REQUEST FOR ADDITIONAL INFORMATION REGARDING INITIAL TITLE V PERMIT APPLICATION
FILE NO. 1030117-002-AV
PINELLAS COUNTY RESOURCE RECOVERY FACILITY

BOARD OF COUNTY COMMISSIONERS
PINELLAS COUNTY, FLORIDA

PINELLAS COUNTY UTILITIES
P.O. BOX 1780
CLEARWATER, FLORIDA 33757

"Serving You Every Day"

COMMISSIONERS
SALLIE PARKS - CHAIRMAN
ROBERT B. STEWART - VICE CHAIRMAN
CALVIN D. HARRIS
KAREN WILLIAMS SEEL
BARBARA SHEEN TODD

RECEIVED
SEP 15 1999
BUREAU OF AIR REGULATION

September 8, 1999

Mr. Scott M. Sheplak, P.E.
Administrator, Title V Section
State of Florida - Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Request for Additional Information regarding Initial Title V Permit Application
File No. 1030117-002-AV
Pinellas County Resource Recovery Facility

Dear Mr. Sheplak:

Pursuant to our receipt of the FDEP letter on June 17, 1999, the attached responses have been prepared to address the issues on the subject permit application request.

The FDEP comments have been repeated in italics, with the provided response immediately following. Supporting exhibits have also been provided, as referenced in the attached responses.

We trust that these responses will provide adequate definition and clarification to your questions and fulfill additional information requirements. Please contact me at your convenience for any further discussion, as required.

Very truly yours,

PINELLAS COUNTY UTILITIES

Pick Talley
Director

Attachment
cc: R. Peter Stasis, P.E., Director of Utilities Engineering
Warren Smith, Director Solid Waste Operations
Donald F. Elias, RTP Environmental Associates, Inc.
Bill Thomas, P.E., DEP, Southwest District Office
David Dee, Esq., Landers and Parsons
Ron Larson, HDR Engineering Inc.
file

PINELLAS COUNTY UTILITIES "Serving You Every Day"

Attachment #1

(Title V Permit Application Responses – June 17, 1999)

1. *Provide application pages for both the auxiliary boiler and the fuel oil storage tank permitted in PA 78-11(B) & PA 83-18(B), Section XV. Also, send a copy of the BACT analysis for the auxiliary boiler.*

Response:

Inquiry withdrawn per FDEP, (Wendy Alexander) August 9, 1999.

2. *Provide revised application pages for the hydrated lime storage silo permitted in AC52-259351 and AO52-268853. The current application pages for the hydrated lime storage silo indicate particulate matter emissions of 14.9 TPY and 4.9 lbs./hr. The RACT exemption of Rule 62-296.700(2)(a), F.A.C. for particulate matter emissions less than 14.9 TPY and 4.9 lbs/hr was misapplied to the hydrated lime storage silo. Rule 62-296.700(2)(a), F.A.C. applies to a facility, not an emission unit. By Rule 62-296.700(2)(c), F.A.C., any emissions unit with particulate matter emissions less than one ton per year is exempt from particulate matter RACT regulations. If the emissions unit is capable of particulate matter emissions less than one ton per year, provide revised application pages with this information. If the emissions unit is unable to meet this exemption criteria, provide revised pages with emissions information and the applicable RACT rules cited.*

Response:

See Exhibit #1

3. *Provide application pages for both the lime storage silo and activated carbon storage silo stating the manufacturer and model number of the baghouses.*

Response:

See Exhibit #2

4. *Provide a copy of the test report for retrofitted Unit 3 indicating the date of compliance with PA 78-11(C) & PA 83-18 (C) and PSD FL-098(A).*

Response:

Subject report has been issued to the distribution list as shown in Exhibit #3. Also attached thereto, are excerpts from the Project Overview contained within said report, which contains a summary of the test results that demonstrate air emission compliance.

5. *Provide the Operation and Maintenance (O&M) plans for the Metals Recovery System (MRS) and the Ash Conditioning Building (ACB) emissions units, which are required by Rule 62-296.700(6), F.A.C.*

Response:

See Exhibit #4

6. *To promote uniformity among permitted Resource Recovery Facilities subject to 40 CFR 60, Subpart Cb, the Department has developed a generic description of wastes allowed to be burned at each facility. This waste description has been previously adopted in Subpart Cb retrofit construction permits and is in the process of being adopted by subsequent facilities as the construction permits are completed. To achieve consistency with the other facilities, the Department requests that Pinellas County review the attached language describing wastes allowed to be burned. If this waste description is acceptable, please request it be included in the Title V permit.*

Response:

Pinellas County appreciates the concept of developing a generic description of waste allowed to be burned at each permitted recovery facility in Florida. However, Pinellas County has expended considerable time and effort in negotiating the current waste description as contained in its Power Plant Siting Act Certification with its vendor, who operates the facility. This description was based on a review of the current and projected waste stream requirements; and therefore, Pinellas County wishes to retain the language contained in this current certification.

7. *Provide a copy of the final order for Power Plant Siting Conditions of Certification PA 83-18 dated March 20, 1984.*

Response:

See exhibit #5 (This copy has been stamped with a "VOID" to note that this 1984 version has been superseded by the Final Order Modifying Conditions of Certification (OGC No. 95-1442) dated July 3, 1996 and Final Order Modifying Conditions of Certification (OGC case No. 98-1335) dated May 19, 1998.)

8. *Provide the electrical generating capacity of the facility (in megawatts) before and after retrofit.*

Response:

The electric generating capacity of the facility has not increased as a result of the Air Pollution Control retrofit. The gross nominal generating capacity of the facility remains fixed at 75MW.

9. *Following retrofit, how many turbine generators will be at the facility and which combustors will provide steam to each generator?*

Response:

The generation equipment and configuration after the retrofit is identical to the pre-retrofit layout. Units #1 & #2 still provide steam to the existing #1 steam turbine, while Unit #3 supplies steam to the existing #2 steam turbine.

10. *Provide the net enthalpy for the combustors, which may be calculated as the difference in enthalpy between the steam at the superheater outlet and the feedwater at the combustor inlet. Also, provide the temperature and pressure of the steam at the superheater outlet.*

Response:

The design enthalpy of the superheater steam at the combustor outlet header is approximately 1380 Btu/lbs., whereas the economizer inlet design enthalpy is approximately 222 Btu/lbs. Accordingly, the net design enthalpy for useful work is 1158 Btu/lbs. The design temperature and pressure conditions at the superheater outlet are 750F-752F and 615psig-611psig, for units 1-3, respectively.

Note: Required signature pages provided as Exhibit #6

List of Exhibits

Exhibit #1 - Revised application pages for the hydrated lime storage

Exhibit #2 - Application pages for the lime storage silo and activated carbon baghouses

Exhibit #3- Copy of letter issuing the test report for Unit #3 retrofit and test report excerpts

Exhibit #4 - Operational and Maintenance (O&M) plans for the Metals Recovery System (MRS) and the Ash Conditioning Building (ACB) emissions units.

Exhibit #5 - Copy of the final order for Power Plant Siting Conditions of Certification PA 83-18 dated March 20, 1984

Exhibit #6 – Required signature pages

Emissions Unit Information Section 4 of 9

Hydrated Lime Storage Silo - RRF Water Softening Area

E. POLLUTANT INFORMATION

For the emissions unit addressed in this Emissions Unit Information Section, a separate set of pollutant information must be completed for each pollutant required to be reported. See instructions for further details on this subsection of the Application for Air Permit.

Pollutant Potential/Estimated Emissions: Pollutant 1 of 1

1. Pollutant Emitted:	**PM/PM_{10}**
2. Total Percent Efficiency of Control:	**99** %
3. Primary Control Device Code:	**101**
4. Secondary Control Device Code:	
5. Potential Emissions:	**0.043** lb/hour **0.19** tons/year
6. Synthetically Limited? [ ] Yes [X] No	
7. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3	_____ to _____ tons/year
8. Emission Factor: **0.005 grains/scf** Reference: **Vendor Data and Engineering Estimates**	
9. Emissions Method Code: [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5	
10. Calculation of Emissions: $\frac{0.005\ gr}{scf} \times \frac{1000\ scf}{\min} \times \frac{1\ lb}{7000\ grains} \times \frac{60\ \min}{hr}$	
11. Pollutant Potential/Estimated Emissions Comment: **AO52-268853 Specific Condition 3 revised for FAC 62-296.700(2)(c).**	

EXEMPTIONS from Applicable Facility/Emission Units Regulations: (Concluded)

FAC 62-296.320(4)(a)	Particulate Emission Limiting Standards - NOT APPLICABLE[e]
FAC 62-296.500	VOC/NO_x RACT - NOT APPLICABLE[f]
FAC 62-296.600	Lead RACT - NOT APPLICABLE[g]
FAC 62-296.700	Particulate Matter RACT - NOT APPLICABLE to most sources[h]

MWCs - Applicable Regulations:

40 CFR 60 Subpart A	New Source Performance Standards-General Provisions
40 CFR 60 Subpart Cb	Emissions Guidelines for Large MWCs[i]
40 CFR 60 Subpart E	Standards of Performance for Incinerators
FAC 62-204.800(8)(b)	Emissions Guidelines for Large MWCs[i]
FAC 62-210.700	Excess Emissions

---

[e]Emission units in this application are not subject to FAC 62-296.320(4)(a). The MWCs are subject to a particulate limit elsewhere in this chapter (FAC 62-296.401(3)(a)) and are also exempted by FAC 62-296.320(4)(a)1.b (i.e. burn refuse). The lime and carbon storage silos, wet scrubbers, and diesel engine, are exempted by FAC 62-296.320(4)(a)1 since they do not process raw materials to produce a finished product through a chemical or physical change.

[f]Florida VOC RACT rules at FAC 62-296.500 to .516 or FAC 62-296.401 to .415 could be applicable (except for emission units which received BACT/LAER determinations pursuant to FAC 62-212.400/.500) since Pinellas County is an ozone maintenance area (together with Hillsborough County as defined at FAC 62-204.340(4)(a)4). However, there are no VOC RACT requirements in FAC 62-296.500 to .516 or FAC 62-296.401 to .415 applicable to any emissions unit at the Pinellas County complex (and the MWCs underwent BACT review as part of the original PSD permits). Also, the VOC and NO_x RACT rules in FAC 62-296.570 are not applicable since these requirements apply only to Broward, Dade, and Palm Beach Counties as described at FAC 62-296.500(1)(b).

