flow-Matic
Bingham
Johnston
Peabody Floway

AIR COMPRESSORS

Atlas-Copco
Ingersoll Rand Company
Joy Manufacturing

HEAT EXCHANGERS

TANKS

RECO Industries
PDM Inc.
Brown Minneapolis
Chattanooga Boiler and Tank
Prairie Tank and Construction Co.
Modern Welding Company, Inc.
RECO
Buffalo Tank
Addision Fabricators

FLY ASH SYSTEM

Vulcan Engineering
Continental Screw
Process Equipment
Thomas Conveyor

TURBINE GENERATOR

General Electric
Turbodyne

AIR - COOLED CONDENSER

GEA
Hudson
C.E. Lummus
Hamon
Siemens

CONDENSATE PUMPS

Worthington
Goulds
Warren
Lawrence
Flot-matic

BOILER FEEDWATER PUMPS

Ingersoll Rand Company
Worthington Group
FMC Corporation
Bingham Pump
Union Pump

DEAERATOR FEEDWATER HEATER

Graver Water
Cochrane Environmental Systems

FEEDWATER HEATERS

Bos-Hatten
Manning & Lewis Engineering Co.
Ametek
Graham Manufacturing Company
Marley Heat Transfer

AIR PREHEATERS

Babcock & Wilcox

SOOTBLOWERS (ECONOMIZER)

SDA

APC

BAGHOUSE

APC

STACK

Crown-Union
Pullman Power Products
Pittsburgh Des Moines Steel Co.
Van-Packer Company
Peabody

BOTTOM ASH SYSTEM

General Kinematics
Triple S Dynamics