OGDEN MARTIN SYSTEMS
of LEE, Inc.

SPEC NO. SS-410
ISSUE 006
DATE 5/17/91

TECHNICAL SPECIFICATION

FOR

STRUCTURAL STEEL

Facility Name: LEE COUNTY RESOURCE RECOVERY FACILITY

Location: LEE COUNTY FLORIDA

****

****

Specification Prepared By: A/E Name: OMS

Address: FAIRFIELD, NJ

Telephone: 201-882-7071

A/E Approved for Release:

	Printed Name	Signature	Date
1.	R. TERRAMOCCIA	R. Terramoccia	10/30/91
2.			
3.			
4.			
5.			

REVISIONS

001	Initial Issue	1/01/87
002	Revision	8/28/87
003	Revision	11/03/87
004	Revision	9/29/89
005	Revision	2/28/90
006	Revision	5/17/91

OGDEN MARTIN SYSTEMS, INC.

TECHNICAL SPECIFICATION
FOR
STRUCTURAL STEEL

TABLE OF CONTENTS

TABLE OF CONTENTS (contd)

1.0 GENERAL

1.1 Work Included

The Contractor shall provide all labor, supervision, equipment, tools, materials, and services to furnish, shop detail, fabricate, shop coat paint deliver, unload, store, handle, and erect the following items as shown on the Engineer's drawings and as specified herein:

1. Structural steel framing and bracing for all buildings, structures supporting equipment, pipe, tray and duct supports.

2. Miscellaneous steel framing and assemblies including clips, angles, plates, and stiffeners.

3. Grating and raised pattern floor plate platforms, complete with curbs, railings, toe plate, banding, sleeves and stiffeners.

4. Stairways including stringers, handrail, landings, hangers, posts, bracing, treads with non-skid nosing, connecting clip angles, including concrete filled treads.

5. Ladders, safety cages, top hoops, self-closing safety gates, guide and support clips.

6. Roof purlins, wall girts, eave struts, sill angles, sag rods and roof parapets.

7. Crane girders, rails, rail clamps and splice bars with fasteners, traction plates, electrical support brackets and beams and crane end stops.

8. All lifting beams; hitch plates, monorails, hoists and davits attached to steel framing.

9. Base, splice & cap plates for columns and bearing plates for beams including setting and shimming material at the required elevations.

10. Door, louver, window, lintel, smoke hatches, floor openings, roof access openings, vents, T-G silencers, skylights, pipe penetrations and HVAC framing constituting a part of the steel framing.

11. Bolts, washers, nuts, and direct tension indicators, where applicable, for all shop and field connections and drilled-in concrete anchors.

12. Weld for shop and field connections.

13. Surface preparation, painting, galvanizing where specified herein, and field touch-up of painted and galvanized items and field painting of bolts after erection.

14. Other remaining items necessary to complete construction.

15. Steel framing and shaftway structural steel for elevator(s).

1.2 Work Not Included

The following associated items and work will be furnished and/or performed by others:

1. Supply and installation of anchors bolts, sleeves, plates, and other embedments which are to be set in concrete.

2. Supply and installation of grout for equipment and column base plates.

3. Supply and installation of elevators with guideways/guiderails.

1.3 Related Work

Other specifications related to work in this specification include, but are not limited to, the following:

Specification No. SS-408 - Concrete
Specification No. SA-550 - Painting Ferrous Metals Included in Subcontractor's Work

1.4 References

The following documents relating to the work are referenced herein. The issue date of the document (including addenda) in effect on the date of Invitation to Bid shall apply. If there appeàrs to be a conflict between this specification and a referenced document, the matter shall be referred immediately to OMS for resolution.

AISC - American Institute of Steel Construction

AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings

AISC Code Standard Practice for Steel Buildings and Bridges

AISC Manual of Steel Construction

ASME - American Society of Mechanical Engineers

ASME/ASTM A17.1B Safety Code for Elevators

ASTM - American Society for Testing and Materials

ASTM A1	Carbon Steel Tee Rails
ASTM A3	Steel Joint Bars, Low, Medium, and High Carbon (Non-Heat Treated)
ASTM A36	Structural Steel Shapes and Plates
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless (Types E or S, Grade B)
ASTM A123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A307	Carbon Steel Externally Threaded Standard Fasteners
ASTM A325	High-Strength Bolts for Structural Steel Joints
ASTM A386	Zinc Coating (Hot-Dip) on Assembled Steel Products
ASTM A500	Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes (Grade B)
ASTM A501	Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A569	Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip Commercial Quality
ASTM A572	High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality (Grade 50 KSI)
ASTM A759	Carbon Steel Crane Rails

AWS - American Welding Society

AWS D1.1	Structural Welding Code

RCSC - Research Council on Structural Connections of the Engineering Foundation

RCSC	Structural Joints Using ASTM A325 or A490 Bolts Specification

1.5 Quality Assurance

1.5.1 Welding

Welds shall be tested by nondestructive methods as specified in the Welding section herein.

1.6 Submittals

The Contractor shall comply with the submittal of the following documents and drawings:

TITLE	OMS	ENGR
CMTR - Structural Steel and Bolts	1	1
NDT Reports	1	1

CMTR - Certified Mill Test Reports
OMS - OMS's Site Representative
ENGR - Engineers
NDT - Non Destructive Test

The Contractor's fabricator shall provide shop drawings, bolt lists and other information as may be required by the contract documents.

Shop drawings (including erection plans) shall show fabrication details in English units, bolted and welded connections (including grooves & back-up bars) for both shop and field welds, copes, blocking and shop notes.

Shop drawings shall be furnished progressively as completed and all such drawings and bolt/material lists shall bear OMS's project number and the name (or item number) of the structure to which they apply. Weight of shipments shall be based on AISC Code of Standard Practice, (AISC Manual of Steel Construction). The Contractor shall furnish OMS's site representative with a copy of the packing lists.

All shop detail and erection drawings, including calculations for special connections (where appropriate) shall be prepared under the supervision of a registered professional engineer, checked before submittal and approved by the engineer before fabrication commences.

A complete copy of all shop drawings shall be kept on file at the site by the contractor and made available on request by OMS or the Engineer.

1.7 Product Handling

1.7.1 Provisions for Storage

All items shall be stored on cribbing or equivalent to avoid trapping water and to allow air circulation.

Items shall be handled in a manner which is consistent with safe and sound material handling practices.

1.7.2 Shipping Requirements

For all items, packaging shall be adequate to prevent contamination, mechanical damage or deterioration during the field storage period. Structural steel members shall be cleaned, painted and identified by erection marks. Bolts, nuts, and washers shall be shipped in closed containers to exclude moisture.

2.0 PRODUCTS

2.1 Materials

All material shall be new.

Structural steel shall conform to ASTM A36 and shall be a domestic source (exceptions will require OMS's prior written approval).

High-strength steel shall conform to ASTM A572, Grade 50. Structural tubing shall conform to ASTM A501. Steel pipe shall conform to ASTM A53, Type E or S, Grade B.

2.2 Design and Workmanship

2.2.1 General

The AISC Specification and Code are hereby incorporated into this specification and shall apply except as otherwise specified herein or in related documents, or approved in writing by OMS.

The type of construction used for the structural steel framing, in general, shall be Type 2, ("simple framing") as defined in the AISC Specification. Type 1 construction, ("rigid-frame") shall also be used where design conditions dictate.

Steel construction projecting inside of elevator enclosure walls shall conform to ASME/ANSI A17.1b.

2.2.2 Design of Connections

Shop connections shall be either welded (preferred) or high strength bolted (A325). Field connections shall be high strength bolted unless otherwise specified on the Engineers drawings. Also where indicated on the Engineers drawings, connections may be made with ASTM A307 bolts or with high strength bolts for light, miscellaneous framing such as handrailing, ladders & cages, stair treads, purlins and girts.

High strength bolts, unless otherwise noted, shall be bearing type with bolt threads included in the shear plane.

Connections with repeated reversal and vibratory loads shall be friction-type connections and shall have no less than two (2) bolts per connection.

All connections shall be designed in accordance with the AISC specifications. The connection details shall be shown on the design drawings except as follows:

- Framed beam shear connections shall be designed and detailed by the Steel Fabricator in accordance with AISC Type 2 construction provided the beam shear loads at the connections do not exceed one-half of the total allowable uniform load for beams laterally supported, (as given in the AISC "Manual of Steel Construction") plus any axial load that may be shown on the drawings.

- The connections at ends of tension or compression members for bracing members shall develop the force due to the design load, but not less than 50 percent of the effective strength of the member, based upon the kind of stress that governs the selection of the member. Working points for designing and detailing of the connections shall be shown on the design drawings.

- When the loads acting on the connections are given on the design drawings, the Fabricator shall design and detail the connections.

- The Contractor shall be responsible for the design of connections not shown on the drawings and as such, is also responsible for the coordination of the connections and their effect on other building components or systems.

Where connections are to be field welded, holes for erection bolts shall be placed in the end connections and the members to which they are to be attached. Erection bolts shall be furnished by the Fabricator.

2.3 High Strength Bolts

2.3.1 Material

High strength bolts, washers and nuts shall conform ASTM A325. High strength alloy bolts, washers and nuts shall conform to ASTM A490.

2.3.2 Use

A minimum of one hardened washer per bolt shall be placed under part turned when tightening A325 or A490 bolts.

All bolts in any connection shall be installed with all nuts on the same side unless interferences will not permit. Vertical bolts shall be installed with nuts on the lower side, except where space restrictions make this impossible.

2.3.3 Inspection

The inspection of high-strength bolts shall conform to all provisions of Section 6 of the RCSC Specification and AISC Code.

2.4 Plate and Angle Curbs

All plate and angle curbs shall have neat close joints and shall be butted at corners. The maximum clearance at joints shall be 1/8 inch.

2.5 Structural Steel Stairs

Stair widths shall be no less than 2'-6" or greater if required by code.

Exposed ends of stair stringers shall be cut with a saw or other approved method and ground smooth. Ends of stair stringers in public areas shall be capped with a steel plate.

American Stair Products "speed stair" is an acceptable alternate subject to OMS and the engineers approval for manufacturer's component option list for treads, landings, rails, posts and risers.

2.6 Floor Grating and Stair Treads

Steel floor grating (preferred) and stair grating treads (with raised pattern plate non-skid nosing) shall be of welding quality mild carbon steel conforming to ASTM A569. Steel floor grating and stair treads, in the depths indicated on the Contractor's drawings, shall be of welded construction, rectilinear in pattern, with 3/16 inch thick longitudinal bearing bars spaced 1 3/16 inches on centers, and cross members 3/16 inch minimum thickness spaced 4 inches on centers. Grating and stair treads (including raised pattern plate nosing) shall be hot dipped galvanized in accordance with ASTM A123.

Exception: Concrete filled, metal pan stair treads (with closed riser) and landings shall be provided for enclosed fire escape stair towers and public stairs as shown on the Engineer's drawings.

Serrated grating and stair treads shall be provided in exterior applications for northern climates where ice and snow conditions prevail.

Grating shall be furnished and installed in reasonable sized sections, avoiding patchwork, with due regard for neat appearance and safety of finished product. Longitudinal and cross bars in adjacent sections shall be in line when erected end-to-end.

Grating shall be fabricated and erected to fit around protruding structural members, equipment and piping.

All grating shall be banded at edges of openings. Banding strips shall be at least the same thickness and depth as the bearing bars to which they are welded. When openings between grating & protruding elements exceeds 1", then a 1/4"

minimum toe plate thickness shall be provided and have a vertical height of 4" from its top edge to the level of the floor.

Manufacturing standards and tolerances of the NAAMM Manual shall be followed.

Removable sections of grating (as identified on the drawings) shall be fastened to the supporting steel with four (4) sturdy 14 gauge galvanized saddle type clips using 1/4 inch diameter studs bolts or self tapping machine bolts, together with nuts and washers. Clips shall have a 5/16 inch diameter by 1/2 inch slotted hole. Stair treads shall be fastened to the stair stringers with 3/8 inch diameter bolts and nuts.

Permanently installed grating shall be welded in the field as shown on the drawings or in the shop for shop assembled pieces.

2.7 Raised Pattern Floor Plate

Raised pattern floor plate (where a closed flooring is required) shall conform to ASTM A36 with a symmetrical raised diamond pattern. The plate shall be smooth-cut or finished to provide smooth, straight edges. Removable floor plates shall be fastened to the supporting steel using the Floor-Fast system by Struct-Fast Inc., Wellesley Hills, MA, or approved equal.

Permanently installed raised pattern floor plate shall be welded in the field as shown on the drawings or in the shop for shop assembled pieces. Stiffening ribs are to be provided where required by design.

2.8 Railing

Guardrail, handrail and posts shall be of pipe construction and designed to resist governing code specified loadings and "openings" between rails that may be enforced by the local building official. Railing shall be located as shown on the Engineers drawings with posts spaced not greater than 8 feet-0-inches on centers.

For "Fire-Rated Stair Towers" and applications in areas of public use, handrailing shall also be of pipe construction and designed to satisfy code and local regulations.

When governing code specified loadings are not given, then the following shall apply: the anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail. Engineer to verify railing design is adequate to resist applied forces.

Handrailing & toe plates shall be shop fabricated into complete assemblies for ease of field erection.

All projecting cut edges and welds on railing to be ground to a smooth finish.

2.9 Ladders, Cages and Self Closing Safety Gates

Ladders shall be provided for access from one structure level to another where operations require infrequent travel, non-routine access to equipment and where stairs are impractical due to space limitations. The refuse and turbine generator cranes serve as only two examples where ladders must be provided to mount equipment for servicing.

Ladders and cages shall conform to ASTM A36.

Self closing safety gates shall be made from 3/4" diameter bar material and fabricated to rest on the cage hoop or rail as shown on the Engineers drawings.

Ladders shall be provided with top hoop only when they extend less than 20' above grade.

Ladder rungs shall be spaced at 1'-0" c.c. (max.).

Provide cages on ladders of more than 20'-0" above grade or as required for safety.

All projecting cut edges on ladders & cages to be rounded to a smooth finish.

Ladder cages shall be shop assembled & attached to ladders as permitted by shipping limitations.

2.10 Crane Rails

Crane rails and standard accessories shall conform to ASTM A1, No. 1 modified rail, for rails weighing less than 104 pounds per yard, and ASTM A759 for rails weighing 104 pounds per yard or more. Joint bars shall conform to ASTM A3.

Crane rail splices shall have tight joints using bolted splice bars, ASTM A325 bolts & nuts with alloy spring washers furnished to A.R.E.A. specifications. Refuse crane rail clamps shall be floating type clamps with double bolts unless otherwise specified. Turbine generator crane may be a single bolt rail type clamp (appropriately sized and spaced) due to its limited service. Splices and clamps shall be in accordance with the AISC Manual.

Clamps, connections and their spacing shall be selected to withstand side thrust equal to 20% of the sum of the trolley weight and the lifted load.

Note: Gantrex crane rail clips are an acceptable fastening system alternate.

2.11 Identification of High-Strength Steel

Shop drawings shall identify each structural member that is to be made of steel other than ASTM A36 material (i.e., high-strength steel). The ASTM number and a color code shall be marked on the original pieces, and maintained until after application of piece marks on the members.

Members which are killed and normalized shall be identified at the mill as being heat treated by painting serial codes or other mill identification so that the material can be easily identified during fabrication.

2.12 Welded Plate Girders

The plate girders, as shown on the Engineers' drawings, shall be designed for welded fabrication.

Girders shall be completely shop fabricated and shipped in one piece when feasible. When shipment or erection requirements dictate, field joints shall be located subject to approval by the Engineers. Web and flange splices shall be complete penetration groove welds. The flanges shall be single thickness plates joined to the web by continuous welds.

2.13 Welding

2.13.1 General

All welding, welding procedures and qualifications, welder qualifications, and weld material shall be in accordance with AWS D1.1, local laws, ordinances, and the additional requirements herein. Welding procedures and qualifications shall be maintained and readily accessible in the shop where welding is being performed.

Welding electrodes shall be E-70 series.

In addition to the requirements of AWS D1.1, all welding materials shall be stored in a controlled access, clean, dry area that is weathertight and is maintained at a temperature between 40°F and 140°F.

2.13.2 Inspection, Tests, and Repair of Welds

All welds shall be visually inspected to the requirements of AWS D1.1.

Weld inspection shall be performed by an AWS Certified Inspector, or Assistant Welding Inspector(s), under the supervision of the AWS Certified Inspector. Alternatively, a program for self certification of welding inspectors may be implemented provided the program is written and supervised by an AWS Certified Inspector in compliance with the requirements of AWS D1.1. The Weld Inspection Program, including the Inspector's certification records, shall be maintained and readily accessible in the shop where welding is being performed.

Complete penetration groove welds in the following locations shall be tested by radiographic or ultrasonic methods after completion:

1) Flange splices of beams, girders, and columns, or chord splices of trusses, and splices subject to stress reversal.

2) Web splices of beams, girders, and columns at one-sixth of the depth of the web beginning at the point or points of maximum tension, and 25 percent of the remainder of the web depth.

3) Any additional locations shown on the Engineers' drawings.

Note: To avoid expensive field testing, complete penetration groove welds, where required, shall be performed in the shop (unless directed otherwise). Field bolted splices shall be the preferred method.

Magnetic particle testing may be used instead of radiographic or ultrasonic testing when approved by the Engineers.

For welded plate girders, fillet welds and partial or complete penetration groove welds occurring at the intersection of webs and flanges, or used for attaching cover plates to flanges, shall be tested by the magnetic particle method after completion. At least one foot of every 10 feet of accumulated weld length of each size shall be tested.

All welds found deficient shall be repaired in accordance with AWS D1.1.

2.14 Protective Coating

2.14.1 General

All steel material furnished under this specification, excluding fasteners, galvanized surfaces, machined surfaces, or surfaces to be bonded to concrete, shall be cleaned and coated as required herein.

Material used to mark steel after painting shall be the same paint used as the general shop coat, tinted to suit with a tinting material as recommended by the paint manufacturer. Materials used for piece marking shall not be of a type which will bleed through when a touch up coat is applied.

All coating material containers shall be labeled to show the name of the manufacturer, the product trade name or designation, and color.

2.14.2 Material

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

2.14.3 Surface Preparation

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

2.14.4 Mixing and Thinning

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

2.14.5 Shop Application

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

Surfaces adjacent to edges of joints to be field welded shall be kept free of paint within 4 inches of the edge, the unpainted weld area being protected with one coat of Carbo-Weld 11 manufactured by the Carboline Company, St. Louis, Missouri. This protective coating need not be removed prior to welding. Such surfaces shall, subsequent to welding, be prepared and coated in the same manner as specified for the appropriate standard painting system.

The condition of contact surfaces of friction-type connections shall conform to the requirements of the RCSC Specification for the type of coating used.

Milled surfaces shall be coated with a rust-preventive material similar to Tectyl 506G, manufactured by Ashland Petroleum Company, Ashland, KY, or approved equal. Coating shall be applied after inspection and prior to being placed outdoors. Where later removal of this coating is required, SSPC SP1 cleaning methods and recommendations shall be followed.

2.14.6 Galvanizing

Where galvanizing is called for, all steel shapes, plates and bars shall be hot dip galvanized according to ASTM A123; all steel and iron hardware and thread components according to ASTM A153. Embrittlement control shall be according to ASTM A143.

All welds on assembled items to be galvanized (if specified) shall be continuously seal welded, i.e. all around the contact perimeter.

2.15 Signs

Allowable floor loading signs shall be marked on plates of approved design by OMS and securely affixed in a conspicuous place in each space to which they relate as required by OSHA (1910.22).

3.0 EXECUTION

3.1 Workmanship

The recommendations and procedures prescribed in the AISC Code shall govern the erection work unless otherwise specified herein.

3.2 Anchor Bolts

Prior to erecting steel, anchor bolts shall be checked to assure that they are correctly aligned and that elevations are correct. Any deviation from the intended line and grade shall be brought to the attention of the Engineers when discovered. The implementation of the required corrective action is necessary before the commencement of erection operations.

3.3 Erection Tolerances

The erection tolerances as listed in the AISC Code shall apply unless otherwise specified herein or indicated on the Engineers' drawings.

3.4 Crane Rails

Crane rail splices, on opposite girders, shall be staggered. Rail and girder splices shall not coincide. The two runway rails must be parallel along their entire length.

Crane runway rails shall be straight, parallel, level, and at the specified elevation given on the drawings. Appropriate survey equipment shall be used to prepare a drawing showing as-built runway rail elevations, plan locations and distances between rails and submitted to OMS for approval.

3.5 Festooned Cable Support Beam (Refuse Crane)

To provide a proper trolley running operation, ends of trolley beam flanges shall be straightened (squared) to correct standard mill rolling tolerances. Unless the Manufacturer dictates otherwise the I-Beam joints shall be welded all around lower flange continuing up web of beam at least 50% of depth with a root opening equal to 25% of web thickness. Grind weld smooth and flush all around joint for optimum transition of trolley wheels.

The I-Beam track may be supported by any suitable framework to suspend the entire weight of the Festoon System using bolt fasteners or welding at 5 foot increments (or Vendor recommendations) throughout beam length. The recommended minimum factor of safety is five (5).

3.6 Erection Alignment of Structures

When all the columns, beams, bracing, and struts of a tier within a given erection sequence have been set in place, the joints shall be made secure by the insertion of a number of erection bolts equal to at least 30 percent of the total number of bolts in the connection. A minimum of two bolts shall be installed in every connection. The structure shall be plumbed and the connection holes faired up with enough driftpins to maintain dimensions and plumbness.

After all of the members in a tier have been aligned and the columns plumbed, all remaining connections shall be installed with high-strength fasteners and tightened.