[g]Florida Pb RACT rules at FAC 62-296.600 to .605 could be applicable since the Pinellas County complex is located 25 km from a Pb maintenance area (portion of Hillsborough County as defined at FAC 62-204.340(4)(c)) and therefore located within the "area of influence" (i.e., within 50 km of area boundary). However, there are no Pb RACT requirements in FAC 62-296.601 to .605 applicable to any emissions unit at the complex.

[h]Florida PM RACT rules at FAC 62-296.700 to .712 or FAC 62-296.401 to .415 could be applicable (except for emission units which received BACT/LAER determinations pursuant to FAC 62-212.400/.500) since the Pinellas County complex is located 15 km from a PM maintenance area (portion of Hillsborough County as defined at FAC 62-204.340(4)(b)1) and therefore located within the "area of influence" (within 50 km of area boundary). However, unconfined (fugitive) emissions associated with the landfill and other activities are exempted from PM RACT by FAC 62-296.700(2)(e) (exempts unconfined emissions associated with open stockpiling of materials, vehicular traffic, and other emissions from roads, plant grounds, or construction activities) and 62-296.700(2)(d) (exempts all unconfined emissions located more than 5 km from the boundary of the maintenance area). Other sources in this application exempt from PM RACT requirements are described below:

MWC Units 1-3:	Exempted by undergoing PSD review and receiving BACT determination (all MWC units meet the PM emission requirement of 0.08 gr/dscf pursuant to FAC 62-296.401(3));
Lime and Carbon Storage Silos:	Exempted from PM RACT requirements pursuant to FAC 62-296.700(2)(c) since maximum emissions are less than one ton/year each; and
Mulch Engine:	No RACT requirements identified.

[i]40 CFR 60 Subpart Cb requirements typically apply to each MWC unit only after the MWC air pollution control equipment is retrofit for EG requirements (one exception is the training requirements at 40 CFR 60.54b).

MWCs - Applicable Regulations: (Concluded)

FAC 62-296.320(4)(b)	General Visible Emission Standards
FAC 62-296.401(3)	Specific Emission Limiting and Performance Standards - Requirements (PM/Odor) for New Incinerators (after 1/18/72) with Charging Rates equal to or greater than 50 tons per day
FAC 62-296.416(3)(a)1	Mercury Emissions Limiting Standards (Waste-to-Energy Facilities)[j]
FAC 62-297.310(1)	Required Number of Tests
FAC 62-297.310(2)	Operating Rate during Testing
FAC 62-297.310(3)	Calculation of Emission Rate
FAC 62-297.310(4)	Applicable Test Procedures
FAC 62-297.310(6)	Required Stack Sampling Facilities
FAC 62-297.310(7)	Frequency of Compliance Tests
FAC 62-297.310(8)	Test Reports

Water Softening Plant Lime Silo and Lime/Carbon Silos - Applicable Regulations:

FAC 62-296.320(4)(b)	General Visible Emission Standards
FAC 62-296.700(2)(c)	PM emissions less than one ton/year to be exempted from PM RACT Requirements[k]
FAC 62-296.700(5)	Prohibition on circumventing emission limit by increasing the volume of gas for purposes of reducing the stack gas concentration.
FAC 62-297.310(2)	Operating Rate during Testing
FAC 62-297.310(4)(a)2	Applicable Test Procedures-Opacity Compliance Tests
FAC 62-297.310(7)(a)1	General Compliance Testing (initial opacity test)
FAC 62-297.310(7)(a)4a	General Compliance Testing (annual opacity tests)[k]
FAC 62-297.310(8)	Test Reports
FAC 62-297.401(9)(c)	DEP Method 9
FAC 62-297.620(4)	Department waived test requirements for PM emissions and specified an alternative standard of 5% opacity in the permit or PPSA Conditions of Certification as required by regulation.

Metal Recovery System/Ash Conditioning Building Wet Scrubbers - Applicable Regulations:

FAC 62-210.700	Excess Emissions
FAC 62-296.320(4)(b)	General Visible Emission Standards
FAC 62-296.700(5)	Prohibition on circumventing emission limit by increasing the volume of gas for purposes of reducing the stack gas concentration.
FAC 62-296.711(2)(a)	Opacity from handling operations limited to no visible emissions (5% opacity)
FAC 62-296.711(2)(b)	PM emissions from the stack are limited to 0.03 gr/dscf.
FAC 62-297.310(2)	Operating Rate during Testing
FAC 62-297.310(4)(a)2	Applicable Test Procedures-Opacity Compliance Tests

[j]Florida mercury limits are applicable to each MWC only after SDA installed according to FAC 62-296.416(3)(a)2.

[k]Condition revised for Water Softening Plant Lime Silo based on Department's June 17, 1999 comments.

Emissions Unit Information Section 7 of 9

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section: **Activated Carbon Storage Silo**		
2. ARMS Identification Number: [X] No Corresponding ID [ ] Unknown		
3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code: **49**
6. Initial Startup Date (DD-MON-YYYY): **24-Sep-1998**		
7. Long-term Reserve Shutdown Date (DD-MON-YYYY):		
8. Package Unit: Manufacturer: **Wheelabrator Canada, Inc.** Model Number: **22WSC-BV**		
9. Generator Nameplate Rating: MW		
10. Incinerator Information: Dwell Temperature: °F Dwell Time: seconds Incinerator Afterburner Temperature : °F		
11. Emissions Unit Comment: **Installation of 30 ton capacity storage silo for storage of powdered activated carbon. Emissions will be controlled by dust collector. This source was included in the EG construction permits, for which a PSD permit amendment and modifications to PPSA Conditions of Certification were issued.**		

Emissions Unit Information Section 8 of 9

Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section: **Lime Storage Silo**		
2. ARMS Identification Number: [X] No Corresponding ID [ ] Unknown		
3. Emissions Unit Status Code: **A**	4. Acid Rain Unit? [ ] Yes [X] No	5. Emissions Unit Major Group SIC Code: **49**
6. Initial Startup Date (DD-MON-YYYY): **24-Sep-1998**		
7. Long-term Reserve Shutdown Date (DD-MON-YYYY):		
8. Package Unit: Manufacturer: **Wheelabrator Canada, Inc.** Model Number: **22WSC-BV**		
9. Generator Nameplate Rating: MW		
10. Incinerator Information: Dwell Temperature: °F Dwell Time: seconds Incinerator Afterburner Temperature : °F		
11. Emissions Unit Comment: **Installation of 70 ton capacity storage silo for storage of lime. Emissions will be controlled by dust collector. This source was included in the EG construction permits, for which a PSD permit amendment and modifications to PPSA Conditions of Certification were issued.**		

BOARD OF COUNTY COMMISSIONERS
PINELLAS COUNTY, FLORIDA
"Serving You Every Day"

COMMISSIONERS

BARBARA SHEEN TODD - CHAIRMAN
STEVEN M. SEIBERT - VICE CHAIRMAN
CALVIN D. HARRIS
SALLIE PARKS
ROBERT B. STEWART

UTILITIES ENGINEERING
14 SOUTH FORT HARRISON AVENUE
CLEARWATER, FLORIDA 33756
PHONE: (813) 464-3588
FAX: (813) 464-3595

January 29, 1999

Mr. Hamilton Oven, Jr., P.E.
Power Plant Siting Section
State of Florida
Department of Environmental Protection
Division of Environmental Permitting
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399

RE: Initial Compliance Testing of Pinellas County Resource Recovery Facility-Unit No. 3
Modification of Power Plant Site Certification (OGC No. 95-1442, July 25, 1996)

Dear Mr. Oven:

In accordance with Article XIV.A.3 a. of Exhibit "B" to the "Final Order Modifying Conditions of Certification" for the Pinellas County Resource Recovery Facility (OGC No. 95-1442) , this is to provide the FDEP with submittal of the two volume "Report on Initial Compliance Testing for Unit No. 3, as completed on December 4, 1998. One (1) of the two required FDEP copies of this report has been forwarded directly under this cover to Mr. Bill Thomas in the Southwest District Office of the FDEP, Tampa, Florida.

Should you require any discussion on the enclosed report, please contact me at your convenience.

Sincerely,
PINELLAS COUNTY UTILITIES

RPStasis

R. Peter Stasis, P.E.
Director of Utilities Engineering

Enclosure
cc: Distribution

PINELLAS COUNTY UTILITIES "Serving You Every Day"

DISTRIBUTION LIST (Page 1 of 3)

Recipient	Transmittal
CLAIR FANCY STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION TWIN TOWERS OFFICE BUILDING 2600 BLAIR STONE ROAD TALLAHASSEE, FL 32399	Letter only
RICHARD D. GARRITY STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION SOUTHWEST DISTRICT 3804 COCONUT PALM DRIVE TAMPA, FL 33619-8318	Letter only
BILL THOMAS STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION SOUTHWEST DISTRICT 3804 COCONUT PALM DRIVE TAMPA, FL 33619-8318	Letter & 1 copy of Enclosure
WINSTON SMITH ENVIRONMENTAL PROTECTION AGENCY 345 COURTLAND STREET, N.E. ATLANTA, GA 30365	Letter & 1 copy of Project Overview Section (only)
WALT STEVENSON OFFICE OF AIR QUALITY, PLANNING AND STANDARDS ENVIRONMENTAL PROTECTION AGENCY RESEARCH TRIANGLE PARK, NC 27711	Letter only
PICK TALLEY, DIRECTOR PINELLAS COUNTY UTILITIES DEPARTMENT 14 S. FORT HARRISON AVE., 5TH FLOOR CLEARWATER, FL 33756	Letter only
JULIE YARD OFFICE OF THE PINELLAS COUNTY ATTORNEY 315 COURT STREET CLEARWATER, FL 33756	Letter only

DISTRIBUTION LIST (Page 2 of 3)

Recipient	Transmittal
R. PETER STASIS DIRECTOR OF ENGINEERING PINELLAS COUNTY UTILITIES DEPARTMENT 14 S. FORT HARRISON AVE., 6TH FLOOR CLEARWATER, FL 33756	Letter & 1 copy Enclosure (previously transmitted)
PETER HESSLING AIR QUALITY ADMINISTRATOR DEPARTMENT OF ENVIRONMENTAL MANAGEMENT 300 S. GARDEN AVENUE CLEARWATER, FL 33756	Letter & 1 copy Enclosure
DAVID DEE LANDERS & PARSONS 310 WEST COLLEGE AVENUE P.O. BOX 271 TALLAHASSEE, FL 32302	Letter & 1 copy of Project Overview Section (only) (previously transmitted)
MICHAEL RUDD, DIRECTOR DEPARTMENT OF SOLID WASTE OPERATIONS 3095 114TH AVENUE NORTH ST. PETERSBURG, FL 33716	Letter & 2 copies Enclosure (1 copy previously transmitted)
WILLIAM RIES DEPARTMENT OF SOLID WASTE OPERATIONS 3095 114TH AVENUE NORTH ST. PETERSBURG, FL 33716	Letter only
LINWOOD BUBAR PLANT MANAGER WHEELABRATOR PINELLAS, INC. 3001 110th AVENUE NORTH ST. PETERSBURG, FL 33716	Letter only
LUKE KOON PROJECT MANAGER WHEELABRATOR AIR POLLUTION CONTROL 3001 110th AVENUE NORTH ST. PETERSBURG, FL 33716	Letter only

DISTRIBUTION LIST (Page 3 of 3)

Recipient	Transmittal
RONALD LARSON PROJECT MANAGER HDR ENGINEERING, INC. 5100 W. KENNEDY BLVD. TAMPA, FL 33609	Letter & 2 copies Enclosure (previously transmitted)
DONALD ELIAS RTP ENVIRONMENTAL ASSOCIATES, INC. 239 U.S. HIGHWAY 22 EAST GREEN BROOK, NJ 08812	Letter & 1 copy (previously transmitted)

PROJECT OVERVIEW

Wheelabrator Pinellas, Inc. operates the Pinellas County Refuse to Energy Facility located in St. Petersburg, Florida. The facility's emission levels are regulated by the Florida Department of Environmental Protection, as well as the United States EPA. Wheelabrator Pinellas, Inc. contracted Clean Air Engineering to perform the initial performance testing at their municipal waste combustor (MWC) facility in St. Petersburg, Florida after the retrofit of Unit 3 air pollution control unit. The sampling was conducted at the Unit 3 SDA Inlet and FF Outlet. The visual emissions were determined at the exit of new Unit 3 Stack. The flyash conditioning building wet scrubber and metals recovery wet scrubber were also observed for visual emissions. Testing was conducted in accordance with CAE Protocol No: 8224P Revision 1: Dated July 23, 1998 and 40 CFR 60.8 and 60.38b requirements.

The testing included the determination of the following pollutants:

- particulate;
- cadmium;
- lead;
- mercury;
- PCDDs and PCDFs;
- hydrogen chloride;
- fugitive emissions;
- visual emissions.

Coordinating the field portion of the program were:

J. Ritchey	- Wheelabrator Pinellas, Inc.
T. Porter	- Wheelabrator Environmental Systems, Inc.
T. Etchason	- Clean Air Engineering

Observing the testing on December 3, 1998 was:

A. Nguyen	- Department of Environmental Protection, State of Florida

The schedule of activities shown in Table 1-1 on page 1-3. A summary of the results is presented in Table 1-2 on pages 1-4 and 1-5.

Also reported in this report are three days of continuous emission monitor data (CEMs) supplied by Wheelabrator Pinellas, Inc. to demonstrate initial compliance with the NOx and SO_2 limits in accordance with 40 CFR 60.38b requirements. A summary of this data is displayed in Table 1-3 on page 1-5. The data acquisition printouts are found in the appendix.

PROJECT OVERVIEW

Run 2 Particulate test had significantly moisture on the filter due to backflush of impinger contents onto filter during the post test leak check, so a fourth run was done. Because of this Runs 1, 3 and 4 are presented in this report.

All data reported in the units of $lb/10^6$ BTU utilized the Fd of 9,570 as per EPA Method 19.

Any fractions of the mercury analysis that were reported as not detected were summed as zero if there were at least one fraction in that run that was detected.

Field blanks were done for the Method 23 and 29 testing by assembling a used set of glassware and taking the complete train to the outlet location for the duration of one run. These samples were treated exactly as the other samples. The results are presented in Table 2-13 and 2-14 on page 2-11 and 2-11, respectively. The results of the Method 29 reagent blank analysis were used to correct any data as outlined in Method 29.

All Method 23 samples were analyzed with the DB-5 column with confirmation for the 2,3,7,8 TCDF and Total TCDF analytes on the DB-225 column as EPA Method 23 directs. The lower result of the two columns is reported in all cases.

Because of chlorinated diphenyl ether interference of three furan analytes in EPA Method 23 Run 1 and 2 and four furan analytes in EPA Method 23 Run 3 results are reported as an estimated maximum possible concentration (EMPC) value. These values are calculated through as zero and the reported maximum. The EMPC values can be considered a worst case scenario, and the EMPC values as zero a best case scenario. Method 23 does not allow the theoretical positive identification for the target furans when the interference is present as mentioned in EPA Method 23 Section 5.3.2.5.7 "For the identification of PCDF's, no signal may be found in the corresponding PCDPE channels."

Two separate sets of hydrogen chloride emissions determinations were done at different minimum slurry set points for the spray dryer absorber. All results are presented within this report as Runs 1, 2, and 3 and Runs 4, 5 and 6.

The lime silo and carbon silo opacity tests were not performed since reagent deliveries could not be scheduled. However, this testing will be completed within 180 days after start-up and results provided in a letter addendum to this report.

All process data was provided by Wheelabrator Pinellas Inc. personnel. This data is presented in its entirety in the Appendix. Any process data presented in the results table is from hourly average(s) in which the run occurred for at least thirty minutes.

PROJECT OVERVIEW

Table 1-1:
Schedule of Activities

Date / Constituent	Sampling Method	Run Number	Location	Start Time	End Time
December 1					
Particulate	EPA M5	1	Unit 3 FF Outlet	15:45	18:08
Metals	EPA M29	1	Unit 3 FF Outlet	15:45	18:08
Mercury	EPA M29	1	Unit 3 SDA Inlet	15:45	17:54
Visual Emissions	EPA M9	1	Unit 3 Stack Outlet	16:00	17:00
December 2					
Mercury	EPA M29	2	Unit 3SDA Inlet	8:04	10:19
Metals	EPA M29	2	Unit 3 FF Outlet	8:04	10:19
Metals	EPA M29	3	Unit 3 FF Outlet	11:15	14:13
Mercury	EPA M29	3	Unit 3 SDA Inlet	11:15	14:13
Particulate	EPA M5	3[1]	Unit 3 FF Outlet	11:15	13:42
Particulate	EPA M5	4[1]	Unit 3 FF Outlet	15:32	17:42
Visual Emissions	EPA M9	3	Unit 3 Stack Outlet	12:20	13:20
Visual Emissions	EPA M9	4	Unit 3 Stack Outlet	16:40	17:40
Hydrogen Chloride	EPA MM26A	1	Unit 3 SDA Inlet and FF Outlet	15:32	16:56
December 3					
PCDDs/PCDFs	EPA M23	1	Unit 3 FF Outlet	8:53	13:06
PCDDs/PCDFs	EPA M23	2	Unit 3 FF Outlet	13:16	17:24
Hydrogen Chloride	EPA MM26A	2	Unit 3 SDA Inlet and FF Outlet	8:53	9:59
Hydrogen Chloride	EPA MM26A	3	Unit 3 SDA Inlet and FF Outlet	10:14	11:31
Hydrogen Chloride	EPA MM26A	4	Unit 3 SDA Inlet and FF Outlet	14:14	15:14
Hydrogen Chloride	EPA MM26A	5	Unit 3 SDA Inlet and FF Outlet	15:29	16:55
Hydrogen Chloride	EPA MM26A	6	Unit 3 SDA Inlet and FF Outlet	17:09	18:25
Visual Emissions	EPA M9	1	Flyash Conditioning Scrubber Outlet	17:10	17:40
December 4					
PCDDs/PCDFs	EPA M23	3	Unit 3 FF Outlet	7:25	11:34
Visual Emissions	EPA M22	1	Facility Ash Handling[2]	7:46	9:36
Visual Emissions	EPA M22	2	Facility Ash Handling[2]	9:53	11:43
Visual Emissions	EPA M9	2	Flyash Conditioning Scrubber Outlet	8:10	8:40
Visual Emissions	EPA M9	3	Flyash Conditioning Scrubber Outlet	8:50	9:20
Visual Emissions	EPA M9	1	Metals Recovery Wet Scrubber Outlet	9:30	10:00
Visual Emissions	EPA M9	2	Metals Recovery Wet Scrubber Outlet	10:10	10:40
Visual Emissions	EPA M9	3	Metals Recovery Wet Scrubber Outlet	10:50	11:20

[1] Run 2 Particulate filter was wet due to backflushed sampling train and was not analyzed.
[2] The facility's ash handling system was observed for a total of three hours at two sights, no visible emissions were observed.

PROJECT OVERVIEW

Table 1-2:
Summary of Test Results

Source / Constituent	Sampling Method	Average Emission	Permit Limit[1]
Unit 3			
Particulate(gr/dscf @ 7% O_2)	EPA M5	0.0006	0.012
Particulate(lb/hr)		0.47	14.4
Visual Emissions(percent)	EPA M9	0	10
Cadmium(µg/dscm @ 7%O_2)	EPA M29	0.748	40
Cadmium(lb/hr)		0.000280	0.021
Cadmium(lb/10^6 BTU)[3]		6.72 E-07	4.6 E-05
Lead(µg/dscm @ 7%O_2)		3.53	490
Lead(lb/hr)		0.000135	0.257
Lead(lb/10^6 BTU)[3]		3.17 E-06	5.6 E-04
Mercury(µg/dscm @ 7%O_2)		53.2	70
Mercury Removal[2] (%)		70.3	85[3]
Total[5] PCDDs/PCDFs(ng/dscm @7%O_2)	EPA M23	16.4	30
Total[5] PCDDs/PCDFs(lb/hr)		6.25 E-06	1.6E-05
Total[5] PCDDs/PCDFs(lb/10^6 BTU)[4]		1.48 E-08	3.44E-08
Hydrogen Chloride[6] (ppmdv @ 7%O_2)	EPA Mod.M26A	29.3	31 or
Hydrogen Chloride Removal[6] (%)		96.1	95

[1] Limits obtained from 40 Code of Federal Register part 60 Subpart Cb - Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994 published in Federal Register as 62 FR 45123 on December 19, 1995 as modifed on August 25, 1997, Florida's Rule 62-296.416, F.A.C. and Power Plant Site Certification (PPSC) PA 78-11, PA 83-18 as modified by OGC 95-1442 and OGC 98-1335.
[2] Removal for mercury and hydrogen chloride calculated in the units of their standards.
[3] Mercury limit is 70 µg/dscm @ 7%O_2 or 85% removal.
[4] All lb/10^6 BTU calculations used Fd of 9,570 for MSW as per Method 19.
[5] These results for Total PCDDs/PCDFs are calculated with the flagged EMPC values as zero. Worst case results withe EMPC values reported as actual are found in Table 2-2.
[6] Results for hydrogen chloride from the second set of three 1 hour runs are reported in Table 2-6.