Each tier shall be secured in the foregoing manner.

Anchor bolts shall be snug tightened as soon as columns are set and shall be fully tightened after the first tier is plumbed. All baseplates within a given erection sequence will be grouted promptly after setting, or before the second tier is erected, unless otherwise approved by the Engineers.

Shim packs adequately sized to support the weight of the first tier shall be used if the base plate is not grouted prior to erection of the first tier. Shim packs shall not be placed near the edge of shear keys. Base plate leveling bolts shown on the Engineers' drawings shall not be used for support.

3.7 Bracing

The bracing shown on the Engineers' drawings shall be designed to provide a stable structure upon the completion of erection.

The Contractor shall design and install all additional temporary bracing or guying required to meet loading imposed during erection, consistent with the erection sequence used, or required at the end of any work period to ensure safe and stable conditions. Additional temporary bracing of this nature shall be reviewed by the Engineers. However, the Engineers' review shall not relieve the Contractor from full responsibility for the stability of the structure during erection.

3.8 Sag Rods

Sag rods serving as an intermediate support for purlins and girts (arranged in its weak axis direction) shall be located the minimum gage distance from the roofing and siding it supports.

4.0 PROJECT SPECIFIC REQUIREMENTS

The attached Project Specific Requirements, if any, are additions, deletions, and/or revisions to the preceding specification requirements and shall be considered as part of this specification.

4.1 Add the following sections:

3.9 Cuts, Alterations, and Holes for Other Trades

Neither the fabricator nor the erector will cut, drill or otherwise alter his work, or the work of other trades, to accommodate other trades, unless such work is clearly specified in the contract documents. Whenever such work is required, the Contractor is responsible for furnishing complete information as to materials, size, location and number of alterations for the Design Engineer's review and written approval.

3.10 Misfabrications

Incorrectly fabricated, damaged or otherwise misfittings or non-conforming materials or conditions shall be reported to the owner prior to remedial or corrective action. Any such action shall require approval.

4.2 Add the following to Section 2.3.2:

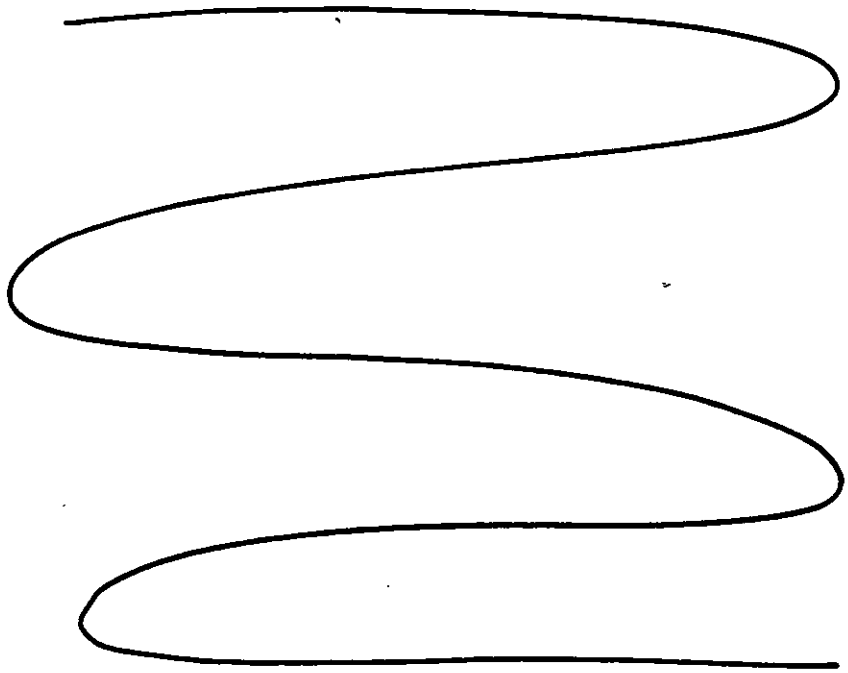
All equipment connections to structural steel shall be high strength bolted (A325). Unmarked bolts or bolts of foreign manufacturer without valid test certificate shall not be used.

4.3 Add the following to Section 1.5:

The contractor shall [redacted] engage a recognized independent testing laboratory (certified by the appropriate state or local agency), approved by OMS, to conduct routine testing and installation of bolting and welding.

Testing shall be in accordance with Section 6 of the RCSC Specification and AISC Code.

End of Project Specific Requirements



ATTACHMENT 1
DOCUMENT SUBMITTAL SCHEDULE

Documents for Approval	Engineering Need Date for Vendor Data	Schedule Date for Certified Vendor Submittal	Actual Vendor Submittal Date
- Certified Mill Test Reports for Structural Steel and Bolts	Upon Receipt of Reports	_____	_____
- Non-Destructive Test Reports	7 Days After Test	_____	_____
- Shop Detail Drawings	90 Days Before Shipment	_____	_____
- Bolt Lists	90 Days Before Shipment	_____	_____
- Crane Runway Survey (As per Section 3.4)	7 Days After Completion	_____	_____
- High Strength Bolt Installation Report	7 Days After Completion	_____	_____

LAW OFFICES

CARLTON, FIELDS, WARD, EMMANUEL, SMITH & CUTLER, P.A.

P.O. DRAWER 190

TALLAHASSEE, FLORIDA 32302

ATTORNEY #

REFERENCE #

RECEIVED

MAR 26 1991

DER - BAQM

DEPARTMENT OF ENVIRONMENTAL REGULATION
BUREAU OF AIR QUALITY MANAGEMENT
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

IN RE: PETITION FOR DETERMINATION OF NEED FOR A SOLID WASTE-FIRED COGENERATION POWER PLANT BY LEE COUNTY	DOCKET NO. 900454-EC ORDER NO. 23963 ISSUED: 1/7/91

RECEIVED
MAR 26 1991
DER-BAQM

LEE COUNTY'S MEMORANDUM IN OPPOSITION TO PETITIONER'S MOTION TO STRIKE LEE COUNTY'S FIRST AFFIRMATIVE DEFENSE

Applicant, Lee County, in accordance with Rule 25-22.038(2)(b), Florida Administrative Code, files this memorandum in opposition to A. Duda & Sons, Inc.'s Motion to Strike Lee County's First Affirmative Defense. In short, Lee County's First Affirmative Defense was properly asserted and should not be stricken.

LEE COUNTY HAS PROPERLY ASSERTED ITS FIRST AFFIRMATIVE DEFENSE

Rule 1.110(d), Florida Rules of Civil Procedure, lists matters which shall be asserted as affirmative defenses. Included within the list is "any other matter constituting an avoidance or affirmative defense." An affirmative defense avoids liability, wholly or partly, by allegations of excuse, justification or other matter negating the cause of action. H. Trawick, Florida Practice and Procedure, Section 11-4 (1990). Lee County's First Affirmative Defense is a classic example of just such a matter constituting an avoidance or affirmative defense.

Paragraph 8 of Duda's Petition alleges that "action by the

governing body for Lee County" might reduce the size of the proposed Lee County resource recovery facility beneath the 1800 tons per day (tpd) capacity designated in Lee County's application to the PSC. Duda's Petition further asserts that a reduction may diminish the efficiency, reliability, and cost effectiveness of the facility.

In response to Duda's allegations, Lee County's First Affirmative Defense was not only proper, but also necessary under Rule 1.110(d), Florida Rules of Civil Procedure. The County's First Affirmative Defense properly points out the following:

(1) Lee County has not formally decided to change the size of the facility nor amended its PSC application for a determination of need. Consequently, Duda's speculation regarding potential "action by the governing body for Lee County" is irrelevant and has no bearing on this proceeding.

(2) Even if the proposal to reduce the size of the facility were before the Commission, such assertions would have no bearing on Lee County's entitlement to an affirmative determination of need pursuant to Section 403.519, Florida Statutes. In other words, even if Duda's allegations about the possibility of down-sizing the facility were true, they do not affect the outcome of the determination of need proceeding.

Clearly, Lee County's First Affirmative Defense is proper because

it raises matters "justifying" Lee County's position and "negating" the allegations by Duda.

EVEN IF IT WERE ASSUMED THAT LEE COUNTY'S FIRST AFFIRMATIVE DEFENSE WERE SOMEHOW DEFICIENT, IT SHOULD NOT BE STRICKEN

In a prior memorandum, Duda's counsel argued to this Commission that the law does not favor motions to strike, like the one now filed by Duda:

> 3. Motions to strike are governed by Rule 1.140(f), Florida Rules of Civil Procedure, which provides that redundant, immaterial, impertinent or scandalous matters may be stricken from pleadings.
>
> 4. Striking pleadings, however, is not favored and is an action to be used sparingly; any doubts as to the relevance of the material must be resolved in favor of the pleadings. Hulley v. Cape Kennedy Leasing Corp., 376 So.2d 884, 885 (Fla 5th DCA 1979); Bay Colony Office Bld'g Joint Venture v. Wachovia Mortg. Co., 342 So.2d 1005, 1006 (Fla. 4th DCA 1977). Such a motion should be granted only if the material is wholly irrelevant, has no bearing on the equities involved, and could have no influence on the decision at issue. Bay Colony, 342 So.2d at 1006; . . .

See Duda's Memorandum in Opposition to Lee County's Motion to Strike Portions of Duda's Petition at pages 1-2. The substance of Lee County's First Affirmative Defense cannot possibly be considered "wholly irrelevant" or "having no bearing on the equities involved." Therefore, according to Duda's own memorandum, any doubts as to the relevance of the affirmative defense must be resolved in favor of the County.

Moreover, even if we assumed Lee County's First Affirmative Defense were deficient, the liberal rules of pleading would necessitate that the affirmative defense not be stricken, but

rather treated as part of Lee County's answer. See Mayflower, Inc. v. Suskind, 112 So.2d 394 (Fla. 3d DCA 1959) (if justice requires, courts shall treat the pleading as if there had been a proper designation); Michelin Tire Corp. v. Roose, 531 So.2d 361 (Fla. 4th DCA 1988) (trial court improperly struck affirmative defense stripping away party's ability to portray the true factual situation); Hulley v. Cape Kennedy Leasing Corp., 376 So.2d 884 (Fla. 5th DCA 1979) (where affirmative defense is legally sufficient on its face and presents a bona fide issue of fact, it is improper to grant motion to strike); Bay Colony Office Bld'g Joint Venture v. Wachovia Mortgage Co., 342 So.2d 1005 (Fla. 4th DCA 1977) (affirmative defense should be stricken as redundant or immaterial only if it is wholly irrelevant and can have no bearing on the equities and no influence at all on the decision).

Notwithstanding the arguments and case law presented in this memorandum, Duda is, in effect, urging the Commission to ignore the merits of Lee County's First Affirmative Defense. Duda apparently would ignore its own prior arguments to this Commission and strike the County's affirmative defense on the basis of procedural niceties, while attempting to sidestep the substance of the County's position.

CONCLUSION

Based on the foregoing, it is clear that Lee County's First Affirmative Defense was necessary and properly asserted because it raises matters which "justify" Lee County's position and "negate" Duda's allegations. Moreover, if there is any doubt about the propriety of this defense, the case law demonstrates that striking the affirmative defense is not the appropriate remedy. To the contrary, the affirmative defense should be treated as part of Lee County's answer.

Respectfully submitted this 25th day of March, 1991.

CARLTON, FIELDS, WARD, EMMANUEL,
SMITH & CUTLER, P.A

David S. Dee
Florida Bar No. 281999
R. Vincent Russo
Florida Bar No. 826103
First Florida Bank Building
Suite 410
215 South Monroe Street
Tallahassee, Florida 32301

and

David Owen
Lee County Assistant Attorney
Post Office Box 398
Ft. Myers, Florida 33902

and

Donna J. Bobbish
Winston & Strawn
1400 L Street, N.W.
Washington, D.C. 20005-3502

Attorneys for Lee County, Florida

CERTIFICATE OF SERVICE

I hereby certify that on March 25, 1991, the original and fifteen copies of Lee County's Memorandum in Oppostion to Petitioner's Motion to Strike Lee County's First Affirmative Defense were furnished by hand delivery to the Commission Clerk, 101 East Gaines Street, Fletcher Building, Tallahassee, Florida; a copy of the document has been furnished by hand delivery to: D. Bruce May, Holland & Knight, Barnett Bank Building, Suite 600, 315 S. Calhoun Street, Tallahassee, Florida and copies have been furnished by U. S. Mail to:

Bill Walker
Florida Power & Light Company
215 South Monroe Street
Suite 703
Tallahassee, Florida 32301-1888

Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399

Department of Community Affairs
Division of Local Resource Management
2571 Executive Center Circle, East
Tallahassee, Florida 32301

Richard Donelan
Assistant General Counsel
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399

Mike Palecki
Public Service Commission
Fletcher Building
101 E. Gaines Street
Tallahassee, Florida 32399

Cal Livingston
General Counsel
A. Duda & Sons, Inc.
1975 W. State Road 426
Oviedo, Florida 32765

for:
David S. Dee

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Bob Martinez, Governor | Dale Twachtmann, Secretary | John Shearer, Assistant Secretary

September 6, 1990

Ms. Diane K. Kiesling
Division of Administrative Hearings
The Desoto building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550

RE: Lee County Resource Recovery Facility
Power Plant Siting Application, PA 90-30
DOAH Case No. 90-3942 EPP

Dear Ms. Kiesling:

Pursuant to Section 403.5067, F.S., the Department of Environmental Regulation finds the application to be insufficient. Attached are comments from the Department and affected agencies concerning the insufficiencies. The following request for information from the Bureau of Air Regulation should be addressed.

1. According to the application, this facility has an initial design-rated capacity of 1800 tpd of MSW with an ultimate capacity of 2400 tpd, capable of generating 65 MW. Do you plan to increase the process input rate beyond the 2400 tpd in the future?

2. As per Vol. I, page ES-7, do you plan to build a sludge composting facility? If so, please provide more details of this facility.

3. What kind of particulate control device do you propose to install for controlling bottom ash and fly ash from the fly ash handling building?

4. The odors within the MSW receiving building will be controlled by drawing this air into the furnace. How do you propose to control the odors during the scheduled and unscheduled down time of the combustors?

5. What is the capacity of the lime silo? Please provide a specification sheet for this baghouse.

6. All wastes received at this facility are to be dumped into the bunker where the overhead cranes mix this waste and load the charging hoppers. This waste must be accurately weighed and recorded on a continuous basis. Accordingly, please provide details as to how the waste will be weighed during each charge.

7. When the auxiliary burners are fired with propane gas and it exceeds the 10% capacity factor as determined by 40 CFR 60.43b(d), this facility will be subject to the standards of nitrogen oxides. Please explain how you plan to control the NO_X emissions when the said capacity factor exceeds 10%.

8. Once a vendor has been selected, you must provide the Department with the make and model number along with the specification sheets and operation and maintenance manuals for all combustors, recorders, scrubbers, baghouses and CEM's for recording opacity, oxygen, carbon monoxide, NO_X and SO_2 for approval prior to purchasing.

Sincerely,

Hamilton S. Oven, Jr.

Hamilton S. Oven, Jr., P.E.
Administrator, Office of Siting
Coordination
Division of Air Resources
Management

HSO/ah

Attach.

cc: David Dee
Richard Donelan
All Parties

OGDEN MARTIN SYSTEMS
of LEE, Inc.

SPEC NO. SA-550
ISSUE 002
DATE 08/15/90

TECHNICAL SPECIFICATION

FOR

PAINTING FERROUS METALS
INCLUDED IN SUBCONTRACTOR'S WORK

Facility Name: LEE COUNTY RESOURCE RECOVERY FACILITY

Location: LEE COUNTY, FLORIDA

****

****

Specification Prepared By:

A/E Name: OMS

Address: FAIRFIELD, NJ

Telephone: 201-882-9000

A/E Approved for Release:

	Printed Name	Signature	Date
1.	K.J. WALLS		1/10/92
2.	K.J. WALLS		10/26/92
3.			
4.			
5.			

REVISIONS

001	Initial Issue	08/16/89
002	Revision	08/15/90

TECHNICAL SPECIFICATION
FOR
PAINTING FERROUS METALS
INCLUDED IN SUBCONTRACTOR'S WORK

TABLE OF CONTENTS

1.0 General

1.1 Scope

This Specification establishes the minimum requirements for the furnishing of all labor, materials, tools and equipment, the coordination of work with that of other trades, and the performing of services for the coating of ferrous metals as shown on the plans and specified herein, including both shop and field applied systems. This Specification shall be worked with Specification SA-502, Painting. Reference to other industry standards for compliance shall be interpreted as an integral part of this Specification.

1.1.1 Work Included

Work shall include but is not limited to the surface preparation and application of prime and finish coats and touch-up of paint systems on ferrous metals. Items receiving coatings shall include but are not limited to:

- Structural Steel
- Miscellaneous steel angles, channel, plates, braces, brackets, embedments, etc.
- Equipment Supports
- Ducts as required
- Pipes
- Stair stringers and pans
- Handrails and Guardrails
- Hollow metal doors and frames, and industrial doors
- Electrical cabinets
- Louvers
- Equipment furnished without shop finish

1.2 Related Work

Items of work related to work of this Specification, but not included within its scope shall be furnished or performed under the General Contractor's responsibilities. These items include, but are not limited to:

- Shop finished equipment
- Removal and reinstallation of fixtures, equipment and systems by others when required

Other specifications related to work in this Specification include but are not limited to the following:

SA-502 Painting

1.3 References

1.3.1 Abbreviations

Abbreviations listed below, when used in this Specification, shall have the following meanings:

ANSI	American National Standards Institute
CFR	Code of Federal Regulations
SSPC	Steel Structures Painting Council

1.3.2 Codes and Standards

Work under this specification shall be performed in accordance with applicable sections of the following codes, standards, publications and practices, and to the extect referenced, form a part of this specification. Date of issue in effect at the time of Notice to Proceed shall apply.

ANSI A13.1	Scheme for the identification of piping systems
29 CFR 1910 & 1926	Occupational Safety and Health Act (OSHA)
SSPC-SP-1	Solvent Cleaning
SSPC-SP-3	Power Tool Cleaning
SSPC-SP-6	Commercial Blast Cleaning

1.4 Quality Assurance

All stages of work including surface preparation, priming and finish coating of surfaces, materials, equipment, workmanship, and touch-up shall be subject to inspection by a representative of Purchaser for conformance to the applicable SSPC specifications, the manufacturer's instructions, and this specification.

All components of each paint system, specified herein, shall be by one manufacturer. The paints of one manufacturer shall not be used over the paint of another and shall not be intermixed with each other unless approved by OMS.

1.5 Submittals

In compliance with all provisions and conditions of the Contract, the following items and documents shall be submitted per the document submittal schedule in Attachment 1.

1.5.1 Engineering Documents

- Technical data sheets on each product to be used.
- A paint schedule indicating the total system (material, thickness, etc) to be applied including surface preparation for each substrate type.

- Color selection charts with the full range of manufacturer's standard colors for selection by Purchaser.
- Material Safety Data Sheets for coatings, solvents, etc.
- Manufacturer's instructions for mixing, thinning, application and storage of the coating materials

1.5.2 Verification Documents

Written Certification that all coatings comply with the provisions of this specification. Alternate manufacturer's will only be considered upon submittal of complete technical and company data and approval by Purchaser.

1.6 Product Shipping, Handling and Storage

All coating materials shall be delivered to the job site in original, sealed and unopend containers bearing the Manufacturer's name, paint type designation, batch number, color and shelf life.

Coatings shall be stored in an area that is well ventilated and free from excessive heat, sparks, flame or the direct rays of the sun. Ambient temperature of stroage areas shall be maintained within the range specified in the coating manufacturer's printed instructions unless otherwise specified.

1.7 Scheduling

It shall be the responsibility of the contractor to provide schedules for the painting of surfaces and to coordinate the coating work with the work of all other trades.

1.8 Safety

The Contractor shall observe all OSHA, state and local laws, ordinances and regulations pertaining to health and safety. The precautions indicated on the paint containers with regard to fire and safety, as well as the laws of the state in which the project is located, shall be oberved.

2.0 Products

2.1 Acceptable Manufacturers

Subject to compliance with this specification and the painting schedule herein, the following coating manufcaturers are acceptable to provide the materials for the work:

a) Carboline Company
b) Cook Paint and Varnish
c) Glidden
d) Hampel's Industrial Coatings
e) Keeler and Long
f) Pratt and Lambert
g) Sherwin/Williams Company
h) Tnemec

The above manufacturer's provide the quality of paint, and are of the stature to provide the specified coatings for this project. The brand names and designations used in the specified Paint systems indicate the required type and quality of the coatings to be furnished.

2.2 Materials

Materials supplied shall be per the Paint Systems as listed in section 3.12. When required, all coatings shall be mixed in strict accordnace with the manufacturer's written instructions, and thinning shall not be permitted unless specified in those instructions. Thickness of coatings shall comply with manufacturer's recommendations. Where a range of thickness is presented in the technical data, the thicker coat shall be applied.

All tools and equipment necessary for surface preparation and application of coatings such as compressors, spray equipment, sandblaster, power tools, brushes, etc., shall be maintained in good working order.

Any false work (scaffolding, ladders, etc.) required for surface preparation and/or painting shall be designed by the Contractor for loads not less than those established by the state or local building codes and (OSHA) 29 CFR 1910 and 29 CFR 1926. The cable trays, conduit, piping, etc, shall not be used for support or access unless prior approval is obtained from OMS.

3.0 Execution

3.1 Coordination

It shall be the responsibility of the Contractor to coordinate with all material and equipment suppliers furnishing items that are to be shop primed and field finshed in order to ensure compatibility of the prime and finish coats. It is imperative that the paint systems specified herein be followed.

3.2 Job Conditions

3.2.1 Atmospheric Conditions

Paint shall not be applied when the surfaces are at a temperature of over 120°F unless the paint is specifically formulated for application at elevated temperatures. When painting in hot weather, precautions shall be taken to assure that the specified dry film thickness (DFT) of paint is obtained.

Paint shall not be applied in rain, snow, fog or mist, or when the relative humidity is such as to cause condensation on surfaces. All surfaces shall be completely dry before, and while being painted.

Forced ventilation shall be provided to keep fume levels at safe levels and shall be exhausted outdoors. Spark producing motors or implements shall not be used in areas when fume concentrations may occur.

3.2.2 Fire Protection

Oily rags and other waste which may constitute a fire hazard, shall be removed daily or stored in U.L. labeled metal containers with automatic closing covers.

The Contractor shall provide portable fire extinguishers of suitable type and sufficient number to permit placing at least one (1) extinguisher in any area where coating with fume-creating or flammable products is in progress, and where coatings are stored and mixed. No smoking shall be permitted in these areas and the Contractor shall be responsible for policing the work.

3.3 Color Selection

With the exception of standard colors for pipe identification or designated safety hazards, the colors will be selected specifically for this project and shall be presented separately in a color schedule.

Regardless of the source utilized in the selection of colors for the Project, the Contractor shall be responsible for assuring that all finish paints match the specified colors. If required, the Contractor shall submit samples of the specified color and the color selected by the Contractor to the Purchaser for color match analysis.

3.4 Protection of Adjacent Surfaces

All hardware, hardware accessories, machined surfaces, nameplates, lighting fixtures and similar items on or in contact with surfaces to be painted shall be removed, masked or otherwise protected prior to surface preparation and painting operations. All protective covers shall be removed upon completion of paint application.

3.5 Surface Preparation

Surfaces shall be prepared for coating in accordance with SSPC specifications and preparation technique for each surface shall be indicated in the painting schedule by the Contractor.

The anchor profile provided on steel shall be not less than that specificed by SSPC-SP-6.

After blast cleaning, dust, loose particles and spent abrasives shall be removed from the prepared surfaces by compressed air or vacuum cleaning, and the cleaned surfaces shall be primed as soon as possible after blasting and always before surface starts to rust. Cleaned surfaces shall not be allowed to stand overnight before coating.

Where applicable, dirt, dust, oil, grease and similar contaminants shall be removed by solvent cleaning in accordance with SSPC-SP-1.

3.6 Mixing

All ingredients shall be thoroughly mixed before use and agitated frequently during application to keep the paint in suspension. Mechanical mixers and agitated pressure pots shall be used as required.

Paints shall be thinned only when necessary for good application properties, and only with the recommended thinner, in amounts recommended by the paint manufacturer.

Catalysts or other types of multipackaged paints shall be mixed in strict accordance with manufacturer's recommendations and instructions.

3.7 Application

In general, the Manufacturer's specifications regarding the mixing, thinning, application, drying and general handling of the various materials shall be followed as being supplementary to this Specification.

Spray application may be used at the Contractor's option in non-enclosed areas when the spraying can be closely controlled to prevent spattering any other property.

Effective oil and water separators shall be used in all compressed air lines to remove oil or moisture from the air before it is used. Separators shall be placed as close as practical to the equipment. The effectiveness of the separators shall be tested by means of the "white blotter test." The test shall be performed prior to blasting or spray coating, and at intervals of four (4) hours during the work. Tests shall be at full operating pressure and velocity.

Nozzle sizes and pressure settings for spray equipment shall comply with the manufacturer's recommendations.

When coatings are applied by spraying, each coat shall be sprayed in two directions at right angles to each other, to obtain complete coverage. Care shall be exercised during spraying to avoid excessive evaporation of the volatile constituents, loss of material into the air, and the bridging over of crevices and corners.

Areas inaccessible to the spray gun shall be coated by brush and if not accessible by brush, daubers or sheepskins. Brushes shall be used to work coatings into cracks, crevices, and blind spots which cannot be adequately coated by spray.

When coatings are applied by brush or roller, the surface shall be cross-brushed or cross-rolled to secure uniformity of surface and the specified paint film thickness.

Film thickness of the coating being applied shall be periodically checked using a wet film thickness gauge. Dry film thickness shall be calculated from wet film thickness and volume solids and as recommended by the Coating Manufacturer. In addition, each coat shall be visually inspected for holidays and thin spots before the next coat is applied.

Steel which has been coated shall not be handled, worked on, or otherwise disturbed until the coating is completely set. Sufficient time shall elapse between coats to permit them to dry hard. All coats of coated surfaces shall be unscarred and completely integral at the time of application of all succeeding coats.

Prior to application of the finish coat, all visible rust resulting from construction damage, or other coating or surface defects, shall be removed and the surface prepared to the requirements of SSPC-SP3 Power Tool Cleaning and the prepared surface re-primed per Purchaser approved repair procedure.

3.8 Testing of Materials

The dry film thickness (dft) of non-metallic paints applied to magnetic surfaces shall be measured nondestructively using the "Elcometer" thickness gauge, as marketed by Gardmer Laboratories, or similar magetically operated testers. Non-metallic paints applied to nonmagnetic surfaces shall be measured using a battery powred, pentrating - needle type thickness gauge such as the "Gardner Thickness Gauge", also marketed by Gardner Laboratories.

3.9 Inspection

All work performed under this Contract shall be subject to inspection by Purchaser.

All definiencies, defects and damage revealed by the inspection and cased by test methods used shall be propmtly reparied or corrects, using the applicable type, grade and color of finish coat material, and preparation methods.

Any part of the paint system which is defective shall be corrected. The method of repairing damaged areas shall be in accordance with the requirements listed for the original system. Damage to adjacent systems painted by other shall be corrected in the same manner. Field touch-up of shop primer shall be with the same paint as the original primer.

3.10 Touch-Up

All shop-primed and shop-topcoated steel shall be touched up in the field as required, prior to final field, topcoating. Touch-up shall include any damaged or masked areas.

Field touchup shall be done after final erection or assembly, unless otherwise specified.

3.11 Clean-Up

All surfaces not coated under this specification, or those previously coated, shall be carefully protected during coating work.

Any unspecified coatings which are found during inspection shall be thoroughly cleaned and the original finish restored at the Contractor's expense.

Name and data plates on equipment shall not be painted and shall be left clean and legible upon completion of the project.

3.12 Paint System

The paint system descriptions provided herewith outline the generic paint system names. The paint system numbers are then utilized in the approved coating Manufacturer's system schedule and the Application Schedule to dictate the coating system for each type of substrate.

Ferrous Metal:	Prep:	SSPC-SP-6
	Prime:	Recoatable Polyamide Epoxy
	Topcoat:	100% Acrylic Gloss
Examples of Approved	System:	Mfgr. - Sherwin Williams
	Prime:	B67H5/B67V5
	Topcoat:	B66 Series DTM Acrylic Gloss

3.13 Project-Specific Requirements

The attached Project Specific Requirements, if any, are additions, deletions and/or revisions to the requirements of this Specification and shall be considered a part of this Specification.

3.13.1 CHANGE ALL REFERENCES TO SA-502 TO SA-550

ATTACHMENT 1

DOCUMENTS SUBMITTAL SCHEDULE

Documents for Approval	Engineering Need Date For Vendor Data*	Schedule Date For Certified Vendor Submittal**
A. _____		
Technical Data Sheets	30	
Color Charts	30	
Paint Schedule	30	
Mixing/Application Instructions	30	
B. Documents for Information		
Certificate of Compliance	45	
Material Safety Data Sheets	30	

* Calendar days after award

** To be completed by seller and finalized prior to award

PSD-FL-151

CDM

environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC.

1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907
813 939-3775

July 11, 1990

Mr. Bruce Miller, Branch Chief
USEPA Region IV
345 Coutland Street
Atlanta, Georgia

Dear Mr. Miller:

On behalf of the Department of Lee County Utilities (DLCU), Camp Dresser & McKee Inc. is submitting four (4) copies of the application for Power Plant Certification for the Lee County Energy Recovery Facility. This submittal is being made in accordance with direction received from Mr. Buck Oven of DER, Tallahassee.

As engineering consultant for Lee County, Camp Dresser & McKee Inc. looks forward to working with you regarding this application. If you require clarification or additional information, do not hesitate to contact us.

Sincerely,

CAMP DRESSER & McKEE INC.

Deborah E. Chaiton

Deborah E. Chaiton

DEC:mjc
MLC20/15

cc: Buck Oven, DER
Lew Nagler (w/attachment) - USEPA Region IV
Winston Smith (w/attachment) - USEPA Region IV
Wayne Aronson (w/attachment) - USEPA Region IV
George Reilly, DLCU
Lee Casey, DLCU
Bob Tietz, CDM
Dan Strobridge, CDM
Michael J. Ihnat, CDM
David Dee, Environmental Counsel

Department of Environmental Regulation

Routing and Transmittal Slip

To: (Name, Office, Location)

1. PATTY ADAMS
2.
3.
4.

Remarks:

RECEIVED

JUL 17 1990

DER - BAQM

3-26-91

~~BA~~ BA CAD
~~CHF:~~

FYI. For your review, initial & forward. Return to Patty for filing, etc.
Thanks,
P.S. cc'd: Mirza
B[illegible]

From: H. OVEN

Date 7/17

Phone 8-1344

CDM

environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC.

1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907
813 939-3775

July 11, 1990

Julie Thomas
National Park Service
75 Spring Street, SW
Room 1092
Science Division
Atlanta, Georgia 30303

Dear Ms. Thomas:

On behalf of the Department of Lee County Utilities (DLCU), Camp Dresser & McKee Inc. is submitting one (1) copy of the application for Power Plant Certification for the Lee County Energy Recovery Facility. This submittal is being made in accordance with direction received from Mr. Buck Oven of DER, Tallahassee.

As engineering consultant for Lee County, Camp Dresser & McKee Inc. looks forward to working with you regarding this application. If you require clarification or additional information, do not hesitate to contact us.

Sincerely,

CAMP DRESSER & McKEE INC.

Deborah E. Chaiton

Deborah E. Chaiton

DEC:mjc
MLC20/17

cc: Buck Oven, DER
George Reilly, DLCU
Lee Casey, DLCU
Bob Tietz, CDM
Dan Strobridge, CDM
Michael J. Ihnat, CDM
David Dee, Environmental Counsel

CDM

environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC.

1620 Medical Lane, Suite 221
Ft. Myers, Florida 33907
813 939-3775

July 11, 1990

Bud Rolofson
National Park Service - Air
Room 215
12795 West Alameda Parkway
Lakewood, Colorado 80228

Dear Mr. Rolofson:

On behalf of the Department of Lee County Utilities (DLCU), Camp Dresser & McKee Inc. is submitting one (1) copy of the application for Power Plant Certification for the Lee County Energy Recovery Facility. This submittal is being made in accordance with direction received from Mr. Buck Oven of DER, Tallahassee.

As engineering consultant for Lee County, Camp Dresser & McKee Inc. looks forward to working with you regarding this application. If you require clarification or additional information, do not hesitate to contact us.

Sincerely,

CAMP DRESSER & McKEE INC.

Deborah E. Chaiton

Deborah E. Chaiton

DEC:mjc
MLC20/17

cc: Buck Oven, DER
George Reilly, DLCU
Lee Casey, DLCU
Bob Tietz, CDM
Dan Strobridge, CDM
Michael J. Ihnat, CDM
David Dee, Environmental Counsel

OGDEN MARTIN SYSTEMS
of LEE, Inc.

SPEC NO. SE-212
ISSUE 004
DATE 1/10/90

TECHNICAL SPECIFICATION

FOR

SQUIRREL CAGE INDUCTION MOTORS ABOVE 2000 VOLTS

Facility Name: LEE COUNTY RESOURCE RECOVERY FACILITY

Location: LEE COUNTY, FLORIDA

****

****

Specification Prepared By:

A/E Name: OMS

Address: FAIRFIELD, NJ

Telephone: 201-882-7071

A/E Approved for Release:

	Printed Name	Signature	Date
1.	R. Tyler	R Tyler	1/10/92
2.			
3.			
4.			
5.			

REVISION

001	Initial Issue	01/01/87
002	Revision	08/14/87
003	Revision	01/30/89
004	Revision	01/10/90

OGDEN PROJECTS, INC.

TECHNICAL SPECIFICATION
FOR
SQUIRREL CAGE INDUCTION MOTORS ABOVE 2000 VOLTS

TABLE OF CONTENTS

1.0 GENERAL

1.1 Scope

This specification covers the requirements for squirrel cage induction motors, either horizontal or vertical, medium voltage, 300 hp and larger.

Motors 300 Hp and larger shall be rated 4000 volts, three phase, 60 Hz unless otherwise indicated on Attachment 1.

All conflicts between the requirements of this specification, supplement sheets, data sheets and standards listed below shall be referred to the Purchaser for clarification before proceeding with the manufacture of the affected parts.

Motors which are supplied as component parts of equipment requiring special design shall comply with this specification where practicable.

No modifications of or deviations from this specification may be made, unless authorized by the Purchaser in writing. Any exceptions to these specifications shall be clearly noted in the Seller's proposal.

It is not the intent to specify all details of design and construction. Motors shall be constructed and equipped with accessories in accordance with the Seller's standard practices when such practices do not conflict with the specification.

2.0 TECHNICAL REQUIREMENTS

2.1 Applicable Standards

All motors shall be manufactured in accordance with the latest edition of the following standards including all supplements, except as modified herein or on the data sheets.

ANSI - American National Standards Institute

ANSI/AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
ANSI/AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings

IEEE - Institute of Electrical and Electronics Engineers

ANSI/IEEE 43	Testing Insulation Resistance of Rotating Machinery
IEEE 85	Test Procedure for Air Borne Sound Measurements on Rotating Electric Machinery

IEEE 112 Test Procedure for Polyphase Induction Motors and Generators

NEMA - National Electrical Manufacturers Association

ANSI/NEMA MG1 Motors and Generators

2.2 Electrical Design Features

2.2.1 Voltage and Frequency Variation

Without injurious heating, motors shall start and accelerate a load to running speed that meets the torque characteristics and inertia requirements of 2.2.2 and meets the voltage and frequency variations specified in NEMA MG1.20.45. For loads with other characteristics, the starting voltage and frequency limits may be different.

Performance within these voltage and frequency variations will not necessarily be in accordance with the standards established for operation at rated voltage and frequency.

2.2.2 Load Requirements

The motor manufacturer shall obtain load speed torque requirements and total load inertia referred to the motor shaft from the driven equipment manufacturer.

2.2.3 Starting Capabilities

Motors shall be designed for across-the-line starting and shall be capable of accelerating the connected load to full load speed with 80% voltage at its terminals. Motors shall be suitable for the following starting duty:

1. Two starts in succession, coasting to rest between starts, with the motor initially at ambient temperature, or

2. One start with the motor initially at a temperature not exceeding its rated load operating temperature.

2.2.4 Torque Current Requirements

Alternating current motors operating with rated terminal voltage and rated frequency shall have torque values in accordance with the applicable NEMA standards.

Locked rotor current of polyphase squirrel cage induction motors shall have the lowest value consistent with good performance and economical design for their torque current class, and shall not exceed 650 percent of rated full load current at motor rated horsepower and voltage.

Motor safe stall time at maximum voltage shall be greater than the accelerating time at minimum voltage.

2.2.5 Temperature Requirements

Motors shall be rated for continuous operation in an ambient temperature not exceeding 40°C at an altitude not exceeding 3300 ft above mean sea level unless stated otherwise in the data sheets.

The limiting observable temperature rise of insulated windings of induction motors for continuous ratings, when operated at rated load under rated operating conditions shall not exceed the value for Class B rise in NEMA Standard MG-1-20.40.

2.2.6 Insulation

All motors shall be provided with a vacuum pressure impregnated, epoxy sealed insulation system for the complete wound stator. Qualification tests of the sealed insulation system proposed shall have been made on models typical of the Seller's line of motors. The qualification tests shall conform to the procedures set forth in NEMA Standard MG-1.

Motors shall have all insulated windings treated for protection against severe moisture, oil, abrasive and conducting dust, and sulphur fumes, in combination with weak acid or alkali dust or fumes.

The insulation system(s) (stator and rotor) shall withstand the negative or positive, 1.0 microsecond to crest (2.3 pu rated peak line to ground operating voltage) switching surges originating from an ungrounded power system and applied to the motor terminals once a month during the specified life of the motor. Feeds to motors will be supplied using vacuum breakers or vacuum contactors.

Seller shall advise Purchaser in writing if externally connected protective devices are needed to meet the above requirement and shall also obtain Purchaser's approval for use of such devices. (The motors will be connected by cables to their supply buses thus no direct exposure to lightning waves is possible.)

Any junction in motor insulation, such as at coil connections or between slot and end winding sections, shall have protection equivalent to that of the slot sections of coils. The entire windings of all motors when finished shall have a homogeneous sealing, tough, protective surface.

2.2.7 Temperature Detector (Stator Winding)

Motors 1500 Hp and larger shall be equipped with six detectors embedded in the stator winding at locations where highest temperatures are expected. The resistance temperature detectors shall be three-wire copper having a DC resistance of 10 ohms at 25°C.

Leads from the temperature detectors shall be brought out to a terminal box, separate from the main power and space heater leads. Provisions for grounding of RTD's shall be provided in the terminal box. Terminal leads shall be identified so that location of each detector can be determined by reference to motor outline drawing.

2.3 Mechanical Design Features

2.3.1 Materials

Enclosure parts may be made of cast iron, cast steel, sheet steel, or steel plate. Parts made of sheet steel or steel plate shall have a minimum thickness of 1/8 in.

2.3.2 Enclosures

Motor enclosures shall be as specified in Attachment 1.

2.3.3 Requirements for Weather-Protected Type I Motors

Weather Protected Type I motors shall conform to NEMA MG1.1.25H.

Terminal boxes shall be watertight. These boxes shall be made of cast iron, or steel sheet, and shall have hubs or threaded openings for rigid conduit. Boxes made of steel sheet shall have a minimum wall thickness of 1/8 in.

All internal parts of the motor exposed to the cooling air, such as air deflectors and fans, shall be made of corrosion-resistant material or have corrosion-resistant platings or treatments.

Drain holes shall be provided at all locations in the enclosure where water might collect.

The bearing housing at the shaft-extension end of grease-lubricated motors shall have a rotating labyrinth-type seal whose rotating parts are made of bronze or similar corrosion-resistant metal. The bearing housing at the shaft-extension end of oil-lubricated motors shall have a seal to prevent moisture or dirt from entering the housing along the shaft. Housings for ball bearings or roller bearings shall have inside bearing caps.

All bolts, studs, other fastening devices, and balance washers of the motor shall be made of corrosion-resistant material or be plated or treated with corrosion-resistant material.

2.3.4 Requirements for Totally Enclosed Motors

Totally enclosed motors shall conform to NEMA MG1.1.26B and MG1.1.26J (totally enclosed, fan-cooled, guarded).

Enclosures shall completely enclose the motors. Designs in which the stator laminations form a part of the enclosure or in which the stator laminations are otherwise exposed to external cooling air are not acceptable.

External cooling fans shall be made of a corrosion-resistant, ductile material and shall conform to the following:

a. For totally enclosed, fan-cooled motors, fans made of brass, bronze, aluminum, stainless steel, and malleable iron, are acceptable.

b. Aluminum fans shall be made of an aluminum alloy containing not more than 0.2 percent copper.

Fan covers shall be made of cast iron, or steel sheet. Covers made of steel sheet shall have a minimum thickness of 1/8 in. The air-intake opening shall be guarded by either a grill cast or formed integrally with the cover or by a metal screen made of corrosion-resistant material.

Sheet metal covers or wrappers used to form air passages over the motor enclosure shall be made of steel of 1/8 in. minimum thickness.

All bolts, studs, and other fastening devices on the outside of the motor enclosure shall be made of corrosion-resistant material or be plated or treated with corrosion-resistant material.

Terminal boxes shall conform to Weather Protected Type I requirements.

Shaft seals shall conform to Weather Protected Type I requirements.

Totally enclosed motors shall have combination drain and breather, Crouse-Hinds type ECD to minimize condensation and drain accumulated condensate.

2.3.5 Balance and Vibration

Motors shall be dynamically balanced. The use of solder or similar deposits shall not be acceptable. Parent metal removed to achieve

dynamic or static balance shall be drilled out in such a manner as to not effect the structural strength of the rotor; chiseling or sawing shall not be permitted.

2.3.6 Bearings

Bearings shall be conservatively sized, suitable for continuous service under the conditions specified, and sealed against the entrance of dirt and the escape of lubricant.

Bearings shall be insulated to prevent the passage of shaft currents through the bearings, wherever necessary.

Sleeve bearings shall be furnished for horizontal motors wherever available and applicable. Sleeve bearings and housings shall be of the split type. Sleeve bearing housings shall be provided with means for visual inspection of oil rings and level.

Bearing housings shall be provided with drain plugs.

If forced or flood oil lubricating system is required, the pumping system, including all pumps, piping, and controls, will be furnished by the Seller. Upon loss of auxiliary backup lubricating oil pump during a shutdown, the motor shall be capable of decelerating to a safe stop without damaging the bearings.

Antifriction bearings may be furnished on horizontal motors if standard for motor size, enclosure, and speed.

Grease lubricated bearings shall be lubricated prior to shipment. Bearings requiring periodic regreasing shall have provisions for inservice positive lubrication with means to prevent damage due to overgreasing. Bearings of the completely sealed or the prelubricated type shall not have provisions for inservice lubrication.

Ball or roller bearings shall be used for guide bearings on vertical motors. Sleeve guide bearings may be furnished, if required by the application. The thrust bearing may be of the Kingsbury or antifriction type.