PROJECT OVERVIEW

Table 1-2 (cont.):
Summary of Test Results

Source Constituent	Sampling Method	Average Results	Permit Limit[1]
Ash Handling System			
Fugitive Emissions	EPA M22	0	<5 % of observation time
Flyash Conditioning Building Wet Scrubber			
Visual Emissions	EPA M9	0	5%
Metals Recovery Wet Scrubber			
Visual Emissions	EPA M9	0	5%

[1] Limits obtained from 40 Code of Federal Register part 60 Subpart Cb - Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994 published in Federal Register as 62 FR 45123 on December 19, 1995 as modifed on August 25, 1997, Florida's Rule 62-296.416, F.A.C. and Power Plant Site Certification (PPSC) PA 78-11, PA 83-18 as modified by OGC 95-1442 and OGC 98-1335.

Table 1-3 :
Initial CEMS Based Performance Tests - EPA M19

Unit 3 Constituent Date(1998)	December 4	December 5	December 6	Permit Limit
Process Conditions				
Steam flow(klb/hr)[2]	228.9	224.5	224.6	
Spray dryer outlet temp (°F)[2]	321.6	320.7	320.3	
Nitrogen Oxides[1] (ppmdv @ 7%O_2)[2]	172.05	159.03	183.56	205
Sulfur Dioxide[1] (ppmdv @ 7%O_2)[3]	1.59	5.72	2.89	31[4]
Sulfur Dioxide[1] (% Removal)[3]	99.87	96.00	97.33	75[4]
Carbon Monoxide[1] (ppmdv @ 7%O_2)[5]	27.5	56.3	14.3	100

[1] From facility continuous emission system monitors three 24 hour data sets.
[2] 24 hour block average.
[3] 24 hour block geometric mean.
[4] SO_2 limit is 31 ppm @ 7% O_2 or 75% removal whichevery is achieved first.
[5] The maximum 4 hour block average during the 24 hr period.

The test conditions, results of analysis and quality assurance/quality control results are presented in Tables 2-1 through 2-14 on pages 2-1 through 2-12.

Ash Conditioning Building (ACB)

After the dust collector is located and all covers have been secured, the receiver section should be checked and any foreign matter, such as wire, nails or wood used in shipment should be cleaned out so that it will not interfere with the operation.

DUCT CONNECTIONS

INLET - The inlet connection to the WHIRL WET® is a round flange shown as inlet on the drawings. The piece of duct attached to this flange should be bolted, connected, and removable for access to the WHIRL WET®. This piece of duct should also slope down toward the WHIRL WET® for drainage of condensation, etc. from the duct system. The downward slope of this duct toward the unit also prevents solutions from splashing and running back down the duct system in the event that the fan should fail to operate while the water is still being applied to the irrigation system if they are installed in the duct.

OUTLET TO BLOWER - There is a flanged duct connection at the top of the dust collector. This flange is provided so that any desired duct many be bolted in place. The duct should be sufficiently guyed to brace against wind loads. It is recommended that stainless steel guy wires and hardware, or other weather-resistant materials be employed. Large duct should be independently supported with a separate super structure to keep the weight off the dust collector box.

GENERAL INSTRUCTIONS FOR NO (ZERO GPM) OVERFLOW

* Component parts are shown on assembly drawing in print pack section of Operation and Maintenance Manual.

* This system contains electronic level control switches.

* There is no continuous liquid feed or blow down.

* Using the electronic level control system, liquid becomes contaminated and must be dumped on an appropriate time cycle.

* The WHIRL WET® unit may need to be washed out internally during each dump cycle.

* With no overflow, a high level electronic float is installed to be attached to an alarm. This warns of a high liquid level. Appropriate action to reduce water level is required.

* Electronic level switches should be attached through electrical panel, solenoid valve and alarm as shown in Drawing No. AS1014 for proper operation.

Model T has a collector bottom which makes it possible to intermittently or continuously discharge.

Connect unit drain to water discharge with ball valve in off position, making sure not to put strain on the unit.

The water inlet has to be connected by hand valve "Y" and a solenoid valve "Z" to the fill water (fresh water or plant water), marked "Y" and "Z". (See Drawing No. AS1012 and AS1013.)

It is necessary that the dust collector has been installed level. The two bottom blades inside the dust collector have to be even under water.

It is also important to check the following before start up.

1. Manufacturer's instructions on blower and pump motors.

2. Rotation of blower.

3. Tighten and/or adjust belts. Be sure blower belts are not slipping and that all belts are pulling uniformly.

INSTRUCTIONS

At this point, make sure all the electrical functions of this unit are disengaged. This will include the level control station and the blower, along with any other electrical components that may be optioned on this system. Make sure that the bottom drain valve is in the "closed" position and we will be ready to preliminarily fill the unit with water. We will do this by opening the hand valve that has been connected allowing the water to come into the unit. You should continue filling the unit until liquid appears on the lower blades visible through the view port on the side of the unit. Once this level is achieved, turn off the water fill and valve.

With the above level achieved, you can now turn on the blower. Once the blower is to specified operational capacity, check the photohelic gage on the side of the unit or in the control panel which should be reading approximately 7.8" of static pressure. Also note whether the water in the window is rotating, and if so, if it shows signs of very large droplets and a very uneven flow. This may be a key that the unit is still not properly adjusted. There should be a rather smooth turning motion in the window and this action is controlled by adjustments in the level.

Keep in mind this is a preliminary first-time adjustment of the unit and should only have to be done on your initial start up of each system.

At this point, if the unit is not operating in the appropriate static pressure , manual adjustment should be made. If you unit pressure is greater than 7.8", open the bottom drain valve slowly and allow liquid to drain. This lowers the liquid level in the unit which lowers the static pressure on the photohelic. You can lower this liquid to a point where the photohelic reads correctly.

If the static pressure is too low, below 7.8", we can raise the ▲P by raising the liquid level in the unit. Do this by opening the hand valve labeled "Z" as done earlier for initial fill. Open this very slowly and allow small amounts of water to be put into the unit at any one time. Raising the liquid level in this manner will increase the static pressure until the desired level is reached.

Now that the desired level has been reached, you need to set the fill on and fill off level points on the photohelic gage. To set the fill on, turn the knob on the left front of the photohelic gage so the set point indicator is slightly left of the operating level. To set the fill off, turn the knob on the right front of the photohelic gage to 1.5" static pressure above the fill on set point.

The final points to set are high and low level alarm points. To do this you will need a continuity tester to check the level switches for an indication of when the switches open and close. The first point to set will be low level alarm. Move the level switch labeled low level down as far as it can go. Then raise the level switch labelled high level as far up as you can. Once this has been done, attach the level switches and alarms as shown in drawing.

Next, drain the unit while the fan is running to a static pressure 1" below the fill on switch. Now slowly raise the level switch up to the point where your alarm goes off. This will be the low level alarm point. To set the high level alarm point, raise the water in the unit to a point of 1" static pressure above the fill off location. Slowly adjust the high level float switch down to a point that the alarm goes off. This will be the high level alarm point.

When all adjustments on the level switches are made, make sure that the lock caps are tightened to keep the levels from accidentally moving. You will now connect the solenoid valve and any other electrical devices not yet connected to the control panel.

You can test the switch operation by opening the drain valve slowly. This allows a liquid reduction and the unit should automatically replace lost water.

Close the drain valve once the fill on sequence has started. If necessary, make final adjustment to achieve proper operating conditions.

The operation of the level control in this system is simple and straightforward and maintains the level between two pole contact switches.

If there are any questions on the operation of this procedure, or if you need additional information, contact the factory.

CLEANING

The frequency of cleaning blades, mist eliminator and hopper bottom depends on particulate buildup and solubility of particulate collected.

To clean the unit, open the bottom valve completely and let all water drain out, then rinse the unit thoroughly. Take out the demister package and rinse also. To clean the level station (level control), just remove switches and flush with water until clean.

MAINTENANCE

Outside of the normal routine maintenance of the blower bearings, drive and motor (see manufacturer's printed instructions), there will be little maintenance required for your Tri-Mer® WHIRL WET® Series Dust Collectors. Inside the level control box you will need to remove the clean-out plug to check for plugging of an equalization hole. This hole is located in the center of the box 1" from the top. There is also potential plugging at the 4 hose adaptor locations. All of these holes can be cleaned by using a small blunt object similar to a coat hanger. In addition, all that is required is an occasional check of the irrigation system, piping, and mist eliminator for suction to make certain that no plugging exists and that a good rotation pattern is evident.

To clean and empty out the unit, the drain valve has to be opened. If there is a large amount of dust, the collected dust particulate can be easily removed through this valve. To maintain the same liquid heights and to avoid new adjustment for the level control, mark point of adjustment with tape.

We are very proud of our WHIRL WET® Unit and its contribution in reducing atmospheric health hazards and controlling in-plant air pollution. Full awareness and complete understanding of the attached information should insure the successful service of your TRI-MER WHIRL WET® Unit.

FAN IDENTIFICATION AND TECHNICAL DATA

CUSTOMER: (Name) (Address)	WHEELABRATOR AIR POLLUTION CONTROL 441 SMITHFIELD STREET PITTSBURGH, PA 15222-2279	Customer PO#

END USER: VIA: DAYTON

DATE: 9/23/97

MARKINGS:

Exhaust Fan 'A'	Mfr	NYB	Model #FE-24	Serial #7030	Mat'l of Const.	WHITE FRP
Exhaust Fan 'B'	Mfr		Model #	Serial #	Mat'l of Const.	
Exhaust Fan 'C'	Mfr		Model #	Serial #	Mat'l of Const.	