Antifriction bearings shall be designed for a minimum L-10 service life of 100,000 hours for the design speed and applied load condition.

Three wire RTD's shall be provided for all sleeve bearing motors. RTD's shall be copper having a DC resistance of 10 ohms at 25°C.

2.3.7 Endplay and Coupling

Horizontal sleeve-bearing motors shall have a total endplay of at least 1/2 in. The running center of the rotor shall not shift from either side of stator geometric center by more than 3/32 in.

Flexible couplings used with horizontal sleeve-bearing motors will be of the limited end-float type with the end-float limited to not more than 1/4 in. The Seller shall coordinate with the driven equipment manufacture the exact float of the coupling used.

When the limited end-float coupling is used, the motor shall have a permanent indicator to show the allowable limits of motor movement after coupling installation and alignment. The indication method shall be durable, adjacent to a shaft shoulder, and shall show the allowable excursion of the shoulder.

Unless specified otherwise, all motor half-couplings shall be mounted on motor shafts with either a taper or cylindrical fit and be keyed. Cylindrical fits shall be in accordance with ANSI B4.1, Class FN1.

2.3.8 Vertical Motor Requirements

Solid-shaft vertical motors are preferred for all applications except those in which the connection to the driven equipment is a sectional shaft that may unscrew and lengthen during reversal of rotation. Hollow-shaft vertical motors with special couplings (see below for further details) to protect the motor against reverse rotation damage shall be used for these applications.

Vertical motors shall comply with other requirements of this specification and the following:

a. Motors shall have thrust bearings designed to carry the maximum axial thrusts (up and down) imposed by the driven equipment.

b. Hollow-shaft vertical motors used in applications employing a sectional drive shaft with screwed joints shall have special couplings as follows:

   1. All motors, shall be equipped with nonreverse ratchets (preferred) or with self-releasing couplings designed to permit lengthening of the drive shaft and to disconnect the motor from the driven equipment upon reversal of rotation.

   2. The bases for motors meeting NEMA dimensions shall be Type P.

2.3.9 Marking of Terminal Leads

The method of marking leads shall be permanent and suitable for the life of the motor. Leads shall have at least one identification marker within 6 in. of stator frame.

2.3.10 Sound Level Requirements

The maximum sound level for motors furnished under this specification shall not exceed 85 dBA at 5 ft from any surface of a motor.

The Seller shall provide the maximum octave band sound pressure levels and the maximum A-weighted sound level on the appropriate data sheet for the motor. If the motor does not meet the sound level requirement, the Seller shall provide noise data for the motor with noise control options to meet the specified sound level. In either case, only the A-weighted sound level shall be warranted.

2.4 Accessories

2.4.1 Space Heaters

Space heaters are to be supplied on all motors. Space heaters with a total rating of up to 1800 watts shall be connected for single phase, 115V service.

Space heaters rated above 1800 watts shall be three phase 208V service.

Space heaters shall be completely wired, with leads brought out to a separate terminal box. The terminal box will be provided with a threaded pipe tap for external field connection.

2.4.2 Grounding

A tapped hole shall be furnished in the motor terminal box for connection of ground conductor, along with a means for connecting the motor frame directly to the Purchaser's ground grid. This grounding shall be as follows:

> A noncorrodible metal pad welded or brazed to the motor frame having NEMA drilled threaded holes at and mating hexagonal head cap screws or bolts with lockwashers.

2.4.3 Terminal Boxes

Motor terminal boxes shall be of adequate size to permit terminating motor leads and other wiring at the motor. Minimum dimensions and useable volumes shall be not less than those given in NEMA MG 1-20.62. Allowance shall be made for conduit hubs or cable glands, reasonable cable bending radii, 12 inches for stress cones plus insulation and terminal lug requirements. Separate terminal boxes shall be furnished for space heater leads and RTD leads. Terminal boxes shall be adequately sized to mount and enclose all devices mounted within. Terminal points

and nameplates of all accessories shall be accessible without removing motor leads or other wiring. Cable terminations shall be clearly and permanently marked.

2.4.4 Miscellaneous

Motor shafts shall be marked to indicate magnetic center.

For single directional motors, an arrow or arrows indicating the direction of rotation shall be provided on the motor frame. A painted arrow is not acceptable.

Motors shall be provided with one or more lifting eyebolts, rings, or lugs cabable of supporting the weight of the motor.

Motors larger than 2500 Hp shall be provided with, but not limited to, three current transformers for differential protection, surge capacitors and lightning arresters.

3.0 TESTS AND GUARANTEES

3.1 Routine Tests

Each motor shall be given a routine (commercial) test to demonstrate that it is free from mechanical and electrical defects. This test shall be conducted in accordance with the latest edition of IEEE 112. This test shall include:

a. Measurement of no-load current (each phase).

b. Measurement of no-load speed.

c. A determination of locked-rotor current.

d. A high-potential test.

e. An insulation resistance test by megohmmeter.

f. Measurement of winding resistance.

g. Inspection of bearings and oil supply (when furnished). Antifriction and bracket-type sleeve-bearing inspection shall consist of a no-load run observation to ensure bearing operation without excessive noise, heating, or vibration and a check for lubrication leaks.

   Where accessible, the condition of the lubricant shall be examined after the run.

4.0 SUPPLEMENTARY REQUIREMENTS

4.1 Surface Preparation and Painting

Surfaces shall be primed in accordance with the Seller's standard prior to painting. Finish coats shall be in accordance with Seller's standard.

4.2 Nameplates

Motor nameplates shall be of stainless steel construction and be securely attached to the motor by means of stainless steel screws.

Motors shall be equipped with nameplates containing the following data:

a. Manufacturer's data: horsepower, volts, phases, full-load speed, full-load amperes, frequency, locked-rotor code letter, temperature rise at the service factor, service factor, class of insulation system, type of enclosure, serial number, frame size, space heater wattage and voltage level.

b. Mechanical data: the oil level measured from the base of the oil ring for lubricated sleeve-bearing motors provided with constant level oilers; the oil pressure required for pressure-lubricated bearing motors; the minimum endplay for horizontal sleeve-bearing motors; and bearing number.

4.3 Cleaning and Shipping Requirements

The interior of enclosures shall be free from all foreign material such as oil, grease, or other deleterious material.

When an identifying number is assigned to the motor by the Purchaser, a nameplate tag bearing this identification shall be attached to the equipment before shipment, in a location where the tag will be observable while the motor is in operation.

All openings shall be properly protected to prevent the entrance of dirt or debris. All parts that may be exposed to the weather shall be protected by weatherproofing.

All equipment and materials shall be crated, boxed, or otherwise prepared for shipment to prevent damage during handling and shipping. Each box or crate shall be identified with equipment identification number(s), as-shipped weight and purchase order number and shall contain a detailed packing list.

4.4 Data and Drawings

The Seller shall submit drawings for the Purchasers' review in accordance with the following schedule. The drawings submitted shall show the following:

	Description	No. of Weeks After Purchase Order Date
1.	All physical outlines, as required, to show the overall size and space requirements (including that for dismantling and maintenance) and the interrelationship of the various components.	Six Weeks
2.	Cross sections and details, as required, to satisfy the Purchaser that all components conform with specification requirements including design and physical arrangement.	Six Weeks
3.	All information required by the Purchaser for the design and location of all connecting Purchaser-furnished structural, mechanical, and electrical items such as foundations, steel supports, cables, conduit, etc.	Six Weeks
4.	Weight of the equipment and distribution on the foundation support of the static, impact, wind and other loads.	Six Weeks
5.	Wiring diagrams.	Eight Weeks
6.	Complete bills of material.	Eight Weeks
7.	Details of special features including long-term storage and maintenance procedures.	Eight Weeks

For each motor, the Seller shall forward to the Purchaser the following motor curves eight weeks after the Purchase Order date:

1. Stator temperature versus continuous horsepower.

2. Time versus current showing maximum safe stall time and acceleration time versus current at 80, 90 and 100 percent volts, based on load WK^2, and starting from normal load rated temperature conditions.

3. Speed versus torque and current at 80, 90 and 100 percent volts, with the driven equipment speed-torque curves superimposed.

4. Temperature detector calibration.

All curves shall indicate purchaser's tag number, purchase order number, motor specification number and WK^2.

4.5 Installation, Operating, and Maintenance Instructions

The Seller shall provide 10 sets of operating, installation and maintenance instructions. These shall be completely self-contained and include the following as a minimum:

- The purchase order number.
- Unique equipment identification (e.g., serial or model number).
- All necessary requirements and procedures to operate, install, and maintain equipment in the as-shipped condition.
- Preventive maintenance requirements for the life of the equipment.
- A list of warnings and essential actions to avoid serious damage to injury during installation, testing and operation.
- A recommended lubrication and service schedule (for the life of the equipment) and shelf life of materials and parts, if appropriate.
- A list of any special tools and instructions for alignment, levelling, etc., when required.

A parts identification list shall be included or provided separately. It shall provide details of all equipment, including sectional and/or outline drawings or illustrations identifying each numbered part and location in relation to the equipment as a whole.

Any drawing provided as part of the operation, installation and maintenance instructions shall be consistent with those approved by the Purchaser.

4.6 Spare Parts

Seller shall provide a list of recommended spare parts with pricing at the time of bid.

ATTACHMENT 1

PROJECT SPECIFIC REQUIREMENTS

The attached Project Specific Requirements, if any, are additions, deletions, and/or revisions to the preceding specification requirements and shall be considered as part of this specification.

1. Enclosure Type:

	Indoor	____	TEFC or ODP
		X	TEFC
	Outdoor	____	TEFC or WPI
		____	TEFC
____	Special	____	Type

ATTACHMENT 1

PROJECT SPECIFIC REQUIREMENTS

Motors shall be manufactured by:

General Electric Company
Louis-Allis Company
Reliance Electric
Siemens Inc.
Toshiba
Westinghouse Electric Corp.

CLIENT Ogden Martin Systems of Lee County

PROJECT Lee County, Florida

FURNISHED BY Distral S.A.

ATTACHMENT 2

SQUIRREL CAGE INDUCTION MOTORS
ABOVE 2000 VOLTS

DATA FURNISHED BY SELLER

DRIVEN EQUIPMENT	Forced Draft Fan
MARK OR ITEM NO.	
NO. REQUIRED	12
MAKE	Reliance Electric or Equivalent
FRAME NO.	E 5012Z
HORSEPOWER, HP	350
RATED VOLTAGE, V	4000
SERVICE FACTOR	1.15
ENCLOSURE	TEFC-XT
FULL LOAD SPEED, RPM	1191
FULL LOAD CURRENT, AMP	45
LOCKED ROTOR CURRENT, AMP	325
STARTING TORQUE, % FL	119.5
BREAKDOWN TORQUE, % FL	229
EFF.-FULL LOAD, %	94.6
EFF.-3/4 LOAD, %	94.5
EFF.-1/2 LOAD, %	93.6

P.F.-FULL LOAD	85.1
P.F.-3/4 LOAD	81.7
P.F.-1/2 LOAD	73.5
P.F. AT STARTING	
SHORT CIRCUIT AC TIME CONSTANT, SEC	
X/R RATIO	
SPACE HEATERS, WATTS	Reqd.
NET WEIGHT, LB.	Approx. 5000 lb
MOUNTING ARRANGEMENT	Horizontal
BEARING TYPE	Anti Friction
LOCKED ROTOR CODE LETTER	G
PERMISSIBLE STARTS PER HOUR WITH:	
MOTOR AT AMBIENT TEMP	
MOTOR AT RATED TOTAL TEMP	
DESCRIPTION OF INSULATION SYSTEM	VPI - Enduraseal
INSULATION CLASS	F
FULL LOAD TEMP. RISE	B
ACCL. TIME FULLY LOADED	
WITH 100% VOLTAGE, SEC	
WITH 80% VOLTAGE, SEC	
WITH % VOLTAGE, SEC	
SAFE STALL TIME AT 100% VOLTAGE, SEC.	
WK^2 OF ROTOR, $LB-FT^2$	
SOUND LEVEL, DB	85
WINDING TEMP DETECTOR	
BEARING TEMP DETECTOR	

SURGE PROTECTION

ARRESTER — Not Included

CAPACITOR — Not Included

DESCRIPTION OF BEARING CONSTRUCTION

DESCRIPTION OF STTOR WINDING INSULATION SYSTEM AND TREATMENT

ROTOR MATERIAL, COPPER OR [ALUMINUM]

DATA FOR ALTERNATIVE MOTORS WITH IMPROVED NOISE TREATMENT IF PREDICTED OVERALL SOUND PRESSURE LEVEL IS ABOVE 85 dBA

(3) DIE CAST ALUMINUM ROTOR

The die cast aluminum rotor provides a rugged assembly that captures laminations, bars, end rings, and cooling fans (integral die cast aluminum) into one homogeneous assembly. This lightweight rugged assembly improves starting and heat dissipation for longer life. The low inertia, die cast aluminum rotor takes advantage of the unique heat-dissipating qualities of aluminum to shed heat fast. It also allows fast acceleration of heavy loads without undue stress on the rotor cage.

This rotor cage is integrally cast with the rotor laminations, intimate contact of the cage with the core slot aid the transfer of heat generated in the rotor bar to the rotor iron. Rotor iron acts like a heat sink, absorbing heat from the bars approximately three times faster than rotors with copper bar.

Heat is also dissipated fast at the end of the rotor, from a rotor fan integrally cast with the bars and end rings.

Where special applications exist copper bar rotors can be provided.

A key factor affecting motor performance and reliability lies in the proper design (method) of bearing lubrication.

The lubrication system is essential for the reduction of friction, generated heat dissipation, contamination prevention and protection of bearing surfaces from corrosion.

The Reliance Electric PLS/Positive Lubrication System (patent pending) is a uniquely designed open bearing (non-shielded) positive lubrication system that delivers long, reliable bearing and motor life, regardless of mounting position.

PLS helps resolve two major causes of motor bearing failure -- 1) improper lubrication/relubrication, and 2) corrosion, PLS delivers optimum bearing performance by providing positive lubrication in horizontal, shaft up and shaft down mountings.

Cooler Bearing Operating Temperatures -- Open bearing (non-shielded) contruction (1) minimizes friction, allowing cooler bearing operation.

Positive Lubrication/Relubrication In Any Mounting Position -- Exclusive grease channeling window (2), withg minimum grease path entry (3), channels grease directly into bearing track and avoids premature relief out shaft bore or drain plug.

Minimizes Corrosion -- Small clearance on either side of grease window uniformly distributes grease to both inboard and outboard reservoirs (4) to protect bearing surfaces during motor storage, long idle times and start-up. Bearing system is completely greased during motor assembly.

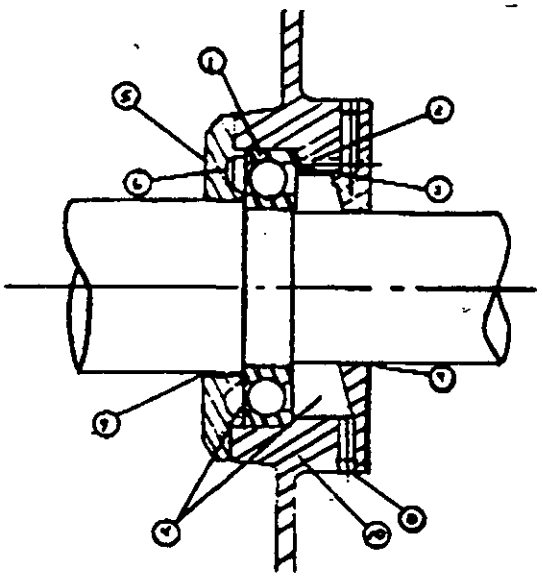
Restricts Inboard Contaminants -- Inner bearing cap (5) with anti-churning vanes (6) and close running shaft tolerances (7) minimize contaminant entry into bearings, and grease migration into motor.

Prohibits Overgreasing During Lubrication/Relubrication -- Grease relief port (8) accurately indicates completion of lubrication/relubrication. (If port is plugged during lubrication, PLS design will relieve grease along the shaft (9).

A Thermal Sensor Provision -- Permits the addition of various sensing devices such as an RTD or thermocouple.

Flexible Bearing Housing -- The Bearing Housing is designed to permit the use of insulated bearings if required as well as roller bearings for special applications or customer requirements.

Heavy Cast Sections -- Case Sections (10) are all heavy walled for rugged support and mechanical and dimension stability.



OGDEN MARTIN SYSTEMS
of LEE, Inc.

SPEC NO. SE-211
ISSUE 004
DATE 1/10/90

TECHNICAL SPECIFICATION

FOR

SQUIRREL CAGE INDUCTION MOTORS BELOW 600 VOLTS

Facility Name: LEE COUNTY RESOURCE RECOVERY FACILITY

Location: LEE COUNTY, FLORIDA

****

****

Specification Prepared By:

A/E Name: OMS

Address: FAIRFIELD, NJ

Telephone: 201-882-9000

A/E Approved for Release:

	Printed Name	Signature	Date
1.	R Tyler		1/10/92
2.			
3.			
4.			
5.			

REVISION

001	Initial Issue	01/01/87
002	Revision	08/14/87
003	Revision	01/30/89
004	Revision	01/10/90

OGDEN PROJECTS, INC.

TECHNICAL SPECIFICATION
FOR
SQUIRREL CAGE INDUCTION MOTORS - BELOW 600 VOLTS

TABLE OF CONTENTS

1.0 GENERAL

1.1 Scope

This specification covers the furnishing, delivery and testing of electrical squirrel cage induction motors rated below 600 volts, either horizontal or vertical type. Motors offered with sleeve type bearings shall be brought to the attention of the Purchaser.

Motors below 1/2 hp shall be rated 115 volts, single phase, 60 Hz.

Motors 1/2 Hp and larger shall be rated 460 volts, three phase, 60 Hz.

Motors which are supplied as component parts of equipment requiring special design are excluded from this specification; however, this specification is to be considered as a minimum standard for such motors.

2.0 TECHNICAL REQUIREMENTS

2.1 General

Motors shall be properly designed and constructed to withstand the maximum service conditions in its mounting position without loss of lubricant and shall be suitable for either clock-wise or counterclockwise rotation unless prohibited by the motor standard design.

When the motors are furnished with the driven equipment, the driven equipment supplier shall be responsible for mounting the driven equipment and the motor as a complete unit, correctly aligned and coupled with the coupling or sheave specified on the driven equipment data sheet.

When the motors are shipped separately, the motor half of the coupling or sheave will be furnished, finish-bored, and key-seated by the driven equipment supplier in accordance with the motor requirements. The motor half-coupling or sheave will be shipped to the field.

Motor manufacturer shall cooperate with driven equipment vendor in establishing the critical speed of the combined equipment.

In the event of conflict between the purchase specifications and the standards listed below, the purchase specifications will take precedence. Where the equipment being quoted does not agree with the purchase specifications, the Seller shall take specific exception in writing.

2.2 Applicable Standards

All motors shall be manufactured in accordance with the latest edition of the following applicable standards except as modified herein.

ANSI - American National Standards Institute

ANSI/AFBMA Std. 9	Load Ratings and Fatigue Life for Ball Bearings
ANSI/AFBMA Std. 11	Load Ratings and Fatigue Life for Roller Bearings

IEEE - Institute of Electrical and Electronics Engineers

ANSI/IEEE 43	Recommended Practice for Testing Insulation Resistance of Rotating Machinery
ANSI/IEEE 112	Test Procedure for Polyphase Induction Motors and Generators
IEEE 85	Test Procedure for Airborne Sound Measurements on Rotating Electric Machinery

NEMA - National Electrical Manufacturers Association

ANSI/NEMA MG1	Motors and Generators

2.3 Electrical Requirements

All motors shall be NEMA Design B, standard, normal efficiency motors unless otherwise stated on Attachment 1 and shall be rated for continuous operation at an ambient temperature of 40°C and an altitude of up to 3,300 feet above sea level. Any special torque requirements shall be noted on the data sheets.

Locked rotor current shall not exceed 6.5 times full load current at rated voltage unless specifically approved by the Purchaser. Motor safe stall time at maximum voltage shall be greater than the accelerating time at minimum voltage.

Motors shall be suitable for operating at rated load with either a 10 percent voltage variation above or below rated value or with a frequency variation of 5 percent above or below normal, or with the sum of the voltage and frequency variations equal to or less than 10 percent provided the frequency variation does not exceed 5 percent. Motors 200 HP and larger shall be capable of starting and accelerating the driven equipment with 80% voltage at the motor terminals. All motors shall be designed for across-the-line starting. Motors shall be suitable for the following starting duty:

1. Two starts in succession, coasting to rest between starts, with the motor initially at ambient temperature, or

2. One start with the motor initially at a temperature not exceeding its rated load operating temperature.

Motors shall be provided with a ground terminal post, located inside the motor terminal box, for connecting the Purchaser's grounding conductor included with the motor feeder. Motors shall also have a ground pad on the motor frame for direct connection to ground.

2.4 Insulation System

Winding insulation shall be NEMA Class B or Class F with motor temperature rise limited to Class B. The winding shall be treated to make the insulation moisture, oil and chemical resistant and capable of withstanding abrasive particles and conductive dust. Any special insulation treatment for other operating conditions or locations shall be stated in Specific Project Requirements.

2.5 Service Factor

Motors supplied with a service factor greater than 1.0 shall not be sized to run in the service factor margin during normal or maximum brake horsepower conditions. For ID Fans a service factor of 1.15 should be provided to meet test block conditions provided that normal operating conditions are satisfied without running in the service factor margin.

2.6 Mechanical Requirements

Motor enclosures shall be as specified in Attachment 1. Motors used for cooling tower fans, circulating water pumps located in cooling tower basin, ash handling areas and water treatment areas shall be of the TEFC type as a minimum. In special cases approval by the Purchaser is required. Motors shall be furnished with cast iron frame, end brackets, and conduit box. When cooling fans are included in the motor design, they shall be of the nonsparking type. If aluminum fans are used, stainless steel bolts shall be provided in the hubs.

If belt or chain drive is used, slide rails shall be provided by the Seller.

Conduit terminal boxes shall be provided with threaded conduit connections and so constructed that conduit entrance may be made from the top, bottom, or either side. Terminal box shall be located on the right hand side when viewed from the non-driving end. Sheet steel terminal boxes are not acceptable for use on NEMA frame size motors. Individual conduit terminal boxes shall be provided for main leads, space heaters, and temperature detection equipment. All leads shall be properly identified. Multipurpose conduit boxes are not acceptable.

All conduit terminal boxes shall be adequately sized to terminate field wiring. At a minimum the main lead terminal boxes on NEMA frame size motors shall be one size larger than standard. On non-NEMA frame motors the main lead terminal box shall be adequately sized to terminate multiple feeder cables and conduits.

All motor winding leads shall be brought into conduit terminal boxes and terminated with crimp type solderless connectors. Cable terminations shall be clearly and permanently marked. Stator leads into the winding, space heater and temperature detector leads into the motor shall be sealed to prevent intrusion of foreign material.

Motors for cooling tower fans and motors 100 Hp and larger located outdoors shall be provided with space heaters to maintain motor temperature 5 to 10°C above the ambient temperature to prevent condensation when the motors are not running. Heaters shall be designed to operate at 115V single phase.

All vertical motors shall be provided with NEMA P mounting flanges. Vertical motors shall have a drip shield.

Motors shall generate noise sound pressure levels of not over 85 dBA, measured in accordance with IEEE-85 test procedures, unless otherwise stated in the data sheets. Supplier shall advise if the 85 dBA sound pressure level requires mechanical modifications or a larger frame than normally used.

The direction of rotation of single directional motors shall be clearly indicated by means of an arrow located on the non-driving end shield of the motor. A painted arrow is not acceptable.

Motors weighing 50 lbs or more shall be provided with one or more lifting eye bolts, rings or lugs capable of supporting the weight of the motor.

Totally enclosed motors shall have at least one drain hole.

2.7 Bearings

Antifriction ball bearings are preferred for standard NEMA frame motors. Antifriction bearings shall be designed for a minimum L10 life of 100,000 hours under continuous duty at rated load and speed, calculated in accordance with ANSI/AFBMA Std. 9.

Motors for belt-driven equipment or requiring side thrust shall be provided with antifriction bearings designed for the particular application.

Vertical motors shall be furnished with ball or roller bearings for thrust and guide bearings. The thrust bearings shall be capable of withstanding the maximum up and down thrust at startup and throughout the full range of the driven equipment.

If horizontal motors are operated in the vertical position, the motor vendor must certify in writing that his motor is suitable for this type of operation. No shielded bearings shall be acceptable unless the grease chamber is on top of the bearing when the motor is operated in its operating position. Slingers or other suitable bearing seals shall be provided on all horizontal motors operated with shaft extension in the up position to keep moisture out of bearings.

2.8 Single Phase Motors

Motors for process service shall be capacitor start type having a high starting torque and low starting current characteristics. Motors shall be totally enclosed type.

Motors for non-process applications such as exhaust fans and blowers shall be either permanent dual capacitor type or split phase type.

All single phase motors shall have grease-lubricated ball bearings.

Motors shall have a threaded conduit connection.

3.0 TESTS

3.1 General

All motors shall be tested in accordance with the test procedures specified in ANSI/NEMA MG1-12.

4.0 SUPPLEMENTARY REQUIREMENTS

4.1 Surface Preparation and Painting

Surfaces shall be primed in accordance with the Seller's standard prior to painting. Finish coats shall be in accordance with Seller's standard.

4.2 Nameplates

Motor nameplates shall be of stainless steel construction and be securely attached to the motor by means of stainless steel screws.

Motors shall be equipped with nameplates containing the following data:

a. Manufacturer's data: horsepower, volts, phases, full-load speed, full-load amperes, frequency, locked-rotor code letter, temperature rise, service factor, class of insulation system,

type of enclosure, serial number, and frame size. Multi-speed or dual voltage motors shall be provided with nameplate information showing wiring diagram and connection for each voltage and/or speed. Motors provided with space heater shall have a nameplate indicating space heater wattage and voltage level.

b. Mechanical data: the oil level measured from the base of the oil ring for lubricated sleeve-bearing motors provided with constant level oilers; the oil pressure required for pressure-lubricated bearing motors; the minimum endplay for horizontal sleeve-bearing motors; and bearing number.

4.3 Cleaning and Shipping Requirements

The interior of enclosures shall be free from all foreign material such as oil, grease, or other deleterious material.

When an identifying number is assigned a motor on the data sheets, a metal tag bearing this identification shall be attached to the motor before shipment, in a location where the tag will be observable when the motor is installed.

Each box or crate shall be identified with equipment identification number(s), as-shipped weight, and purchase order number and shall contain a detailed packing list. All openings shall be properly protected to prevent the entrance of dirt or debris and all parts that may be exposed to the weather shall be protected by weatherproofing.

The Seller is responsible to ensure jobsite arrival of the equipment in an undamaged and satisfactory working condition.

4.4 Data and Drawings

The Seller shall submit drawings for the Purchasers' review in accordance with the following schedule. The drawings submitted shall show the following:

	Description	No. of Weeks After Purchase Order Date
1.	All physical outlines, as required, to show the overall size and space requirements (including that for dismantling and maintenance) and the interrelationship of the various components.	Six Weeks
2.	Cross sections and details, as required, to satisfy the Purchaser that all components conform with specification requirements including design and physical arrangement.	Six Weeks

	Description	No. of Weeks After Purchase Order Date
3.	All information required for the design and location of all connecting Purchaser-furnished structural, mechanical, and electrical items such as foundations, steel supports, cables, conduit, etc.	Six Weeks
4.	Weight of the equipment and distribution on the foundation support of the static, impact, wind and other loads.	Six Weeks
5.	Wiring diagrams.	Eight Weeks
6.	Complete bills of material.	Eight Weeks
7.	Details of special features including long-term storage and maintenance procedures	Eight Weeks

For each motor larger than 60 hp, the Seller shall forward to the Purchaser the following motor curves eight weeks after the purchase order date:

1. Stator temperature versus continuous horsepower.

2. Time versus current showing maximum safe stall time and acceleration time versus current at 80, if applicable, 90 and 100 percent volts, based on load WK^2, and starting from normal load rated temperature conditions.

3. Speed versus torque and current at 80, if applicable, 90 and 100 percent volts, with the driven equipment curve superimposed.

4. Temperature detector calibration (if detectors are specified).

All curves shall indicate purchaser's tag number, purchase order number, motor specification number and WK^2.

4.5 Installation, Operating, and Maintenance Instructions

The Seller shall provide 10 sets of operating, installation and maintenance instructions. These shall be completely self-contained and include the following as a minimum:

The purchase order number.

Unique equipment identification (e.g., serial or model number).

All necessary requirements and procedures to operate, install, and maintain equipment in the as-shipped condition.

Preventive maintenance requirements for the life of the equipment.

A list of warnings and essential actions to avoid serious damage to injury during installation, testing and operation.

A recommended lubrication and service schedule (for the life of the equipment) and shelf life of materials and parts, if appropriate.

A list of any special tools and instructions for alignment, levelling, etc., when required.

A parts identification list shall be included or provided separately. It shall provide details of all equipment, including sectional and/or outline drawings or illustrations identifying each numbered part and location in relation to the equipment as a whole.

Any drawing provided as part of the operation, installation and maintenance instructions shall be consistent with those approved by the Purchaser.

4.6 Spare Parts

Seller shall provide a list of recommended spare parts with pricing at the time of bid.

ATTACHMENT 1

PROJECT SPECIFIC REQUIREMENTS

The attached Project Specific Requirements, if any, are additions, deletions, and/or revisions to the preceding specification requirements and shall be considered as part of this specification.

1. This Specification Applies To:

   _____ all motors 1/2 hp and larger

   _X_ motors 1/2 hp up to and including 250 hp

2. Efficiency Rating _X_ Normal _____ High

3. Enclosure Type:

	Indoor	_____	TEFC or ODP
		_X_	TEFC
	Outdoor	_____	TEFC or WPI
		_X_	TEFC
_____	Special	_____	Type

ATTACHMENT 1

PROJECT SPECIFIC REQUIREMENTS

Motors shall be manufactured by:

General Electric Company
Louis-Allis Company
Reliance Electric
Siemens Inc.
Toshiba

CLIENT: Ogden Martin Systems Of Lee County

PROJECT: Lee County, Florida

FURNISHED BY: Distral S.A.

ATTACHMENT 2

SQUIRREL CAGE INDUCTION MOTORS BELOW 600 VOLTS

DATA FURNISHED BY SELLER

DRIVEN EQUIPMENT		Overfire Air Fan
MARK OR ITEM NO.		
NO. REQUIRED		1/2
MAKE		Reliance Electric or Equivalent
FRAME NO.		44STS
HORSEPOWER, HP (at each speed)		200
RATED VOLTAGE, V		460
SERVICE FACTOR		1.15
ENCLOSURE		TEFC-XEX
Type: Single Speed	X	
Two Speed Single Winding		
Other		
FULL LOAD SPEED, RPM		1784
FULL LOAD CURRENT, AMP		221
LOCKED ROTOR CURRENT, AMP		1325
STARTING TORQUE, % FL		119
BREAKDOWN TORQUE, % FL		237
EFF.-FULL LOAD, %		96.0

EFF.-3/4 LOAD, %	96.4
EFF.-1/2 LOAD, %	96.3
P.F.-FULL LOAD	88.2
P.F.-3/4 LOAD	86.2
P.F.-1/2 LOAD	80.0
P.F. AT STARTING	
SHORT CIRCUIT AC TIME CONSTANT, SEC	
X/R RATIO	
SPACE HTRS., WATTS	225
NET WEIGHT, LB	1890
MOUNTING ARRANGEMENT	F-1
BEARING TYPE	A/F
LOCKED ROTOR CODE LETTER	F
PERMISSIBLE STARTS PER HR WITH:	
MOTOR AT AMBIENT TEMP.	2
MOTOR AT RATED TOTAL TEMP.	1
DESCRIPTION OF INSULATION SYSTEM	
INSULATION CLASS	F
FULL LOAD TEMP. RISE	80°F
ACCEL. TIME, FULLY LOADED	
WITH 100% V, SEC.	
WITH 80% V, SEC.	
WITH % V, SEC.	
SAFE STALL TIME AT 100% VOLTAGE, SEC.	
WK^2 OF ROTOR, LB-FT^2	46
SOUND LEVEL, DB	80

CLIENT: Ogden Martin Systems Of Lee County

PROJECT: Lee County, Florida

FURNISHED BY: Distral S.A.

ATTACHMENT 2

SQUIRREL CAGE INDUCTION MOTORS BELOW 600 VOLTS

DATA FURNISHED BY SELLER

DRIVEN EQUIPMENT		Seal Air Fan
MARK OR ITEM NO.		
NO. REQUIRED		2
MAKE		Reliance Electric or Equivalent
FRAME NO.		256T
HORSEPOWER, HP (at each speed)		20
RATED VOLTAGE, V		960
SERVICE FACTOR		1.15
ENCLOSURE		TEFC-Xt
Type: Single Speed	X	
Two Speed Single Winding		
Other		
FULL LOAD SPEED, RPM		1755
FULL LOAD CURRENT, AMP		25
LOCKED ROTOR CURRENT, AMP		144
STARTING TORQUE, % FL		155
BREAKDOWN TORQUE, % FL		237
EFF.-FULL LOAD, %		86

EFF.-3/4 LOAD, %	87.6
EFF.-1/2 LOAD, %	87.7
P.F.-FULL LOAD	85.5
P.F.-3/4 LOAD	78.5
P.F.-1/2 LOAD	68.2
P.F. AT STARTING	
SHORT CIRCUIT AC TIME CONSTANT, SEC	
X/R RATIO	
SPACE HTRS., WATTS	----
NET WEIGHT, LB	320
MOUNTING ARRANGEMENT	F-1
BEARING TYPE	A/F
LOCKED ROTOR CODE LETTER	G
PERMISSIBLE STARTS PER HR WITH:	
MOTOR AT AMBIENT TEMP.	2
MOTOR AT RATED TOTAL TEMP.	1
DESCRIPTION OF INSULATION SYSTEM	
INSULATION CLASS	F
FULL LOAD TEMP. RISE	
ACCEL. TIME, FULLY LOADED	
WITH 100% V, SEC.	
WITH 80% V, SEC.	
WITH % V, SEC.	
SAFE STALL TIME AT 100% VOLTAGE, SEC.	
WK^2 OF ROTOR, LB-FT^2	1.45
SOUND LEVEL, DB	80dBA

ATTACHMENT 11.15

OGDEN MARTIN SYSTEMS
of LEE , Inc.

Spec No. SM-121
Issue 002
Date 7/31/87

TECHNICAL SPECIFICATION

FOR

MISCELLANEOUS HORIZONTAL PUMPS

SOLID WASTE TO ENERGY FACILITY
LEE COUNTY, FLORIDA

REVISION

001	Initial Issue	01/01/87
002	Revision	07/31/87

OGDEN PROJECTS INC.

TECHNICAL SPECIFICATION
FOR
MISCELLANEOUS HORIZONTAL PUMPS

TABLE OF CONTENTS

TABLE OF CONTENTS CONT'D

1.0 GENERAL

1.1 Scope

This specification details the performance, design, and manufacturing requirements for furnishing and delivering horizontal centrifugal pumps and associated equipment.

1.2 Work to be Provided

The Seller shall furnish a horizontal centrifugal pump(s) as described in the Design Condition and Project Specific Requirements, Attachment 1, and in accordance with the requirements of this specification. The equipment furnished shall be a complete package consisting of the pump, seals, bearings, lubrication system, coupling, coupling guard, driver, baseplate/support system and other standard accessories.

Special requirements of performance or design that effect the equipment will be specified in Section 2.

1.3 Work by Others

1. Handling, unloading, and erection
2. Motor starters
3. Foundation provisions, including anchor bolts
4. External connections to piping and electrical systems power and instrumentation

2.0 TECHNICAL REQUIREMENTS

2.1 Applicable Codes and Standards (latest issue)

American National Standards Institute

ANSI B73.1	Specification for Horizontal End Suction Centrifugal Pump for Chemical Process
ANSI B31.1	Power Piping

ANSI/AFBMA-9	Load Ratings and Fatigue Life for Ball Bearings
ANSI/AFPMA-11	Load Ratings and Fatigue Life for Roller Bearings

Hydraulic Institute Standards

H.I. Standards	Hydraulic Institue Standards

Steel Structures Painting Council

SSPC-SP6	Commercial Blast Cleaning

2.2 Performance

The performance requirements are given in the Design Condition and Project Specific Requirements, Attachment 1.

The hydraulic selection shall permit the installation of a five percent larger in diameter impeller than required for the specified operating conditions.

The pump selected shall be suitable for operation over its full performance curve from no less than minimum continuous flow to no less than 125 percent of rated flow. The pump data sheet shall indicate if parallel pump operation is required. Pumps that have stable head/capacity curves with continuously rise to shutoff are preferred. The pump's best efficient point shall be as close as possible to 90 percent of the pump rated flow.

Minimum flow requirements shall be based upon continuous operation at design temperature.

Each pump furnished shall perform within the following tolerances:

1. Capacity, gpm, without tolerance.
2. NPSH required, ft, without positive tolerance.
3. Total head, ft, without negative tolerance and plus 5 tolerance at the guaranteed capacity.
4. Pump efficiency, percent, without negative tolerance.

Pump horsepower, at 110 percent of design flow, shall not exceed the motor service rating.

2.3 Construction

2.3.1 General

Where possible standard pump construction shall be offered.

Horizontal single or multistage pumps shall be designed in accordance with the rules of ANSI B73.1, or Hydraulic Institute Standards.

The pumps offered shall be the horizontal shaft type, single or multistaged, with single or double suction impellers.

Maximum interchangeability of pump components is desired among similar pump designs.

2.3.2 Materials

Materials of construction shall be manufacturer's standard for the design conditions and service, unless otherwise specified on Attachment 1.

The materials used shall be those proven by service in similar pump designs and for similar operating conditions.

All austenitic stainless steel raw material shall be furnished in the solution-annealed, unsensitized condition.

Products which contain asbestos are prohibited. This prohibition includes items such as packings or gaskets even though the item is encapsulated or the asbestos fibers are impregnated with binder material. Alternative materials will be proposed for the approval by the Engineers.

2.3.3 Casing

Castings shall be high quality, free of defects which could affect hydraulic performance or mechanical reliability.

Casing wall thicknesses shall have a 1/8 in. minimum corrosion allowance applied in all areas exposed to the pumped liquid.

If the service is abrasive, the design shall utilize a renewable side plate.

Centerline supported pump casings shall be used for pumping temperatures in excess of 300°F.

Pump casing shall be self venting or supplied with a vent connection.

2.3.4 Connections

For single stage pumps the suction nozzle flanges shall be designed for the same pressure as the discharge flange. Flanged nozzles shall be used for sizes 2 in. and larger.

All flanges shall conform to ANSI standards for the pressures and temperatures involved. Cast iron flanges shall be flat-faced.

2.3.5 Impellers

Impellers may be semi-open, i.e., vanes exposed on one face, or closed. If semi-open impellers are used provisions shall be made in the design to restore the original axial clearances if wear occurs.

Impellers shall be mechanically attached to the shaft and shall be locked into position with an impeller nut and locking type washer or similar mechanical device.

Impellers shall be designed for hydraulic balance and checked for dynamic balance. The manner of attachment must be positive and employ no less than two means.

Flat casing wearing rings shall be provided on all pumps where fully closed impellers are used. Furthermore, multistage and double suction pumps shall be provided with impeller wearing rings.

For multistage and double suction pumps where the motor horsepowers are 200 or larger a Brinell hardness difference of 100 shall exist between the impeller wearing ring and the casing wearing ring.

All wearing rings shall be fully renewable and shall be held in place with staked mechanical fasteners or other approved methods.

2.3.6 Shafts and Shaft Sleeves

Shafts shall be sized to transmit the maximum horsepower required by the largest size diameter impeller available for the pump size and shall be solid and finished all over.

Shafts shall be sized so that the first wet critical speed of the entire pump assembly is above the running speed by a minimum 25 percent of the complete pump. The shaft deflection at the face of the stuffing box or mechanical seal face shall not exceed 0.002 in.

Shaft sleeves when used shall be locked to the shaft mechanically and sealed to prevent leakage between the shaft and sleeve. Sleeve outside surface finish shall be manufacturer's standard.

Sleeve hardness shall be manufacturer's standard; abrasive services shall require a 600 Brinell hardness.

2.3.7 Shaft Sealing

The shaft sealing method required is given in the Design Conditions and Project Specific Requirements, Attachment 1.

Drip shields shall be supplied to prevent any fluid leaking out of the stuffing boxes from being sprayed into the surroundings. The drip shields shall be designed not only to fit snugly around the stuffing box confines but also designed for ease of removal and replacement.

Packing glands shall be split and the halves bolted together for ease of packing replacement.

If quench glands and/or stuffing box cooling are required the Seller shall indicate the quantity of cooling water required in the Technical Data Sheets.

When mechanical seals are required, the Seller shall select the mechanical seal type (balanced or unbalanced) and manufacturer. All external seal piping from and to the pump casing and all other necessary hardware such as coolers, valves, thermometers, separators, orifices, pressure gages, and strainers shall be supplied and completely assembled by the Seller.

Optimum seal requirements: 25,000 hour life with 25 cc/hr leak rate.

Where an external source of fluid is required for cooling or seal flushing the Seller shall state the quantity and pressure requirements in the Technical Data Sheet.

2.3.8 Bearings and Lubrication

The bearing design and method of lubrication shall be that indicated on the Technical Data Sheet.

Antifriction bearings shall be selected for a minimum life of 40,000 hr at the design conditions for which the pump is selected. The 40,000 hr life shall be determined from the rating life, L-10, as calculated in subsection 5.2 of ANSI/AFBMA-9 and 11.

Sleeve bearings, when used, shall be split horizontally and shall be mounted in split bearing housings for ease of maintenance. The bearing housing halves shall be dowelled together.

Permanently sealed, grease lubricated antifriction bearings are preferred. Ring oil lubrication is preferred for sleeve bearings. When conditions dictate the use of a pressurized oil lubricating system, the Seller shall furnish the system complete including a shaft driven oil pump, heat exchangers, strainers, filters, relief valves, thermometers, pressure gages, oil drain sight flow glasses, reservoir, all piping and an auxiliary motor driven lube oil pump. All wetted parts of the lubrication system shall be stainless steel, except for the bearings and housings.

All bearing housings shall have a drain plug.

The Seller shall indicate the quantity of bearing cooling water required in the Technical Data Sheet.

2.3.9 Couplings

The Seller shall furnish dry-type flexible-type couplings. Spacer-type couplings shall be supplied to permit normal pump and driver maintenance without the need for moving either the pump its driver, or breaking the suction or discharge piping.

Limited end float couplings shall be used with electric motor drivers having sleeve bearings. The pump thrust bearing shall carry the residual motor thrust and coupling engagement axial loads when limited end float couplings are used.

Removable all metal coupling guards shall be furnished. All exposed rotating parts between driver and pump shall be guarded to within 1/2 in. of the bearing housings.