Tag	Size	Wheel Dia	Class	Rotation	CFM	OV	SP	RPM	BHP
A	FE 24	24"		CW	5,000		13	2265	
B									

WHEEL DATA (EXHAUST FAN)

Mfr: NYB Material: FRP/BI Coating: NONE

Balance RPM: 2265 Axial Mill: Horizontal Mill: OK Vertical Mill:

Shaft Dia: $1^{15}/_{16}$" Shaft Length: 30½" Drive Key Length: ½"x4" Shaft Key Length:

CONTAMINANTS Shaft Length from Backside of Hub 26"

MOTOR DATA

TAG	POSITION	MFR	HP	RPM	VOLTAGE	TYPE	FRAME	NAMEPLATE AMPS
A	S	SIEMENS	20	1750	220/230/440/460	TEFC	256T	56-54-28-27
B								

DRIVE DATA:

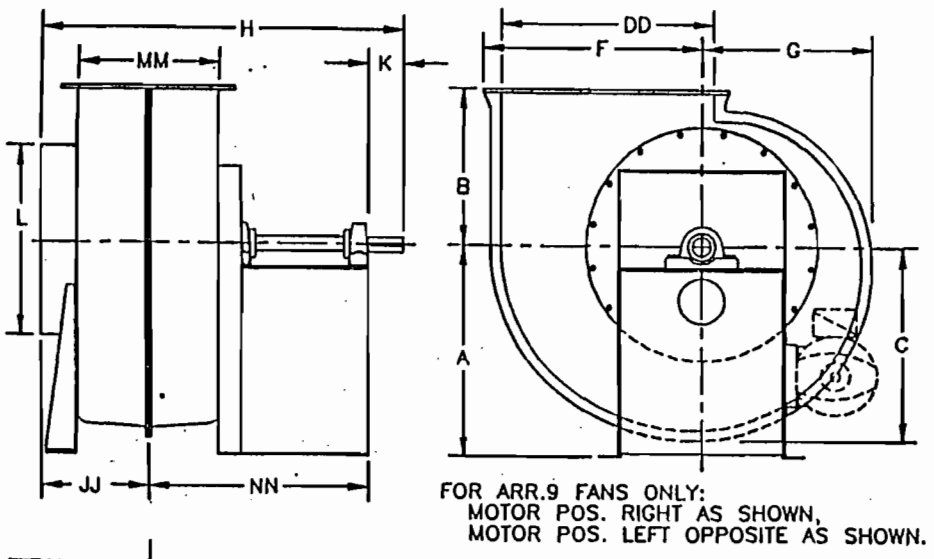
TAG	Bearing Mfg	Bearing Part #	Driver	Bushing	Driven	Bushing	Belts (Qty)	Centers
A	DODGE	SC11516AH	2TB90	Q1x1⅝"	2TB70	Q1x$1^{15}/_{16}$"	Bx105 (2) DAYCO	41"
B								

STANDARD ACCESSORIES (✓)

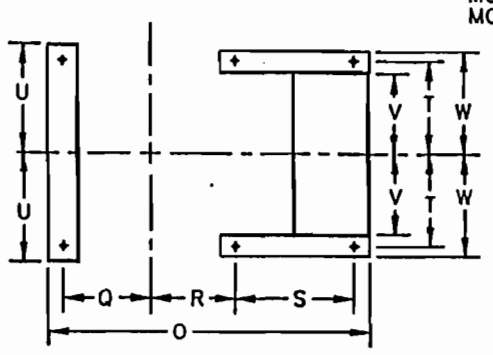
BELT GUARD	✓	Mat'l:	MOTOR ARRANGEMENT:	S ON SUBBASE NYB
SHAFT GUARD	✓	Mat'l:	DISCHARGE ORIENTATION:	
INSPECTION DOOR	✓	Location:8" Rnd Flg	FAN WEIGHT IN LBS:	
DRAIN	✓	Size:1" thrd coup plg	FAN ISOLATION: None___	Spring___ Rubber___
INTEGRAL STACK SUPPORT		——	*NOTES*	
HIGH PRESSURE CONST.	✓	——		
DISCONNECT	--	Model		
FLEX INLET		——		
FLEX OUTLET		——		
INLET SPRAYHEADER		Part #		

JOB NO. 17461-102	DATE: 8/27/97	INSPECTED BY: KENNETH DURHAM	APPROVED BY: BRIAN MARTIN

Tri-Mer® Corporation
Air Pollution Control Systems
1400 Monroe, PO Box 730, Owosso, MI 48867
PH: 517-723-7838 • FAX : 517-723-7844
• E-MAIL: engrgdpt@tri-mer.com •



FOR ARR.9 FANS ONLY:
MOTOR POS. RIGHT AS SHOWN,
MOTOR POS. LEFT OPPOSITE AS SHOWN.



Accessories

Items checked are to be furnished.

- X FLANGED OUTLET, standard, per drawing 2.
- X FLANGED INLET, per drawing 3.
- X BELT GUARD, per drawing 4.
- ____ OUTLET DAMPER, per drawing ____.
- ____ INLET BOX, per drawing ____.
- X UNITARY BASE, per drawing 5.
- X ISOLATION, per drawing 6.
- ____ OUTLET TRANSITION, per drawing ____.
- ____ RAISED BOLTED CLEAN-OUT DOOR, at ____O'clock.
- X SHAFT GUARD.
- X 1" THREADED DRAIN W/PLUG.
- ____ SURFACING VEIL.
- ____ GRAPHITE IMPREGNATION FOR STATIC GROUNDING.
- X INSPECTION PORT.
- ____ STAINLESS SHAFT SLEEVE/VITON SHAFT SEAL.
- ____ HASTELLOY SHAFT SLEEVE/VITON SHAFT SEAL.

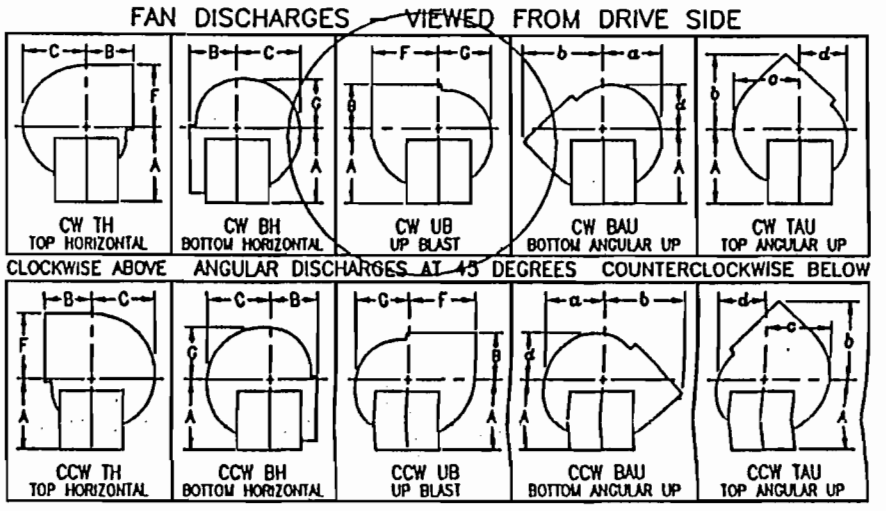
L IS O.D. OF COLLAR.

DD AND MM ARE INSIDE DIMENSIONS.

SIZES 18 THRU 30 ARE ROTATABLE IN THE FIELD.

WHEN REQUIRED, DRAIN LOCATED AT LOWEST POINT ON SCROLL.

FAN DISCHARGES — VIEWED FROM DRIVE SIDE



TOLERANCE: ± 1/8

DIMENSIONS (IN INCHES)

SIZE	A	B	C	DD	F	G	H		JJ		K		L	MM
							MP	HP	MP	HP	MP	HP		
~~18~~	~~21 3/4~~	~~16~~	~~20 3/8~~	~~20 3/4~~	~~21 3/4~~	~~17 3/8~~	~~35~~	~~35 3/4~~	~~10 1/2~~	~~10 5/8~~	~~3 1/2~~	~~4~~	~~18 1/2~~	~~13 5/8~~
24	28 5/8	20	26 3/4	27 3/4	28 3/8	22 5/8	46 1/4	~~47~~	12 7/8	~~13~~	4 1/2	~~5~~	24 1/2	18 1/4
~~30~~	~~34 3/4~~	~~23 1/2~~	~~32 3/8~~	~~34~~	~~34 1/4~~	~~27 3/8~~	~~57~~	~~57 3/4~~	~~16~~	~~16 1/8~~	~~5 1/2~~	~~6~~	~~30 5/8~~	~~22 3/8~~

SIZE	NN		O		Q		R		S	T	U	V	W
	MP	HP	MP	HP	MP	HP	MP	HP					
~~18~~	~~21~~	~~21 1/8~~	~~31 1/4~~	~~31 1/2~~	~~8 3/4~~	~~8 7/8~~	~~8 5/8~~	~~8 3/4~~	~~10 7/8~~	~~9 3/8~~	~~10 7/8~~	~~7 7/8~~	~~10 1/4~~
24	28 7/8	~~29~~	42 1/2	~~42 3/4~~	11 5/8	~~11 3/4~~	11 1/2	~~11 5/8~~	15 3/8	12 1/4	14 3/8	10 5/8	13 1/2
~~30~~	~~35 1/2~~	~~35 5/8~~	~~51 1/4~~	~~51 1/2~~	~~13 3/4~~	~~13 7/8~~	~~13 5/8~~	~~13 3/4~~	~~19 7/8~~	~~14 7/8~~	~~16 7/8~~	~~13 1/8~~	~~16 1/8~~

SIZE	a	b	c	d	SHAFT DIAMETER		KEYWAY		BASE
					MP	HP	MP	HP	HOLES
~~18~~	~~19 3/4~~	~~26 3/4~~	~~22 1/2~~	~~15 3/4~~	~~1 11/16~~	~~1 11/16~~	~~3/8~~	~~3/8~~	~~9/16~~
24	25 7/8	34 1/4	29 5/8	20 3/8	1 15/16	~~1 15/16~~	1/2	~~1/2~~	3/4
~~30~~	~~31 3/8~~	~~40 3/4~~	~~35 7/8~~	~~24 5/8~~	~~2 3/16~~	~~2 7/16~~	~~1/2~~	~~5/8~~	~~3/4~~

DIMENSIONS SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS CERTIFIED.