2.3.10 Base

A rigid common base extending under all parts of the pump and driver shall be furnished. The base shall be provided with a raised rim or drain pan for retaining drips and shall slope to a tapped drain hole connection at one end. Ample grout holes for filling and venting and anchor bolt holes shall also be provided.

In lieu of a raised rim or drain pan type base the Seller shall provide for the collection and drainage of stuffing box drips on the pump proper.

The pump and driver shall be mounted on the base and prealigned at the Seller's shop facility.

2.3.11 Vibration

The peak-to-peak amplitude of vibration at all flows as measured on the bearing housings shall not exceed the limits established by H.I. Standard

for field taken vibration at the running speed of the pump, taken axially and radially.

A rotation arrow shall be furnished at an easily observable location to indicate proper pump direction of rotation.

2.4 Induction Motors

All motors shall conform to Purchaser's Induction Motor Specifications SE-211 and SE-212. An Induction Motor Data Sheet (Attachment No. 1 to Specifications SE-211 and SE-212) shall be completed and submitted to the Purchaser for each motor supplied.

2.5 Welding

All welding, welding procedure qualification, and welder qualification shall be in accordance with the Seller's standard requirements.

Welding procedures and welders are to be qualified for the material and work involved.

The repair of castings, by the Seller or foundry, shall be allowed only if permitted by the material specification and not until the repair procedures to be used are submitted to the Engineers for approval. The repair of leaks and other defects by peening or by the use of filler materials is prohibited.

Cast iron shall not be repair welded.

2.6 Noise

The maximum sound level from rotating equipment furnished under this specification shall not exceed 85 dBA at 5 ft from any surface.

3.0 TEST AND GUARANTEE

3.1 Examination and Tests

3.1.1 Hydrostatic Tests

The pump casing and other pressure-retaining parts shall be tested hydrostatically to at least 1.5 times the casing design pressure.

The hydrostatic tests shall be applied for a minimum of one half hour using water at ambient temperature and the acceptance criteria shall be no visible leakage through pressure-retaining surfaces or gasketed joints.

Test water shall be cool, clean, and free of contaminates.

Noncorrosion-resistant castings and/or welds shall not be painted prior to testing.

Cooling water jackets and bearing housing cooling systems shall be similarly hydrostatically tested.

3.1.2 Performance Tests

When tests are to be performed, procedures must be submitted for information to the Purchaser.

NPSH and performance tests shall be conducted in accordance with the guidelines of the Hydraulic Institute Standards.

The NPSH tests shall be made at the following capacities:

1. 125 percent of the design flow
2. Rated (design) flow
3. Minimum flow

The performance tests shall consist of a minimum of five test points and shall cover the pump flow range from shutoff to 125 percent of the design flow including a point at the guaranteed flow condition.

Vibration measurements shall be made on the bearing housings for each test point. These readings shall be recorded on the performance test data and results sheet and shall show filtered and unfiltered readings radially and axially.

Certified copies of all test results in graphical and tabular from shall be submitted to the Purchaser for approval. The graphical form shall show total head in ft, brake horsepower, NPSH required in ft, and pump efficiency plotted as ordinate against pump flow in gpm as abscissa.

When NPSH and performance tests are not required, the certified performance curves shall be based upon actual test data on identical pumps.

3.2 Inspections

As a minimum, the Seller shall perform a complete inspection of all furnished equipment to ensure compliance with the hydraulic and mechanical requirements of this specification.

The location of nozzles and connections, both mechanically and electrically, shall agree with information submitted to the Engineers for approval and use.

3.3 Guarantee

All equipment shall be warranted by the Seller against defective materials, design and workmanship for one year after being placed in service, but not more than 18 months after date of shipment.

If any malperformance or defects occur during the guarantee and warranty period, the Seller shall make all necessary alterations, repairs, and replacements free of charge, free on board factory. Field charges, if any, shall be subject to neogotiations between the Seller and the Purchaser.

The equipment shall be guaranteed for satisfactory performance at the operating condition specified on the data sheet. Field checks on performance, when made by the Purchaser shall be made within 60 days of initial operation.

4.0 SUPPLEMENTARY REQUIREMENTS

4.1 Markings

The equipment shall be provided with a permanently attached nameplate located in a readable position. The nameplate material shall be compatible with the material to which it is attached to prevent galvanic corrosion. Nameplates shall not be attached to pressure retaining surfaces with mechanical fasteners. The nameplate shall be stamped with the following information:

1. Purchaser's mark number
2. Manufacturer's model number
3. Pump serial number
4. Capacity, gpm
5. Total head, ft
6. Pump speed, rpm
7. Impeller diameter, inches

4.2 Shop Cleaning and Painting

Cleaning of surfaces which are not to be painted or coated shall be done according to the Seller's best recommended practice.

All cleaning operations shall be conducted such that stainless steel and nickel alloys are not contaminated with lead, copper, mercury, and/or other low melting point metals; chlorides, sulfur, halogens, as well as ferritic steel materials.

Machined or mating surfaces as well as pipe and components for lube oil systems shall be free of rust.

Abrasive blasting of noncorrosion resistant materials shall be in accordance with seller's best recommended practice.

All internal surfaces shall be cleaned of all particulate contaminants such as sand, metal chips, weld slag, etc. Additionally, the surface shall be free of organic contaminants such as oils, paint, and preservatives as determined by a visual examination.

All pump surfaces are to be dry before equipment is packaged for shipment.

External noncorrosion-resistant metallic surfaces of pumps and motors shall be primed and finished in accordance with the Seller's standards.

Welded stainless steel and nickel alloys which are not solution annealed after completion of all welding, as well as hardened low- or high-alloy steels, shall not be acid pickled.

4.3 Preparation for Shipment

4.3.1 Packaging

Packaging shall be adequate to prevent contamination, mechanical damage, or deterioration of the item supplied. All expendable materials such as tapes, barriers, plugs, desiccants and desiccant bags, caps, inhibitors, etc., to be in contact with austenitic stainless steel or nickel alloys shall not contribute to corrosion during the storage period by, for example, rain or condensate leaching deleterious chemicals contained in the expendable material.

Items not immediately packaged after manufacture shall be protected from contamination.

All openings into items shall be sealed or plugged. Weld end preparations shall be protected against corrosion and physical damage.

Pumps shall not be shipped with seal/packing installed. The seal packing shall be boxed and shipped with the pumps. Items shall be packaged in suitable containers, crates, or on skids.

The outer most covering shall be clearly marked with the complete vendor identification which shall include weight.

4.3.2 Shipping

The weight, lifting points, indicated on the crate, skid, or package shall be utilized for all handling procedures.

When shipping by open carrier items shall be covered by fire retardent materials, e.g., tarapaulins to prevent contamination from road, dust, dirt, salt spray, and other forms of contaminants.

4.4 Installation, Operation, and Maintenance Instructions

No later than one month after initial shipment of the equipment, 10 final bound sets of installation, operation, and maintenance instructions shall be sent to the Purchaser.

A parts identification list shall accompany each set of instructions. This list shall include sectional and/or outline prints or illustrations identifying each numbered part and location in relation to the equipment as a whole.

4.5 Seller Responsibilities

The Seller shall impose on each subsupplier, the applicable requirements of this specification. He shall be directly responsible that the subsuppliers are completely aware of these requirements, and that items and services meet specified requirements. Upon request, these subsuppliers shall be approved by the Purchaser.

The Seller shall promptly document and notify the Purchaser of all deviations and nonconformances, or Seller documents approved by the Purchaser. No deviation or nonconformance from these documents shall be binding until approved by the Purchaser.

4.6 Data and Drawings

The Seller shall submit with each copy of his proposal one filled-in set of the technical data sheets contained in or attached to this specification, and one each of the following:

1. Outline drawings showing the general arrangement and approximate dimensions of the equipment proposed.
2. Typical cross-sectional drawings or other means of showing salient features of the equipment proposed, including means of mounting pump to foundation.
3. Performance curves.
4. Equipment drawings showing estimated weight and distribution of static, live, wind, and other loads.

5. Installation list of similar operating equipment.

6. Separately priced spare parts list for one year's normal service.

7. Listing of allowable nozzle forces and movements.

After the purchase order is placed, the Seller shall submit one reproducible and two prints of all drawings in accordance with the agreed-upon schedule. The drawings submitted shall be certified correct and have the Purchase Order Number, Job Name, Tag No., Service Name, and Vendor S.O. No. indicated on each page and shall show the following:

1. All physical outlines as required to show the overall size and space requirements including that for dismantling and maintenance and the inter-relationship of the various components

2. Cross sections and details as required to satisfy the Purchaser that all components are in conformance with the specification including design and physical arrangement

3. All information required by the Purchaser for the design and location of all connecting Purchaser-furnished structural, mechanical, or electrical items, such as foundations, steel supports, piping, ducts, cables, conduit, etc.

4. Weight of the equipment furnished

5. Details of special features

6. Separately priced recommended spare parts list for one year normal service

7. Performance curves

4.7 Schedule

For all equipment provided as part of this purchase order, the Schedule, or revisions to it, as submitted to the Purchaser and agreed upon by the Seller and the Purchaser before the purchase order is placed and included with the purchase order, shall be binding on the Seller.

ATTACHMENT 1

DESIGN CONDITIONS AND PROJECT SPECIFIC REQUIREMENTS

HORIZONTAL CENTRIFUGAL PUMPS

1.0 Design Conditions

General

Project _____

Service _____

Mark Number _____

No. Operating/Spare _____

Performance (per Pump)

Capacity, Design, GPM _____

Capacity, Normal, GPM _____

Discharge Press., PSIG _____

Suction Press., Design/Max., PSIG _____ / _____

Differential Press., PSI _____

Total Head, FT. _____

NPSH Available, FT. _____

Pumping Temp., F _____

pH/Sp. Gr. at P.T. _____ / _____

Vapor Press. at P.T., PSIA _____

Viscosity at P.T., SSU _____

Cooling Water Source: _____

Available at _____ PSIG and _____F.

Pumpage _____

Parallel Operation Required Yes/No _____

Seals

Mechanical/Packing _____

Shop Test Required

Non-witnessed Hydro _____

Non-witnessed Perf. _____

Non-witnessed NPSH _____

Other _____

Materials

Casing _____

Impellers _____

Shaft _____

Base _____

Site Conditions

Location, indoors/outdoors _____

Ambient temperature range, °F _____

Site elevation, Ft, above MSL _____

2.0 Project Specific Requirements

The attached Project Specific Requirements, if any, are additions, deletions, and/or revisions to the preceding specification requirements and shall be considered as part of this specification.

ATTACHMENT 2

TECHNICAL DATA BY SELLER

HORIZONTAL CENTRIFUGAL PUMP

General

Project	_____
Service	_____
Manufacturer	_____
Model No.	_____
Casing Split/Impeller Type	_____
No. of Stages	_____
Proposal Curve No.	_____
Mark Nos.: Pumps	_____

Guaranteed Performance

Capacity, GPM	_____
Total Head, FT.	_____
Pump Efficiency, Percent	_____
NPSH Req'd, FT.	_____
BHP Req'd	_____
Pump Speed, RPM	_____
Minimum Continuous Flow, GPM	_____
Maximum Working Press., PSIG at P.T.	_____ AT
Rotation from Coupling End	_____
Impeller Dia. Furn., IN.	_____
Impeller Dia. Avail., Min/Max., IN.	_____
Recommended Driver Size, HP	_____

Bearings

Radial Type	_____
Thrust Type	_____
Radial L-10 Life, HRS.	_____
Thrust L-10 Life, HRS.	_____
Lubrication	_____

Stuffing Box

Packing Size/No. of Rings	_____
Mech. Seal Manufacturer	_____
Mech. Seal Type	_____
Mech. Seal Model No.	_____

Cooling Water Requirements

Bearing Jacket, GPM/PSIG	____/____
Stuffing Box, GPM/PSIG	____/____
Lubrication System, GPM/PSIG	____/____
Mech. Seal Coolers, GPM/PSIG	____/____
Mech. Seal Flushing, GPM/PSIG	____/____

Coupling

Manufacturer	_____
Model No./Size	____/____

Connections

Suction Flange Size, In./Facing	____/____
Suction Flange ANSI Rating, LB.	_____

Discharge Flange Size, In./Facing	/
Discharge Flange ANSI Rating, LB.	

Maximum Allowable Nozzle Loads	Suct./Dis.
Fx, LB.	/
Fy, LB.	/
Fz, LB.	/
Mx, FT.-LB.	/
My, FT.-LB.	/
Mz, FT.-LB.	/

Materials	
Impeller	
Impeller Rings/BHN	
Casing/Min. Thickness	
Casing Rings/BHN	
Shaft	
Base	

Weight	
Pump/Base/Motor	/ /

ATTACHMENT 11.16

OGDEN MARTIN SYSTEMS
of LEE, Inc.

SPEC NO. SS-410
ISSUE 006
DATE 5/17/91

TECHNICAL SPECIFICATION

FOR

STRUCTURAL STEEL

Facility Name: LEE COUNTY RESOURCE RECOVERY FACILITY

Location: LEE COUNTY, FLORIDA

****

****

Specification Prepared By:

A/E Name: OMSL

Address: FAIRFIELD, NJ

Telephone: 201-882-7071

A/E Approved for Release:

	Printed Name	Signature	Date
1.			
2.	R. TERRAMOCCIA	R. Terramoccia	11/19/91
3.	R. TERRAMOCCIA	R. Terramoccia	1/16/92
4.			
5.			

REVISIONS

001	Initial Issue	1/01/87
002	Revision	8/28/87
003	Revision	11/03/87
004	Revision	9/29/89
005	Revision	2/28/90
006	Revision	5/17/91

OGDEN MARTIN SYSTEMS, INC.

TECHNICAL SPECIFICATION
FOR
STRUCTURAL STEEL

TABLE OF CONTENTS

TABLE OF CONTENTS (contd)

1.0 GENERAL

1.1 Work Included

The Contractor shall provide all labor, supervision, equipment, tools, materials, and services to furnish, shop detail, fabricate, shop coat paint deliver, unload, store, handle, and erect the following items as shown on the Engineer's drawings and as specified herein:

1. Structural steel framing and bracing for all buildings, structures supporting equipment, pipe, tray and duct supports.

2. Miscellaneous steel framing and assemblies including clips, angles, plates, and stiffeners.

3. Grating and raised pattern floor plate platforms, complete with curbs, railings, toe plate, banding, sleeves and stiffeners.

4. Stairways including stringers, handrail, landings, hangers, posts, bracing, treads with non-skid nosing, connecting clip angles, including concrete filled treads.

5. Ladders, safety cages, top hoops, self-closing safety gates, guide and support clips.

6. Roof purlins, wall girts, eave struts, sill angles, sag rods and roof parapets.

7. Crane girders, rails, rail clamps and splice bars with fasteners, traction plates, electrical support brackets and beams and crane end stops.

8. All lifting beams, hitch plates, monorails, hoists and davits attached to steel framing.

9. Base, splice & cap plates for columns and bearing plates for beams including setting and shimming material at the required elevations.

10. Door, louver, window, lintel, smoke hatches, floor openings, roof access openings, vents, T-G silencers, skylights, pipe penetrations and HVAC framing constituting a part of the steel framing.

11. Bolts, washers, nuts, and direct tension indicators, where applicable, for all shop and field connections and drilled-in concrete anchors.

12. Weld for shop and field connections.

13. Surface preparation, painting, galvanizing where specified herein, and field touch-up of painted and galvanized items and field painting of bolts after erection.

14. Other remaining items necessary to complete construction.

15. Steel framing and shaftway structural steel for elevator(s).

1.2 Work Not Included

The following associated items and work will be furnished and/or performed by others:

1. Supply and installation of anchors bolts, sleeves, plates, and other embedments which are to be set in concrete.

2. Supply and installation of grout for equipment and column base plates.

3. Supply and installation of elevators with guideways/guiderails.

1.3 Related Work

Other specifications related to work in this specification include, but are not limited to, the following:

Specification No. SS-408 - Concrete
Specification No. SA-550 - Painting Ferrous Metals Included in Subcontractor's Work

1.4 References

The following documents relating to the work are referenced herein. The issue date of the document (including addenda) in effect on the date of Invitation to Bid shall apply. If there appears to be a conflict between this specification and a referenced document, the matter shall be referred immediately to OMS for resolution.

AISC - American Institute of Steel Construction

AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings

AISC Code Standard Practice for Steel Buildings and Bridges

AISC Manual of Steel Construction

ASME - American Society of Mechanical Engineers

ASME/ASTM A17.1B Safety Code for Elevators

ASTM - American Society for Testing and Materials

ASTM A1	Carbon Steel Tee Rails
ASTM A3	Steel Joint Bars, Low, Medium, and High Carbon (Non-Heat Treated)
ASTM A36	Structural Steel Shapes and Plates
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless (Types E or S, Grade B)
ASTM A123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A307	Carbon Steel Externally Threaded Standard Fasteners
ASTM A325	High-Strength Bolts for Structural Steel Joints
ASTM A386	Zinc Coating (Hot-Dip) on Assembled Steel Products
ASTM A500	Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes (Grade B)
ASTM A501	Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A569	Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip Commercial Quality
ASTM A572	High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality (Grade 50 KSI)
ASTM A759	Carbon Steel Crane Rails

AWS - American Welding Society

AWS D1.1	Structural Welding Code

RCSC - Research Council on Structural Connections of the Engineering Foundation

RCSC	Structural Joints Using ASTM A325 or A490 Bolts Specification

1.5 Quality Assurance

1.5.1 Welding

Welds shall be tested by nondestructive methods as specified in the Welding section herein.

1.6 Submittals

The Contractor shall comply with the submittal of the following documents and drawings:

TITLE	OMS	ENGR
CMTR - Structural Steel and Bolts	1	1
NDT Reports	1	1

CMTR - Certified Mill Test Reports
OMS - OMS's Site Representative
ENGR - Engineers
NDT - Non Destructive Test

The Contractor's fabricator shall provide shop drawings, bolt lists and other information as may be required by the contract documents.

Shop drawings (including erection plans) shall show fabrication details in English units, bolted and welded connections (including grooves & back-up bars) for both shop and field welds, copes, blocking and shop notes.

Shop drawings shall be furnished progressively as completed and all such drawings and bolt/material lists shall bear OMS's project number and the name (or item number) of the structure to which they apply. Weight of shipments shall be based on AISC Code of Standard Practice, (AISC Manual of Steel Construction). The Contractor shall furnish OMS's site representative with a copy of the packing lists.

All shop detail and erection drawings, including calculations for special connections (where appropriate) shall be prepared under the supervision of a registered professional engineer, checked before submittal and approved by the engineer before fabrication commences.

A complete copy of all shop drawings shall be kept on file at the site by the contractor and made available on request by OMS or the Engineer.

1.7 Product Handling

1.7.1 Provisions for Storage

All items shall be stored on cribbing or equivalent to avoid trapping water and to allow air circulation.

Items shall be handled in a manner which is consistent with safe and sound material handling practices.

1.7.2 Shipping Requirements

For all items, packaging shall be adequate to prevent contamination, mechanical damage or deterioration during the field storage period. Structural steel members shall be cleaned, painted and identified by erection marks. Bolts, nuts, and washers shall be shipped in closed containers to exclude moisture.

2.0 PRODUCTS

2.1 Materials

All material shall be new.

Structural steel shall conform to ASTM A36 and shall be a domestic source (exceptions will require OMS's prior written approval).

High-strength steel shall conform to ASTM A572, Grade 50. Structural tubing shall conform to ASTM A501. Steel pipe shall conform to ASTM A53, Type E or S, Grade B.

2.2 Design and Workmanship

2.2.1 General

The AISC Specification and Code are hereby incorporated into this specification and shall apply except as otherwise specified herein or in related documents, or approved in writing by OMS.

The type of construction used for the structural steel framing, in general, shall be Type 2, ("simple framing") as defined in the AISC Specification. Type 1 construction, ("rigid-frame") shall also be used where design conditions dictate.

Steel construction projecting inside of elevator enclosure walls shall conform to ASME/ANSI A17.1b.

2.2.2 Design of Connections

Shop connections shall be either welded (preferred) or high strength bolted (A325). Field connections shall be high strength bolted unless otherwise specified on the Engineers drawings. Also where indicated on the Engineers drawings, connections may be made with ASTM A307 bolts or with high strength bolts for light, miscellaneous framing such as handrailing, ladders & cages, stair treads, purlins and girts.

High strength bolts, unless otherwise noted, shall be bearing type with bolt threads included in the shear plane.

Connections with repeated reversal and vibratory loads shall be friction-type connections and shall have no less than two (2) bolts per connection.

All connections shall be designed in accordance with the AISC specifications. The connection details shall be shown on the design drawings except as follows:

- Framed beam shear connections shall be designed and detailed by the Steel Fabricator in accordance with AISC Type 2 construction provided the beam shear loads at the connections do not exceed one-half of the total allowable uniform load for beams laterally supported, (as given in the AISC "Manual of Steel Construction") plus any axial load that may be shown on the drawings.

- The connections at ends of tension or compression members for bracing members shall develop the force due to the design load, but not less than 50 percent of the effective strength of the member, based upon the kind of stress that governs the selection of the member. Working points for designing and detailing of the connections shall be shown on the design drawings.

- When the loads acting on the connections are given on the design drawings, the Fabricator shall design and detail the connections.

- The Contractor shall be responsible for the design of connections not shown on the drawings and as such, is also responsible for the coordination of the connections and their effect on other building components or systems.

Where connections are to be field welded, holes for erection bolts shall be placed in the end connections and the members to which they are to be attached. Erection bolts shall be furnished by the Fabricator.

2.3 High Strength Bolts

2.3.1 Material

High strength bolts, washers and nuts shall conform ASTM A325. High strength alloy bolts, washers and nuts shall conform to ASTM A490.