DATE 01-13-95 CERTIFIED iii kw CONTROL NO. 100

CUSTOMER'S NO. 7906
CUSTOMER'S NAME TRI-MER CORP
TAG ____

MOTOR BY nyb MTG. BY nyb DRIVE BY nyb

FAN DATA

SIZE	ARR.	QTY.	DISCHARGE	WHEEL	CFM	OV	SP	BHP	°F	RPM
24	1	1	CW UB	FRP	5000	1449	12.00	15.73	70	2228

MOTOR DATA

POS.	RPM	HP	ELECTRICAL DATA	FRAME
W	1800	20	3-60-230/460V.	256T
				TEFC

DRIVE DATA

BELTS	DRIVER	DRIVEN	CENTERS
2-BX105	9.0	7.0	40.83

CERTIFIED DRAWING | FORM NO. F-23 G

nyb | The New York Blower Company
7660 Quincy Street-Willowbrook, IL. 60521

FE FANS
FRP FUME EXHAUSTERS
ARRANGEMENT 1 AND 9
MEDIUM AND HIGH PRESSURE
SIZES 18 THRU 30

DRAWING NUMBER
FILE M-480 DWG. 1

Metals Recovery System (MRS)

IMPEL MANUFACTURING CO.

PREVENTIVE MAINTENANCE AND MAINTENANCE MANUAL

SUBMERSIBLE PUMPS "L" SERIES

OIL FILLED MOTORS	AIR FILLED MOTORS
LD-076-034-yyy W	LU-076-034-yyy
LD-076-054-yyy W	LU-076-054-yyy
LD-100-104-yyy W	LD-100-104-yyy
LD-100-154-yyy W	LD-100-154-yyy
LD-100-154-yyy W	LD-100-204-yyy

JUNE 1992

PUMP TYPE : LU-076-xxx-yyy
GENERAL DESCRIPTION

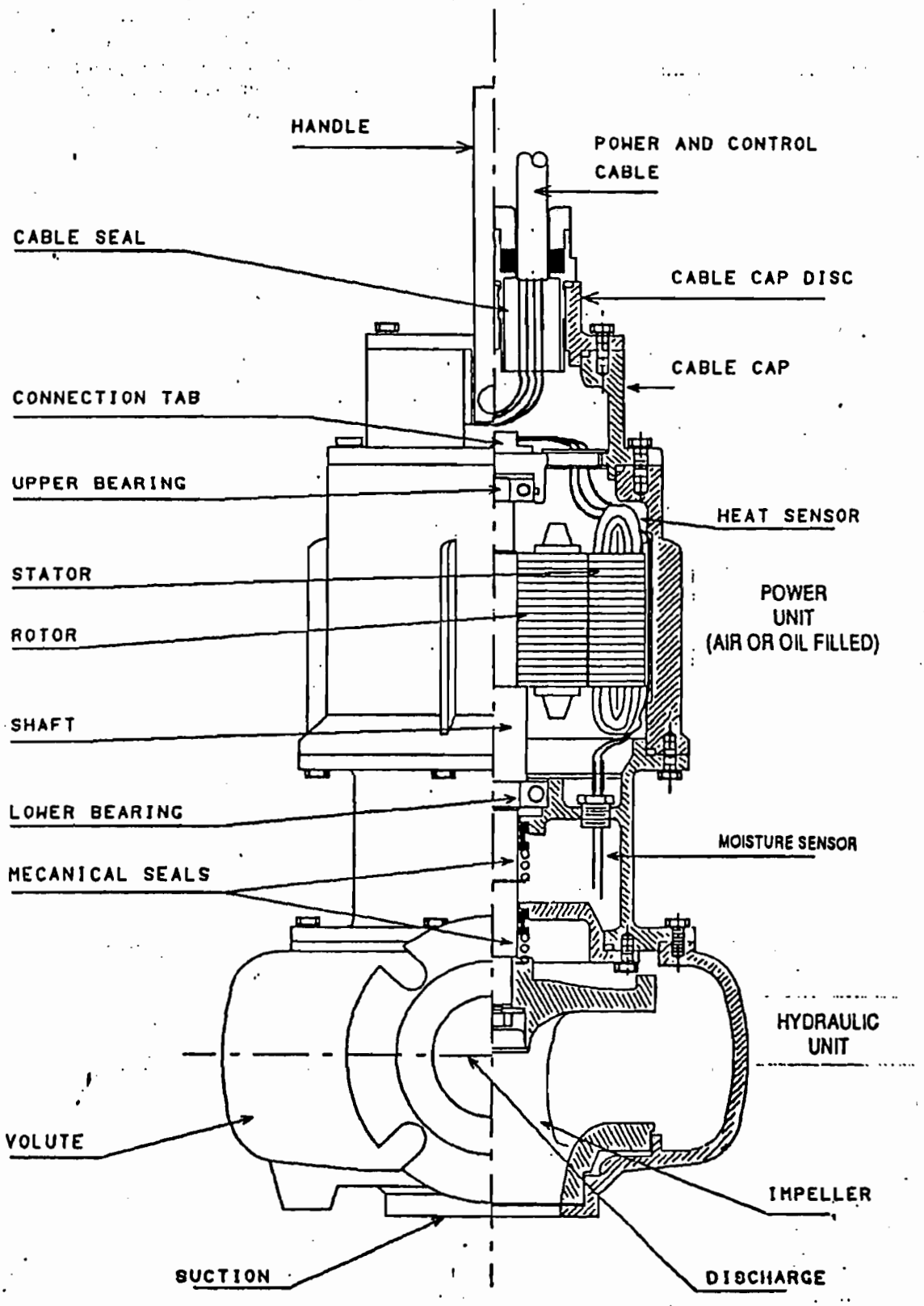


FIG. 1.A

PREVENTIVE MAINTENANCE AND MAINTENANCE MANUAL
IMPEL "L" SERIES (LU & LD)

I. Scope:

This manual covers basic PREVENTIVE MAINTENANCE AND GENERAL REPAIR for IMPEL series "L" (LU and LD) and "L" series with a base for temporary installation. These instructions include disassembly and reassembly sequences.

II. Safety Precautions:

It is recommended that maintenance personnel wear appropriate SAFETY GLASSES, HEAD GEAR, FOOTWEAR, CHEMICAL IMPERVIOUS GLOVES, BREATHING APPARATUS AND APRONS THAT MEET OSHA STANDARDS.

III. Objective And Limits:

This manual gives instructions to individuals who have been previously trained and qualified by IMPEL MANUFACTURING CO. INC., IMPEL conducts maintenance schools periodically in your area. Factory training is available four times a year. If IMPEL PUMPS ARE REPAIRED BY PERSONNEL WHO HAVE NOT BEEN TRAINED AND AUTHORIZED BY IMPEL MANUFACTURING CO. INC. THE IMPEL WARRANTY WILL BE NULL AND VOID even though repair instructions have been followed as per this manual.

IV. Routine Inspection:

When routine inspection activities are performed, it is necessary to remove the IMPEL pump from the basin. It is recommended that pump inspection be performed once a month for a sound preventative maintenance practice.

1. Power Cable:

Visually inspect the Cable and Cable Coating for damage, wear or cracks. DO NOT ATTEMPT TO REPAIR ANY CABLE DAMAGE WITH TAPE OR EPOXY.

2. Noise:

Listen at the discharge pipe (with the aid of a long screwdriver or a mechanics stethoscope) for any irregularity in sound. The regular sound of the pump is similar to the continuous hum of an electric motor.

3. Electrical Testing:

WARNING, BEFORE MAKING ANY ELECTRICAL TESTS BE SURE THAT ALL ELECTRICAL POWER SUPPLY TO THE PUMP IS DISCONNECTED. IF NOT DISCONNECTED THERE IS A RISK OF SEVERE ELECTRIC SHOCK.

Wiring diagrams are shown in FIGS. 6 (a&b) and 7 (a&b).

Set the ohmether at R x 1 scale and test continuity in all windings and thermostats.
After testing continuity then test insulation using a 1000 volts megger on all windings, then on the oil chamber.

Reconnect the electrical power and all control cables and start pump. Check for noise and normal power use.

NOTE: DURING THE MONTHLY PREVENTIVE MAINTENANCE INSPECTION SHOULD YOU FIND ANY IRREGULARITIES IN THE PUMP, REMOVE PUMP FROM BASIN AND INSPECT PUMP IN DETAIL. THIS DETAILED INSPECTION MUST BE ACCOMPLISHED BY THE FOLLOWING INSTRUCTIONS.

V. Detail Inspection Procedure:

This detail inspection must take place once a year or when finding pump damage.

V.1. Preparation Of Pump For Repair:

DISCONNECT POWER SUPPLY, REMOVE PUMP FROM BASIN AND WASH IT WITH STRONG STREAM OF WATER. IF POSSIBLE CLEAN PUMP BY SAND BLASTING. IF SAND BLASTING IS NOT AVAILABLE, SUBMERGE PUMP IN A STRONG CHLORINE SOLUTION FOR ONE HOUR OR LONGER. CLEAN WITH A WIRE BRUSH. WEAR EYE PROTECTION AND APPROPRIATE GLOVES. WHEN PUMP IS CLEAN REMOVE FROM SOLUTION, FLUSH WITH STRONG STREAM OF WATER.

3 HP

PUMPS : 5 & 10 H.P.
WIRING DIAGRAM

230 VOLTS-THREE PHASE
STAR-STAR CONNECTION
WITH LEAK SENSOR

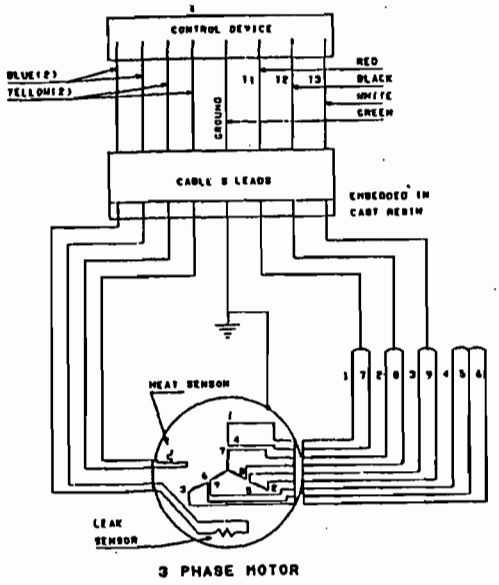


Fig. 6

PUMPS : 15 & 20 H.P.
WIRING DIAGRAM

230 VOLTS-THREE PHASE
STAR-STAR CONNECTION
WITH LEAK SENSOR

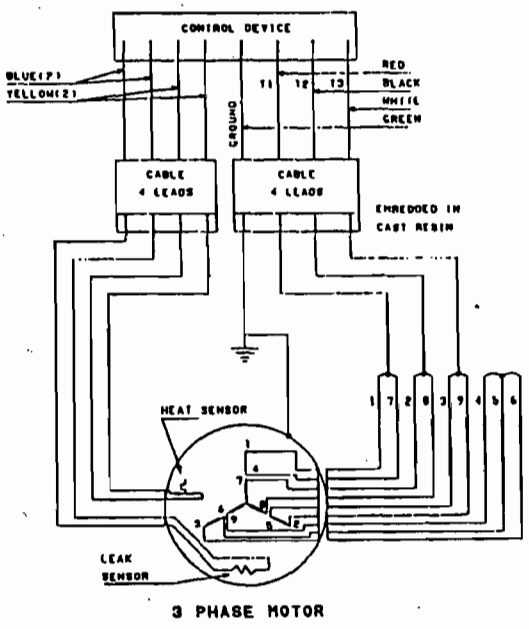


Fig. 7

3 HP

PUMPS : 5 & 10 H.P.
WIRING DIAGRAM

460 VOLTS-THREE PHASE
STAR CONNECTION
WITH LEAK SENSOR

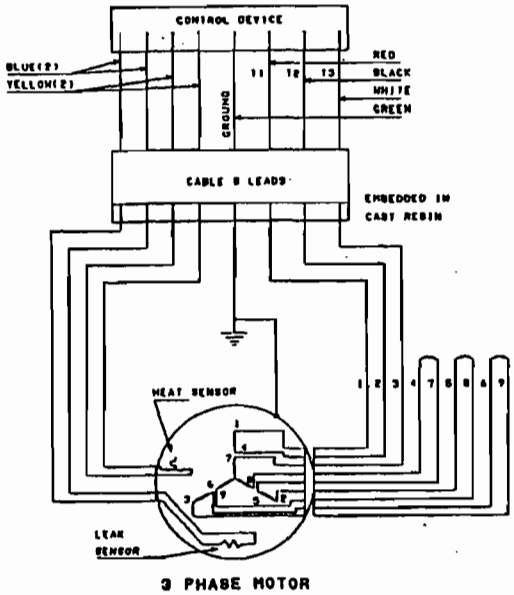


Fig. 6 a

PUMPS : 15 & 20 H.P.
WIRING DIAGRAM

460 VOLTS-THREE PHASE
STAR CONNECTION
WITH LEAK SENSOR

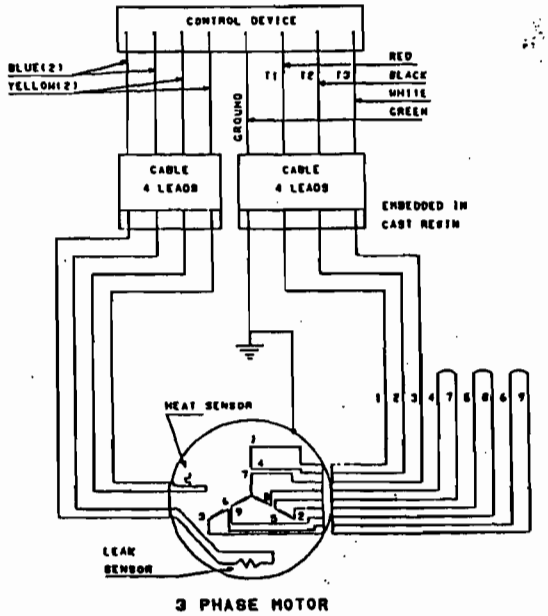


Fig. 7 a

d. Remove cap screw from cable cover and install a 1/8" x 2" nipple (NPT) for air hose connection. Control entrance of air at a rate of 14.2 psi (1kg/cm²) MAXIMUM. Submerge pump in water making sure that pump is totally submerged. Check for air bubbles. If no air bubbles appear, the pump is properly sealed. Remove pump from water and dry with compressed air. When pump is thoroughly dry remove air hose and air nipple. APPLY TEFLON PASTE OR TEFLON TAPE TO MALE CAP SCREW THREAD; SEAT CAP SCREW BEING CAREFUL NOT TO CROSS THREAD. TIGHTEN CAP SCREW FOR COMPLETE SEALING.

Fig. 8

CAUTION: THIS REPAIR OPERATION MUST BE DONE WITH GREAT CARE. CARELESS REPAIR CAN CAUSE SERIOUS DAMAGE TO THE UNIT AND OPERATOR.

c. Remove cable cover (Fig. 9), avoid damaging "0" rings. All wire leads from the windings can be severely damage by rough treatment. DO NOT PULL OR JERK ON THESE WIRES, (See Fig. 10).

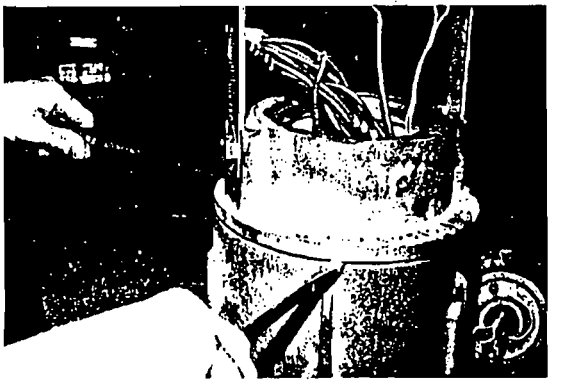


Fig. 9

VI. 1.2. Repair And Replacement Of Other Parts:

ALL REPAIRS, REPLACEMENT OF PARTS, DISASEMBLY AND REASSEMBLY OF THE IMPEL PUMP MUST BE MADE BY PERSONNEL TRAINED AND CERTIFIED BY IMPEL MANUFACTURING CO. INC.. IF REPAIRS OR REPLACEMENT OF PARTS ARE MADE BY PERSONNEL NOT CERTIFIED BY IMPEL, THIS WILL MAKE ALL WARRANTIES NULL AND VOID.

a. Drain oil from unit following the procedure described in VI. 2.5.

b. Remove cable cover disassembling the disc cap first as described in V. 1.1.a. Remove the screws joining the cable cover to the motor housing (casing). See fig. 8.

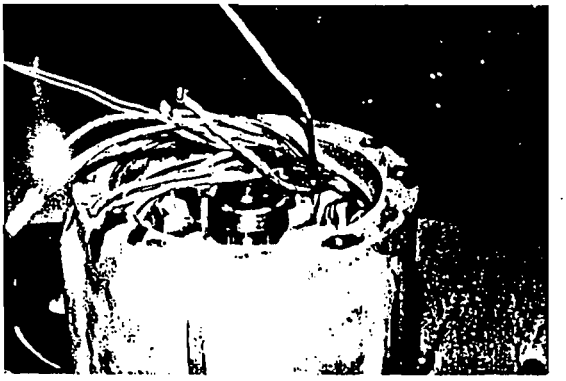


Fig. 10

IF THE KEY-WAY IS DAMAGED OR WORN, THE SHAFT MUST BE REPLACED. SHAFT AND KEY-WAY MUST BE IN PERFECT CONDITION.

VI. 2.3. Inspect the motor body and castings in detail for rust or pits. Rust pits on the pump body or castings should not exceed 1/16" MAX. (1 to 2mm.). The stator must look new and free of MIST or RUST. All windings should look bright and not be dark colored or have any evidence of burning or arcing.

VI. 2.4. The pump shaft and rotor should look new. The shaft might be slightly stained by rust (NOT PITTED) from the impeller. All shaft surfaces where ball bearings and mechanical seals seat must be bright and free from scratches. The areas on the shaft where the impeller is installed should be free from all visual defects.

VI. 2.5. All static seal joints in the pump have NITRILE "O" RING seals. Check the "O" Rings for pressure deformities, cuts or marks made during disassembly. Check the "O"Ring static seat and make sure all seating surfaces are free from grit or rust and offer the "O" Ring a clean even seating surface.

VI. 2.6. Make sure that all screws, nuts and handle are clean and in good condition.

VI. 2.7. If any of the above parts are damaged they must be replaced. CONTACT OUR SALES OR SERVICE DEPARTMENT FOR PARTS OR CONTACT THE IMPEL AUTHORIZED DISTRIBUTOR IN YOUR AREA. EACH PUMP HAS A DETAILED PARTS LIST THAT IS SUPPLIED WITH THE PUMP. MANUALS AND PARTS LIST ARE AVAILABLE FROM OUR SERVICE DEPARTAMENT IN HOUSTON, TEXAS, OR CONTACT THE AUTHORIZED IMPEL DISTRIBUTOR IN YOUR AREA.

VII. Reassembling The Impel Pump:

In order to reassemble the pump reverse the disassembly procedure. Proper sequence on reassembly is very important. Reassembly cleanliness is also important. Maintenance shop or field contaminants can cause "electrical shorts" or bearing and seal failure. CLEANLINESS IS IMPORTANT.

ALL DISASSEMBLING, REPAIR, AND REASSEMBLING ACTIVITY OF IMPEL PUMPS MUST BE CARRIED OUT BY TRAINED AND CERTIFIED PERSONNEL BY IMPEL MANUFACTURING CO. INC., OTHERWISE IMPEL WARRANTY WILL BE NULL AND VOID EVEN WHEN REPAIR INSTRUCTIONS OF THIS MANUAL ARE FOLLOWED.

VII. 1. Motor Unit:

Check the "O" rings and verify that all "O" rings are properly seated and their seat box is clean of all possible contaminants. The cable disc cap has 1 "O" ring, the cable cap for 3 to 15 HP pumps has 3 "O" rings (Fig. 17); 1 "O" ring between the casing and motor cover and 2 in the upper bearing box; 20 HP pump has 2 "O" rings, 1 between casing and cap and 1 in the ball bearing box.

The casing-oil chamber (Fig. 17) joint has 1 "O" ring and the oil chamber cover joint has 1 "O" ring.

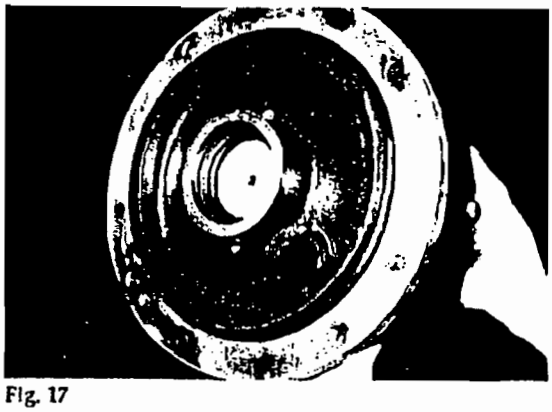


Fig. 17

VII. 2. Mechanical Seals:

Install mechanical seals stationary parts in their clean boxes. Apply a few drops of lubricant oil; SAE 10 W 30 for air filled motor, or dielectric for oil filled motors; to ease installation.