2.3.2 Use

A minimum of one hardened washer per bolt shall be placed under part turned when tightening A325 or A490 bolts.

All bolts in any connection shall be installed with all nuts on the same side unless interferences will not permit. Vertical bolts shall be installed with nuts on the lower side, except where space restrictions make this impossible.

2.3.3 Inspection

The inspection of high-strength bolts shall conform to all provisions of Section 6 of the RCSC Specification and AISC Code.

2.4 Plate and Angle Curbs

All plate and angle curbs shall have neat close joints and shall be butted at corners. The maximum clearance at joints shall be 1/8 inch.

2.5 Structural Steel Stairs

Stair widths shall be no less than 2'-6" or greater if required by code.

Exposed ends of stair stringers shall be cut with a saw or other approved method and ground smooth. Ends of stair stringers in public areas shall be capped with a steel plate.

American Stair Products "speed stair" is an acceptable alternate subject to OMS and the engineers approval for manufacturer's component option list for treads, landings, rails, posts and risers.

2.6 Floor Grating and Stair Treads

Steel floor grating (preferred) and stair grating treads (with raised pattern plate non-skid nosing) shall be of welding quality mild carbon steel conforming to ASTM A569. Steel floor grating and stair treads, in the depths indicated on the Contractor's drawings, shall be of welded construction, rectilinear in pattern, with 3/16 inch thick longitudinal bearing bars spaced 1 3/16 inches on centers, and cross members 3/16 inch minimum thickness spaced 4 inches on centers. Grating and stair treads (including raised pattern plate nosing) shall be hot dipped galvanized in accordance with ASTM A123.

Exception: Concrete filled, metal pan stair treads (with closed riser) and landings shall be provided for enclosed fire escape stair towers and public stairs as shown on the Engineer's drawings.

Serrated grating and stair treads shall be provided in exterior applications for northern climates where ice and snow conditions prevail.

Grating shall be furnished and installed in reasonable sized sections, avoiding patchwork, with due regard for neat appearance and safety of finished product. Longitudinal and cross bars in adjacent sections shall be in line when erected end-to-end.

Grating shall be fabricated and erected to fit around protruding structural members, equipment and piping.

All grating shall be banded at edges of openings. Banding strips shall be at least the same thickness and depth as the bearing bars to which they are welded. When openings between grating & protruding elements exceeds 1", then a 1/4"

minimum toe plate thickness shall be provided and have a vertical height of 4" from its top edge to the level of the floor.

Manufacturing standards and tolerances of the NAAMM Manual shall be followed.

Removable sections of grating (as identified on the drawings) shall be fastened to the supporting steel with four (4) sturdy 14 gauge galvanized saddle type clips using 1/4 inch diameter studs bolts or self tapping machine bolts, together with nuts and washers. Clips shall have a 5/16 inch diameter by 1/2 inch slotted hole. Stair treads shall be fastened to the stair stringers with 3/8 inch diameter bolts and nuts.

Permanently installed grating shall be welded in the field as shown on the drawings or in the shop for shop assembled pieces.

2.7 Raised Pattern Floor Plate

Raised pattern floor plate (where a closed flooring is required) shall conform to ASTM A36 with a symmetrical raised diamond pattern. The plate shall be smooth-cut or finished to provide smooth, straight edges. Removable floor plates shall be fastened to the supporting steel using the Floor-Fast system by Struct-Fast Inc., Wellesley Hills, MA, or approved equal.

Permanently installed raised pattern floor plate shall be welded in the field as shown on the drawings or in the shop for shop assembled pieces. Stiffening ribs are to be provided where required by design.

2.8 Railing

Guardrail, handrail and posts shall be of pipe construction and designed to resist governing code specified loadings and "openings" between rails that may be enforced by the local building official. Railing shall be located as shown on the Engineers drawings with posts spaced not greater than 8 feet-0-inches on centers.

For "Fire-Rated Stair Towers" and applications in areas of public use, handrailing shall also be of pipe construction and designed to satisfy code and local regulations.

When governing code specified loadings are not given, then the following shall apply: the anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail. Engineer to verify railing design is adequate to resist applied forces.

Handrailing & toe plates shall be shop fabricated into complete assemblies for ease of field erection.

All projecting cut edges and welds on railing to be ground to a smooth finish.

2.9 Ladders, Cages and Self Closing Safety Gates

Ladders shall be provided for access from one structure level to another where operations require infrequent travel, non-routine access to equipment and where stairs are impractical due to space limitations. The refuse and turbine generator cranes serve as only two examples where ladders must be provided to mount equipment for servicing.

Ladders and cages shall conform to ASTM A36.

Self closing safety gates shall be made from 3/4" diameter bar material and fabricated to rest on the cage hoop or rail as shown on the Engineers drawings.

Ladders shall be provided with top hoop only when they extend less than 20' above grade.

Ladder rungs shall be spaced at 1'-0" c.c. (max.).

Provide cages on ladders of more than 20'-0" above grade or as required for safety.

All projecting cut edges on ladders & cages to be rounded to a smooth finish.

Ladder cages shall be shop assembled & attached to ladders as permitted by shipping limitations.

2.10 Crane Rails

Crane rails and standard accessories shall conform to ASTM A1, No. 1 modified rail, for rails weighing less than 104 pounds per yard, and ASTM A759 for rails weighing 104 pounds per yard or more. Joint bars shall conform to ASTM A3.

Crane rail splices shall have tight joints using bolted splice bars, ASTM A325 bolts & nuts with alloy spring washers furnished to A.R.E.A. specifications. Refuse crane rail clamps shall be floating type clamps with double bolts unless otherwise specified. Turbine generator crane may be a single bolt rail type clamp (appropriately sized and spaced) due to its limited service. Splices and clamps shall be in accordance with the AISC Manual.

Clamps, connections and their spacing shall be selected to withstand side thrust equal to 20% of the sum of the trolley weight and the lifted load.

Note: Gantrex crane rail clips are an acceptable fastening system alternate.

2.11 Identification of High-Strength Steel

Shop drawings shall identify each structural member that is to be made of steel other than ASTM A36 material (i.e., high-strength steel). The ASTM number and a color code shall be marked on the original pieces, and maintained until after application of piece marks on the members.

Members which are killed and normalized shall be identified at the mill as being heat treated by painting serial codes or other mill identification so that the material can be easily identified during fabrication.

2.12 Welded Plate Girders

The plate girders, as shown on the Engineers' drawings, shall be designed for welded fabrication.

Girders shall be completely shop fabricated and shipped in one piece when feasible. When shipment or erection requirements dictate, field joints shall be located subject to approval by the Engineers. Web and flange splices shall be complete penetration groove welds. The flanges shall be single thickness plates joined to the web by continuous welds.

2.13 Welding

2.13.1 General

All welding, welding procedures and qualifications, welder qualifications, and weld material shall be in accordance with AWS D1.1, local laws, ordinances, and the additional requirements herein. Welding procedures and qualifications shall be maintained and readily accessible in the shop where welding is being performed.

Welding electrodes shall be E-70 series.

In addition to the requirements of AWS D1.1, all welding materials shall be stored in a controlled access, clean, dry area that is weathertight and is maintained at a temperature between 40°F and 140°F.

2.13.2 Inspection, Tests, and Repair of Welds

All welds shall be visually inspected to the requirements of AWS D1.1.

Weld inspection shall be performed by an AWS Certified Inspector, or Assistant Welding Inspector(s), under the supervision of the AWS Certified Inspector. Alternatively, a program for self certification of welding inspectors may be implemented provided the program is written and supervised by an AWS Certified Inspector in compliance with the requirements of AWS D1.1. The Weld Inspection Program, including the Inspector's certification records, shall be maintained and readily accessible in the shop where welding is being performed.

Complete penetration groove welds in the following locations shall be tested by radiographic or ultrasonic methods after completion:

1) Flange splices of beams, girders, and columns, or chord splices of trusses, and splices subject to stress reversal.

2) Web splices of beams, girders, and columns at one-sixth of the depth of the web beginning at the point or points of maximum tension, and 25 percent of the remainder of the web depth.

3) Any additional locations shown on the Engineers' drawings.

Note: To avoid expensive field testing, complete penetration groove welds, where required, shall be performed in the shop (unless directed otherwise). Field bolted splices shall be the preferred method.

Magnetic particle testing may be used instead of radiographic or ultrasonic testing when approved by the Engineers.

For welded plate girders, fillet welds and partial or complete penetration groove welds occurring at the intersection of webs and flanges, or used for attaching cover plates to flanges, shall be tested by the magnetic particle method after completion. At least one foot of every 10 feet of accumulated weld length of each size shall be tested.

All welds found deficient shall be repaired in accordance with AWS D1.1.

2.14 Protective Coating

2.14.1 General

All steel material furnished under this specification, excluding fasteners, galvanized surfaces, machined surfaces, or surfaces to be bonded to concrete, shall be cleaned and coated as required herein.

Material used to mark steel after painting shall be the same paint used as the general shop coat, tinted to suit with a tinting material as recommended by the paint manufacturer. Materials used for piece marking shall not be of a type which will bleed through when a touch up coat is applied.

All coating material containers shall be labeled to show the name of the manufacturer, the product trade name or designation, and color.

2.14.2 Material

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

2.14.3 Surface Preparation

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

2.14.4 Mixing and Thinning

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

2.14.5 Shop Application

Refer to Technical Specification for Painting Ferrous Metals, SA-550.

Surfaces adjacent to edges of joints to be field welded shall be kept free of paint within 4 inches of the edge, the unpainted weld area being protected with one coat of Carbo-Weld 11 manufactured by the Carboline Company, St. Louis, Missouri. This protective coating need not be removed prior to welding. Such surfaces shall, subsequent to welding, be prepared and coated in the same manner as specified for the appropriate standard painting system.

The condition of contact surfaces of friction-type connections shall conform to the requirements of the RCSC Specification for the type of coating used.

Milled surfaces shall be coated with a rust-preventive material similar to Tectyl 506G, manufactured by Ashland Petroleum Company, Ashland, KY, or approved equal. Coating shall be applied after inspection and prior to being placed outdoors. Where later removal of this coating is required, SSPC SP1 cleaning methods and recommendations shall be followed.

2.14.6 Galvanizing

Where galvanizing is called for, all steel shapes, plates and bars shall be hot dip galvanized according to ASTM A123; all steel and iron hardware and thread components according to ASTM A153. Embrittlement control shall be according to ASTM A143.

All welds on assembled items to be galvanized (if specified) shall be continuously seal welded, i.e. all around the contact perimeter.

2.15 Signs

Allowable floor loading signs shall be marked on plates of approved design by OMS and securely affixed in a conspicuous place in each space to which they relate as required by OSHA (1910.22).

3.0 EXECUTION

3.1 Workmanship

The recommendations and procedures prescribed in the AISC Code shall govern the erection work unless otherwise specified herein.

3.2 Anchor Bolts

Prior to erecting steel, anchor bolts shall be checked to assure that they are correctly aligned and that elevations are correct. Any deviation from the intended line and grade shall be brought to the attention of the Engineers when discovered. The implementation of the required corrective action is necessary before the commencement of erection operations.

3.3 Erection Tolerances

The erection tolerances as listed in the AISC Code shall apply unless otherwise specified herein or indicated on the Engineers' drawings.

3.4 Crane Rails

Crane rail splices, on opposite girders, shall be staggered. Rail and girder splices shall not coincide. The two runway rails must be parallel along their entire length.

Crane runway rails shall be straight, parallel, level, and at the specified elevation given on the drawings. Appropriate survey equipment shall be used to prepare a drawing showing as-built runway rail elevations, plan locations and distances between rails and submitted to OMS for approval.

3.5 Festooned Cable Support Beam (Refuse Crane)

To provide a proper trolley running operation, ends of trolley beam flanges shall be straightened (squared) to correct standard mill rolling tolerances. Unless the Manufacturer dictates otherwise the I-Beam joints shall be welded all around lower flange continuing up web of beam at least 50% of depth with a root opening equal to 25% of web thickness. Grind weld smooth and flush all around joint for optimum transition of trolley wheels.

The I-Beam track may be supported by any suitable framework to suspend the entire weight of the Festoon System using bolt fasteners or welding at 5 foot increments (or Vendor recommendations) throughout beam length. The recommended minimum factor of safety is five (5).

3.6 Erection Alignment of Structures

When all the columns, beams, bracing, and struts of a tier within a given erection sequence have been set in place, the joints shall be made secure by the insertion of a number of erection bolts equal to at least 30 percent of the total number of bolts in the connection. A minimum of two bolts shall be installed in every connection. The structure shall be plumbed and the connection holes faired up with enough driftpins to maintain dimensions and plumbness.

After all of the members in a tier have been aligned and the columns plumbed, all remaining connections shall be installed with high-strength fasteners and tightened.

Each tier shall be secured in the foregoing manner.

Anchor bolts shall be snug tightened as soon as columns are set and shall be fully tightened after the first tier is plumbed. All baseplates within a given erection sequence will be grouted promptly after setting, or before the second tier is erected, unless otherwise approved by the Engineers.

Shim packs adequately sized to support the weight of the first tier shall be used if the base plate is not grouted prior to erection of the first tier. Shim packs shall not be placed near the edge of shear keys. Base plate leveling bolts shown on the Engineers' drawings shall not be used for support.

3.7 Bracing

The bracing shown on the Engineers' drawings shall be designed to provide a stable structure upon the completion of erection.

The Contractor shall design and install all additional temporary bracing or guying required to meet loading imposed during erection, consistent with the erection sequence used, or required at the end of any work period to ensure safe and stable conditions. Additional temporary bracing of this nature shall be reviewed by the Engineers. However, the Engineers' review shall not relieve the Contractor from full responsibility for the stability of the structure during erection.

3.8 Sag Rods

Sag rods serving as an intermediate support for purlins and girts (arranged in its weak axis direction) shall be located the minimum gage distance from the roofing and siding it supports.

4.0 PROJECT SPECIFIC REQUIREMENTS

The attached Project Specific Requirements, if any, are additions, deletions, and/or revisions to the preceding specification requirements and shall be considered as part of this specification.

1/16/92 3

4.1 Add the following sections:

3.9 Cuts, Alterations, and Holes for Other Trades

Neither the fabricator nor the erector will cut, drill or otherwise alter his work, or the work of other trades, to accommodate other trades, unless such work is clearly specified in the contract documents. Whenever such work is required, the Contractor is responsible for furnishing complete information as to materials, size, location and number of alterations for the Design Engineer's review and written approval.

3.10 Misfabrications

Incorrectly fabricated, damaged or otherwise misfittings or non-conforming materials or conditions shall be reported to the owner prior to remedial or corrective action. Any such action shall require approval.

1/14/92 3

4.2 Add the following to Section 2.3.2:

All equipment connections to structural steel shall be high strength bolted (A325). Unmarked bolts or bolts of foreign manufacturer without valid test certificate shall not be used.

4.3 Add the following to Section 1.5:

The contractor shall [redacted] engage a recognized independent testing laboratory (certified by the appropriate state or local agency), approved by OMS, to conduct routine testing and installation of bolting and welding.

Testing shall be in accordance with Section 6 of the RCSC Specification and AISC Code.

End of Project Specific Requirements

ATTACHMENT 1
DOCUMENT SUBMITTAL SCHEDULE

Documents for Approval	Engineering Need Date for Vendor Data	Schedule Date for Certified Vendor Submittal	Actual Vendor Submittal Date
- Certified Mill Test Reports for Structural Steel and Bolts	Upon Receipt of Reports	_____	_____
- Non-Destructive Test Reports	7 Days After Test	_____	_____
- Shop Detail Drawings	90 Days Before Shipment	_____	_____
- Bolt Lists	90 Days Before Shipment	_____	_____
- Crane Runway Survey (As per Section 3.4)	7 Days After Completion	_____	_____
- High Strength Bolt Installation Report	7 Days After Completion	_____	_____

ATTACHMENT 12

NOT UTILIZED

ATTACHMENT 13

DOCUMENT SUBMITTAL SCHEDULE
(Days After Award)

	Engineering Need Date for Seller Data	Schedule Date For Certified Seller Submittal
Documents for Approval		
Documents Submittal ~~Schedule~~ List	10	11/30/92
Delivery, Fabrication & Construction Schedule (PRELIM. SUMMARY/FINAL)	10	11/12/92 12/14/92
Process Flow Data		11/10/92
Process Flow Diagram (Expected & Design)	30	12/7/92
~~Plot Plan~~	30	N/A
Foundation Loading Diagrams	10	11/30/92
General Arrangement Drawings	10	11/30/92
Piping & Instrument Diagrams	60	12/28/92
Electrical One-Line Diagrams	60	12/28/92
Logic Diagrams (INTERFACE INFO/FINAL)	60	12/14/92 / 3/1/93
SAMA Logic Diagrams (INTERFACE INFO/FINAL)	60	12/14/92 / 3/1/93
CRT Graphic Sketches	60	~~4/21~~/93
~~I/O List with PLC Holding Registers~~	90	N/A
Control Wiring Diagrams	90	4/28/93
Selective Coordination Curves (PRELIM/FINAL)	90	2/15/93 / 7/28/93
Conduit & Cable Tray Routing Drawings	90	7/28/93
Grounding Drawings (INTERFACE INFO/FINAL)	90	1/28/93 / 7/28/93
Lighting Drawings	90	7/28/93
Motor List	90	1/28/93
~~Test Program Procedure~~	90 days prior to Operation	N/A
~~Test Reports~~	30 days after test	N/A

DOCUMENT SUBMITTAL SCHEDULE
(Days After Award)

	Engineering Need Date for Seller Data	Schedule Date For Certified Seller Submittal
Documents for Approval (cont'd)		
Reference Filterbags, Cages & Cell Plate	30 days prior to Baghouse fabrication	30 DAYS PRIOR TO BAG/CAGE FABRICATION
Baghouse Cage/Bag Dimensional Drawings w/Tolerances	30 days prior to Baghouse fabrication	30 DAYS PRIOR TO BAG/CAGE FABRICATION
Documents for Information		
Physical Piping Interface		2/28/93
Physical Piping Drawings	120	6/30/93
Fabrication & Erection Drawings	120	30 DAYS PRIOR TO ERECTI
Cable & Conduit Schedule	120	7/28/93
Storage & Handling Procedures	60 days before shipment	WITH SHIPMENT
Installation, Operating & Maintenance Manuals	60 days before shipment	60 DAYS BEFORE START-UP
Spare Parts List	60 days before shipment	60 DAYS BEFORE START-UP
As-built Drawing (Mylars)	30 days after start-up	30 DAYS AFTER START-UP

[redacted] General Arrangement Drawings shall be consistent with Purchaser's choice of datum elevation and column line identification.

Reference Section 2.9.12 for detailed requirement for the Electrical Design Drawings.

→ Start-up is defined as first refuse fire - 8/11/94

Installation and Maintenance Operating manuals (10 sets) assembled in book form with printed pages of size 8 1/2" x 11" and/or transparencies shall be submitted prior to equipment installation. All prints shall be clearly legible.

The manuals shall contain the following:

- Index and Table of Contents with directive sections divided to enable prompt location of data.
- List of spare parts recommended by Seller, complete with illustrations, complete ordering nomenclature, name of manufacturer, part number, quantities, etc.
- Installation instructions complete in detail for both origi[illegible]

installation and future removal and replacement of equipment, all components and accessories.

- Operating instructions including all the details necessary to insure correct procedure for start-up, operation, and shutdown.
- Maintenance instructions for both preventive and repair maintenance.

ATTACHMENT 14

Filter Bag Specifications (Pulse-Jet Alternate A)

Fabric/Fiber Type	Woven Fiberglass
Weave	Double Warp Face Crowfoot
Count (Warp x Fill)	48 ± 2 x 30 ± 2 (per inch)
Weight	16 oz/yd^2
Yarns:	
Warp - 1	ECDE 37 1/0
Warp - 2	ECDE 37 1/0 Texturized
Fill	ECDE 75 1/3 Texturized
Fabric Orientation	Texturized Warp Face Out
Finish Type (Seller to specify)	Teflon B (10%) or Acid-Resistant
Heat Cleaning	Continous, prior to finish application
Water Repellency (Drop Test)	30 minutes minimum

All other finished fabric properties are dependent on the finish type and fabric finisher specified by the seller. The folloing specifications, where left blank, should be supplied by the Seller under the appropriate finish heading:

	Teflon B	Acid-Resistant
Weight (oz/yd^2)	17.0 ± 5%	_____ ± 5%
Permeability (ft^3/min/ft^2 @ 0.5" W.C.)	20 - 45	_____ - _____
Mullen Burst (psi, net)	700 minimum	_____ minimum
Loss on Ignition (ASTM)	9.0% minimum	_____% minimum
Fabric Supplier (Weaver)	_____	_____
Fabric Finisher/Finish Code	_____/Teflon B	_____/_____

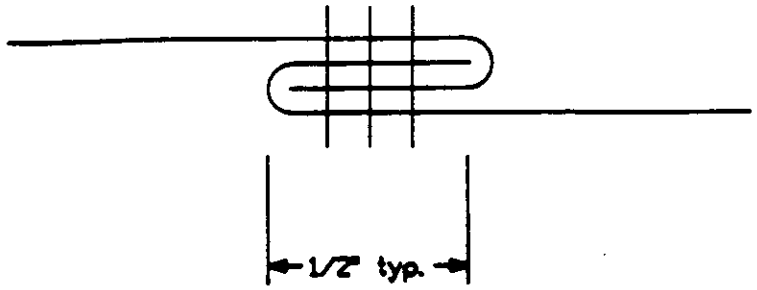
ATTACHMENT 14

Filter Bag Specifications (Pulse-Jet Alternate B)

Fabric/Fiber Type	Woven Fiberglass
Weave	3x1 Double-Filling Face Twill
Count (Warp x Fill)	48 ± 2 x 40 ± 2 (per inch)
Weight (nominal)	22 oz/yd^2
Yarns (seller to specify)	
Warp	ECDE 75 1/2
Warp	ECDE 75 1/4 Texturized
Fabric Orientation	Not Applicable
Finish Type (Seller to specify)	Teflon B (10%) or Acid-Resistant
Heat Cleaning	Continous, prior to finish application
Water Repellency (Drop Test)	30 minutes minimum

All other finished fabric properties are dependent on the finish type and fabric finisher specified by the seller. The folloing specifications, where left blank, should be supplied by the Seller under the appropriate finish heading:

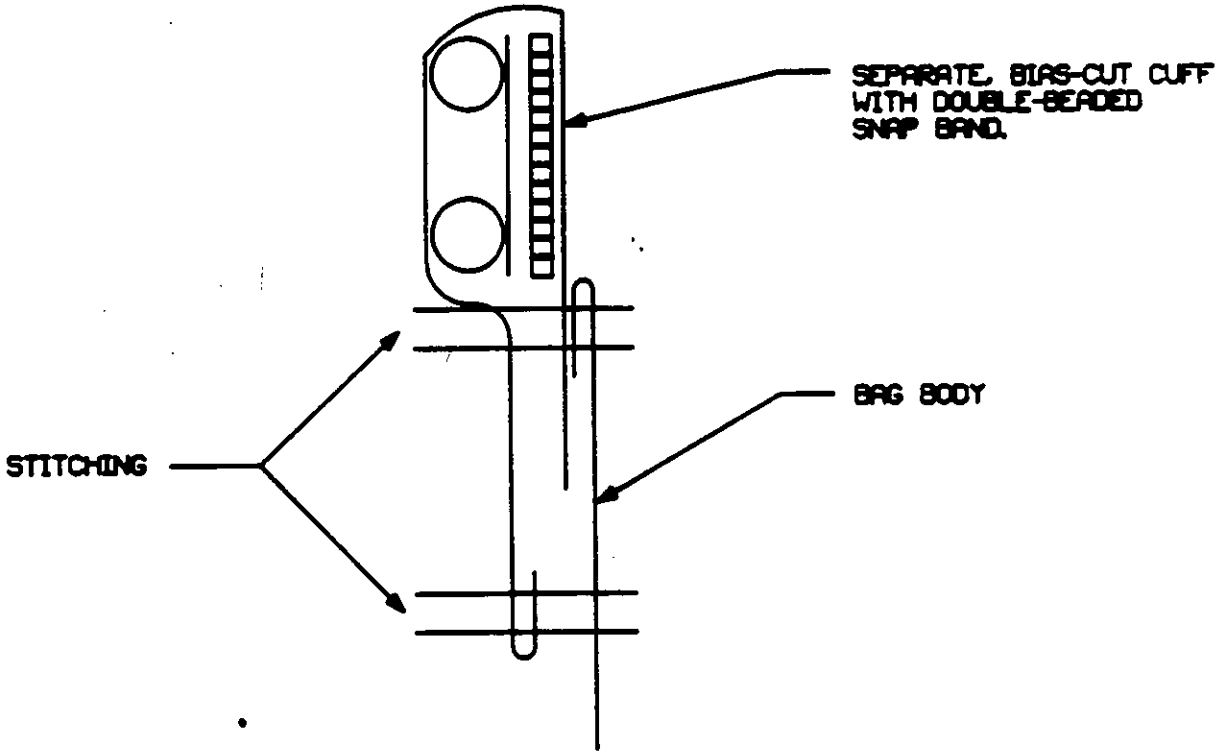
	Teflon B	Acid-Resistant
Weight (oz/yd^2)	22.5 ± 5%	_____ ± 5%
Permeability (ft^3/min/ft^2 @ 0.5" W.C.)	25 - 45	_____ - _____
Mullen Burst (psi, net)	1200 minimum	_____ minimum
Loss on Ignition (ASTM)	9.0% minimum	_____% minimum
Fabric Supplier (Weaver)	_____	_____
Fabric Finisher/Finish Code	_____/Teflon B	_____/_____



SKETCH No.1

VERTICAL SEAM STITCHING

THIS SCHEMATIC IS NOT TO SCALE.



SKETCH No.2

TOP CUFF LOCKSTITCHING

AN OGDEN COMPANY

ATTACHMENT - 15

BAG STITCHING DETAILS

OGDEN PROJECTS, INC.

APPROVED: DATE:

DWG. No. REV.

ATTACHMENT 16

(NOT UTILIZED)

ATTACHMENT 17
(SHEET 1 of 4)

MANUFACTURER	HAWS	WESTERN
NON FREEZE CLIMATE MODEL NO.	# 8300	# 9311
FREEZE PROOF MODEL NO.	# 8300FP	# 9316
SHOWER HEAD	SPECIFY OPTIONAL STAINLESS STEEL HEAD (MODEL # 8127)	SPECIFY OPTIONAL STAINLESS STEEL OR BRASS HEAD
BOWL	S.S.	S.S.
VALVES	BRASS	BRONZE
PIPING	GALVANIZED STEEL	GALVANIZED STEEL

NOTES:

1. SEE FOLLOWING PAGES FOR DIMENSIONAL DATA.
2. COMPLETE SHOWER ASSEMBLY SHALL BE PRIME AND FINISH PAINTED WITH HIGH VISIBILITY YELLOW ENAMEL PAINT.
3. CURBS SHALL NOT BE PROVIDED AROUND EMERGENCY SHOWER/EYE WASH STATIONS AS THEY POSE A TRIPPING HAZARD.

MANUFACTURERS:

HAWS DRINKING FAUCET CO.
P.O. DRAWER 1998
BERKELEY, CA. 94701
TEL. (415) 525-5801
FAX (415) 527-8672

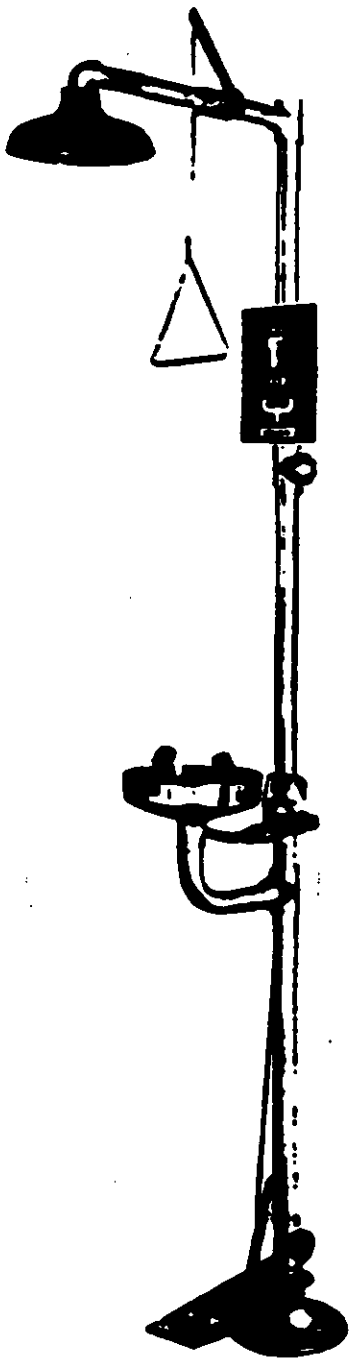
WESTERN DRINKING FOUNTAINS
EMERGENCY EQUIPMENT DIVISION
2085 BURROUGHS AVE.
SAN LEANDRO, CA. 94577
TEL. (415) 351-7170

An OGDEN COMPANY

EMERGENCY SHOWER/EYE WASH STATION

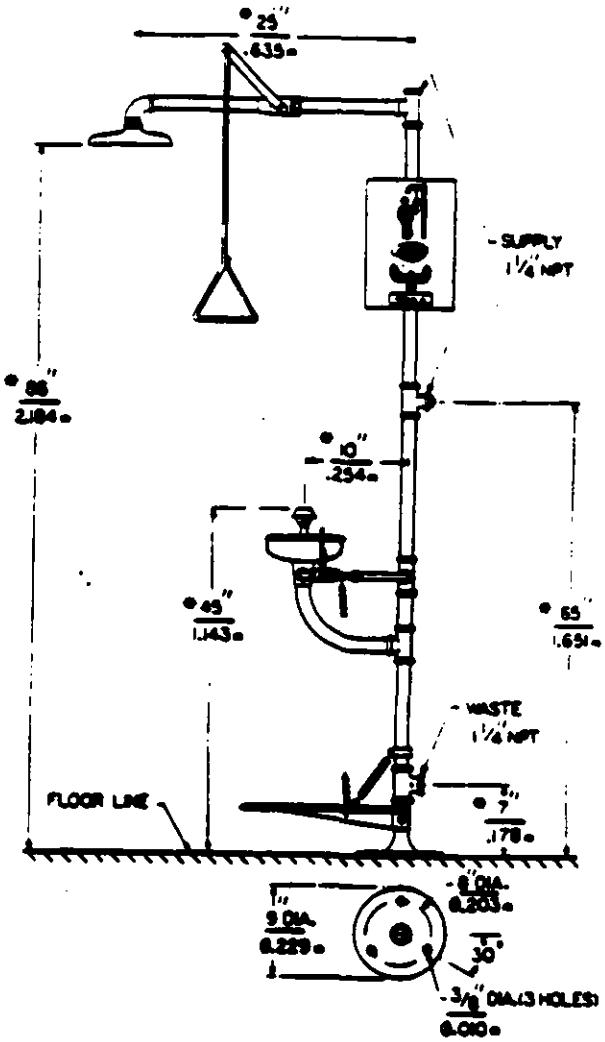
OGDEN PROJECTS, INC.
APPROVED: PJM
DATE: 8/4/93
DWG. NO. RS-425A
REV. 0

ATTACHMENT 17
(SHEET 2 OF 4)



Model 8300

Model 8300

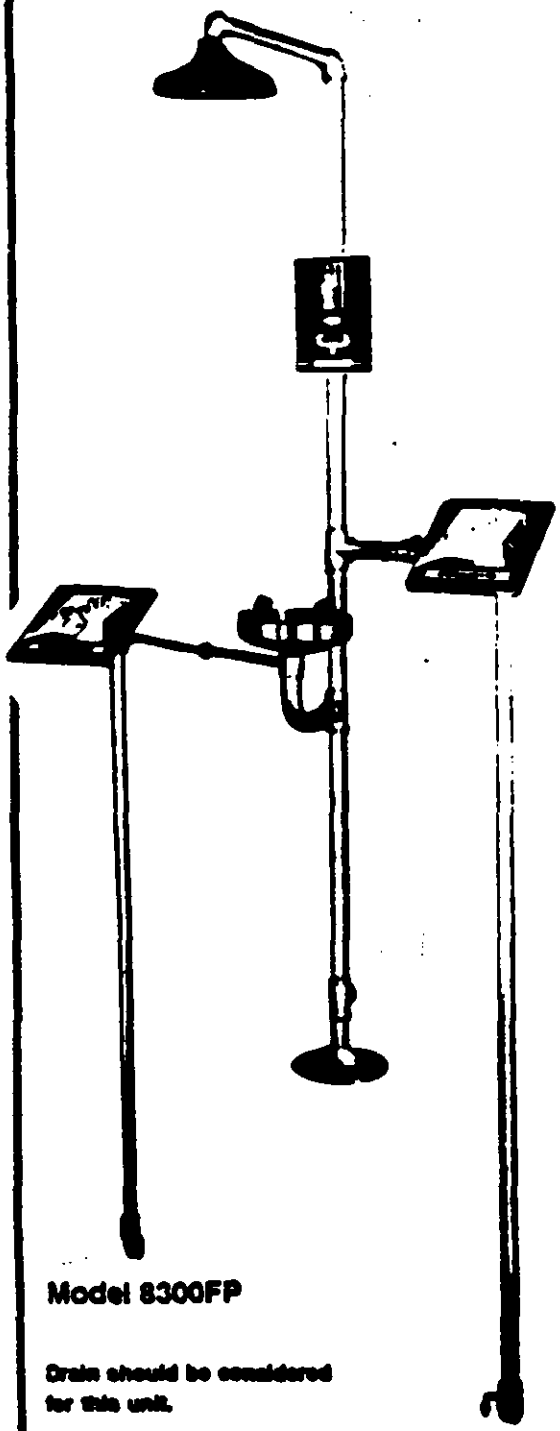


NON FREEZE CLIMATE MODEL NO. 8300
HAWS DRINKING FAUCET COMPANY

AN OGDEN COMPANY	EMERGENCY SHOWER/EYE WASH STATION	OGDEN PROJECTS, INC APPROVED: PJM — DATE: 9/1/90 DWG. NO. RS-4258 — REV. 0

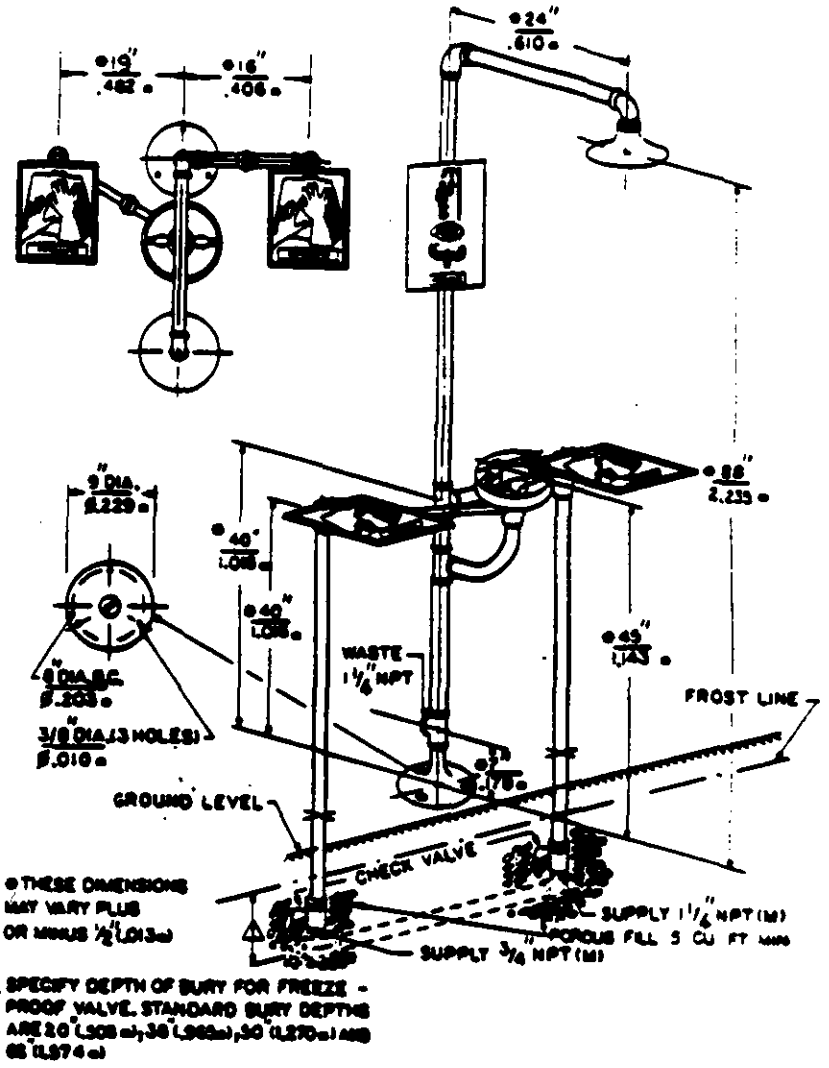
ATTACHMENT 17
(SHEET 3 of 4)

Model 8300FP



Model 8300FP

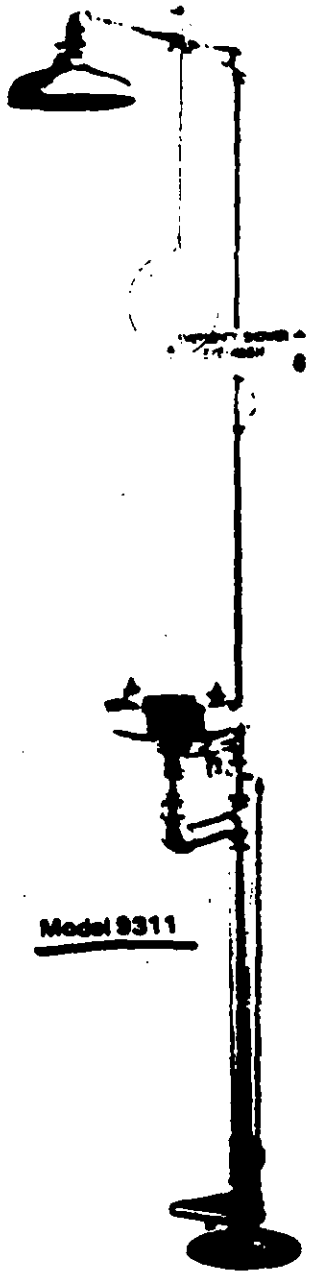
Drain should be considered for this unit.



FREEZE PROOF MODEL NO. 8300FP
HAWS DRINKING FAUCET COMPANY

AN OGDEN COMPANY	EMERGENCY SHOWER/EYE WASH STATION	OGDEN PROJECTS, INC. APPROVED: PJM DATE: 8/14/90 DWG. NO. RS-425C REV. 0

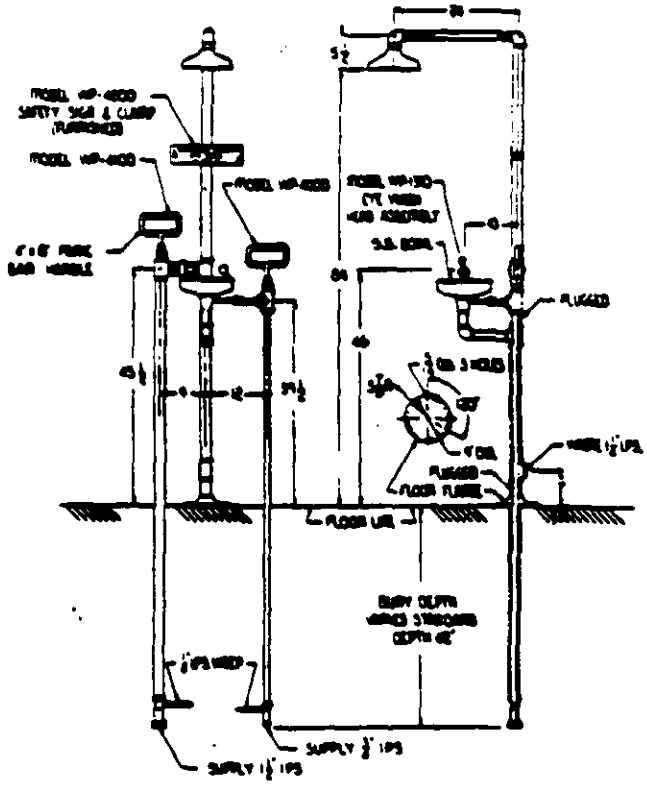
ATTACHMENT 17
(SHEET 4 of 4)



Model 9311

NON FREEZE CLIMATE
MODEL NO. 9311

Model 9316

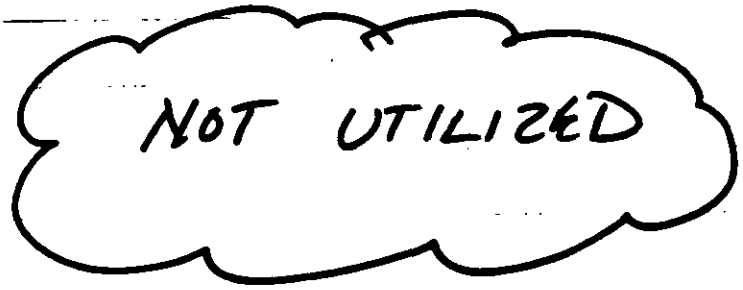


FREEZE PROOF
MODEL NO. 9316

WESTERN DRINKING FOUNTAINS

AN OGDEN COMPANY	EMERGENCY SHOWER/EYE WASH STATION	OGDEN PROJECTS, INC.
		APPROVED: PJM / DATE: 6/14/96
		DWG. NO. RS-425D / REV. 0

ATTACHMENT 18



ATTACHMENT 19
(SHEET 1 OF 2)

FORM 5007 REV. 4/81

United Engineers & Constructors
A Raytheon Company

GENERAL COMPUTATION SHEET

CALCULATION SET NO			REV	COMP BY	CHK'D BY
PRELIM	FINAL	VOID	0	DATE	DATE
SHEET	OF			DATE	DATE
JO					

PROJECT Lee County

SUBJECT Microfilm Requirements

Microfilm Requirements

Size - All microfilm negatives shall be 35 mm in size, made from original drawings on paper cloth, or acetate. Reduction of original drawing shall not be more than the maximum shown on the table below.

16X	19 x 26
24X	29 x 39
30X	36 x 48

Reduction amount shall be marked with a clear, legible symbol indicating the amount of reduction; i.e., 8X (reduced 8 times the original size).

Lines of the image on film should be clear and sharp, not blurred or "choked up".

Negative shall be capable of photographic "blow back" to original size.

Film shall be processed in accordance with the Manufacturer's instructions, and shall be sufficiently washed and processed to meet ANSI Standard PH4.8-1971 for cleanliness of .00645 mg "hypo" per square inch.

Film shall be free of scratches, light paths, fagged areas, water marks and/or air belts.

Card Size: 3-¼ x 7-3/8"
Aperature Right Dimil
Tape Face

ATTACHMENT 19
(SHEET 2 OF 2)

APERATURE CARD LABEL SYSTEM