NOTE: ROTATING SEAL PARTS MUST BE INSTALLED USING THE TOOLS SPECIFIED IN TABLE NO. 2, (See FIG. 18).

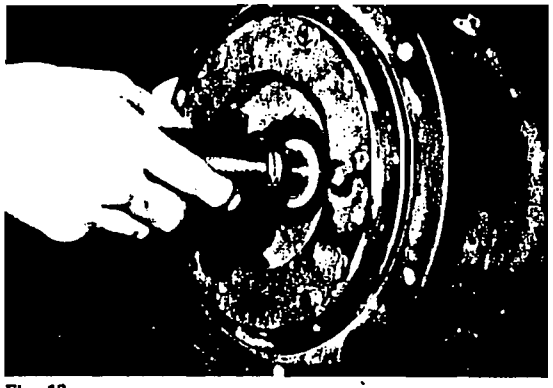


Fig. 18

TABLE No. 2
SEAL INSTALLATION TOOL PART NUMBER

MODEL	TOOL No.
LU-076-034 LU-076-054	HE0100LS
LD-100-104 LD-100-154 LD-100-204	HE0140LS

VII. 3. After assembling the motor unit, conduct the airtightness test specifield in paragraph No. VI.1.1.d., and the continuity/dielectric test specified in paragraph No. IV. 3.

VII. 4. When installing the impeller on the shaft apply LOCKTITE No. 222 to the screw thread and tighten securely (NEVER APPLY TO OR FILL SCREW HOLE THREAD WITH LOCKTITE, GREASE OR ANY TYPE OF LUBRICANT. INSERTION OF THREADED SCREW TRAPS THE MEDIUM IN THE HOLE AND CREATES HYDRAULIC PRESSURE THAT CAN CAUSE HAIRLINE CRACKS IN THE CASTING AND ALSO CAUSE THE SCREW NOT TO SEAT TO ITS FULL HOLDING CAPACITY.

VII. 5. Fill the unit with the appropriate amount of clean oil specified in table No. 1. (SAE 10W30) for air filled motors or in table No. 1A (DIELECTRIC) for oil filled motors. ("L... W" pumps).

VII. 6. Repair And Reassembly Final Test:

When reassembly is completed, the following final tests must be conducted to insure top performance of the IMPEL PUMP.

a. Electric tests specified in VII. 3. and IV. 3.

b. Operation and performance test gives the operator the true operating curve produced by the pump. The following maintenance equipment is needed to conduct tests:
(1). 1 manometer
(2). a regulating valve
(3). a means to measure the medium flow
(4). the appropriate SAFETY APPAREL AND EQUIPMENT.

SPECIAL NOTE TO AUTHORIZED STOCKING DISTRIBUTORS AND OPERATING MAINTENANCE PERSONNEL:

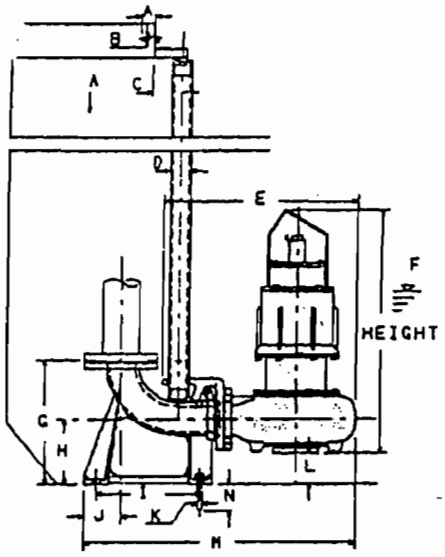
IMPEL MANUFACTURING CO. INC. CONDUCTS IMPEL PUMP PREVENTIVE MAINTENANCE AND REPAIR SCHOOLS FROM TIME TO TIME OR UPON REQUEST FROM THE END USER OF IMPEL PUMPS. THESE SHOOLS ARE CONDUCTED TO SHOW THE RELIABILITY AND OPERATION OF IMPEL PUMPS. PREVENTATIVE MAINTENANCE WILL ENSURE TROUBLE FREE OPERATION OF YOUR IMPEL PUMP.

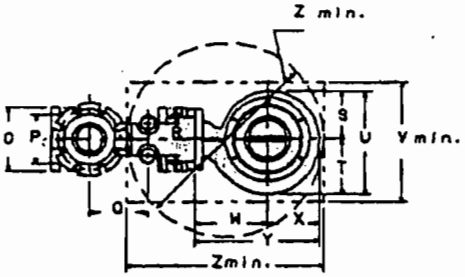
THE IMPEL MAINTENANCE AND REPAIR SCHOOLS ARE CONDUCTED AT IMPEL MANUFACTURING CO. INC. FACTORY OR AT A STOCKING DISTRIBUTOR WAREHOUSE. AFTER COMPLETION OF REPAIR TRAINING, PUMP SELECTION AND PREVENTATIVE MAINTENANCE INSTRUCTIONS, THE PERSON OR COMPANY WILL BE ISSUED MAINTENANCE AND REPAIR AUTHORIZATION TO PERFORM REPAIR WORK ON IMPEL PUMPS.

TO OBTAIN TRAINING SCHOOL DATES AND AREA LOCATIONS CONTACT THE AUTHORIZED IMPEL DISTRIBUTOR IN YOUR AREA OR CONTACT IMPEL MANUFACTURING CO., INC.

Model LU-076-xxx-yyy

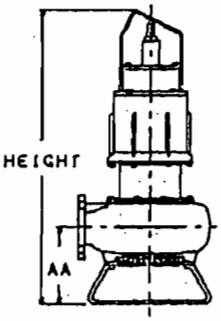
PERMANENT INSTALLATION (PIPE GUIDE SYSTEM)

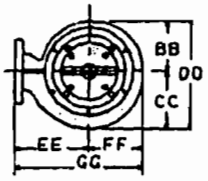


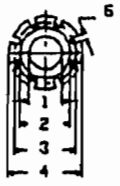


NOTE: This version can be supplied with an adaptor for cable guide instead of the pipe guide system.

PORTABLE INSTALLATION







HP	WEIGHT pounds (kg)			HEIGHT in (mm)	
	PUMP		ELBOW	PUMP	
	Permanent	Portable		Permanent	Portable
3	176 (80)	192 (87)	50 (23)	29-3/4 (755)	35-3/8 (900)
5	187 (85)	202 (92)	50 (23)	29-3/4 (755)	35-3/8 (900)

DIMENSIONS

	REF	mm	inches
PERMANENT INSTALLATION	A	76.0	3
	B	9.5	3/8
	C	92	3 - 5/8
	D	50.8	2 SCHED 40
	E	593	23 - 3/8
	F	595	23 - 3/8
	G	381	15
	H	200	8
	I	325	12 - 7/8
	J	115	4 - 1/2
	K	16	5/8
	L	85	3 - 3/8
	M	837	33
	N	150	6
	O	200	8
	P	153	6
	Q	179	7
	R	100	4
	S	150	6
	T	171	6 - 5/8
	U	321	12 - 5/8
	V	375	14 - 7/8
	W	220	8 - 5/8
	X	161	6 - 3/8
	Y	381	15
	Z	604	23 - 7/8
PORTABLE	AA	227	8 - 7/8
	BB	150	6
	CC	171	6 - 5/8
	DD	321	12 - 5/8
	EE	220	8 - 5/8
	FF	161	6 - 3/8
	GG	381	15
FLANGES PUMP	1	80	3
	2	127	5
	3	152	6
	4	190	7 - 1/2
	5	19	3/4
FLANGES ELBOW	1	102	4
	2	157	6 - 3/16
	3	190	7 - 1/2
	4	229	9
	5	19	3/4

IMPEL MANUFACTURING CO.

650 North Sam Houston Parkway East, Suite 216
Houston, Texas 77060
Ph. (713) 999-1924 Fax (713) 913-7531

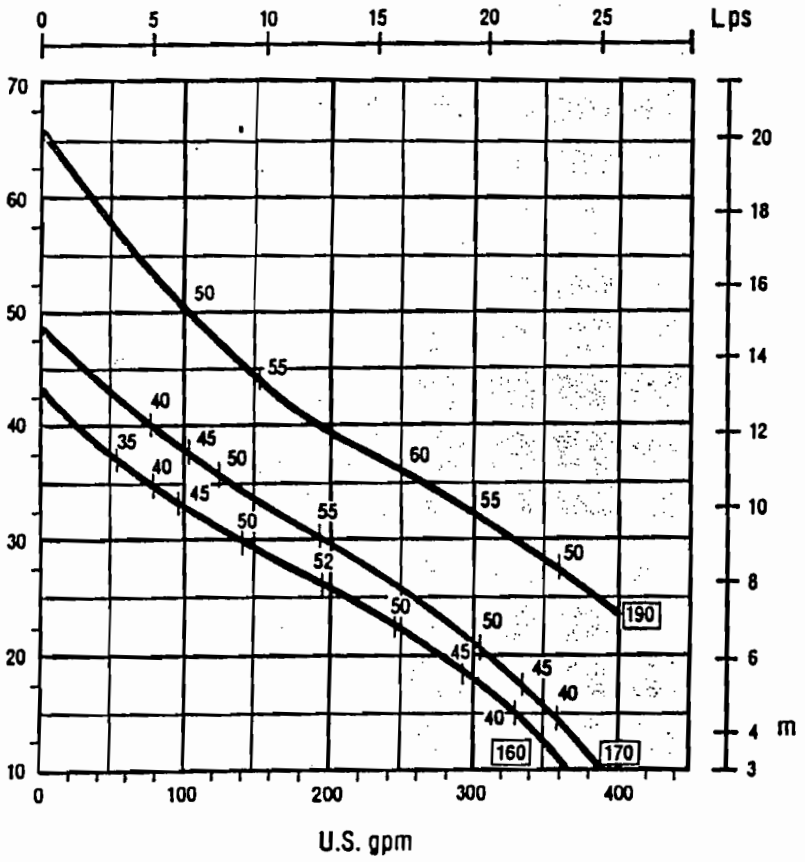
Distributed by:

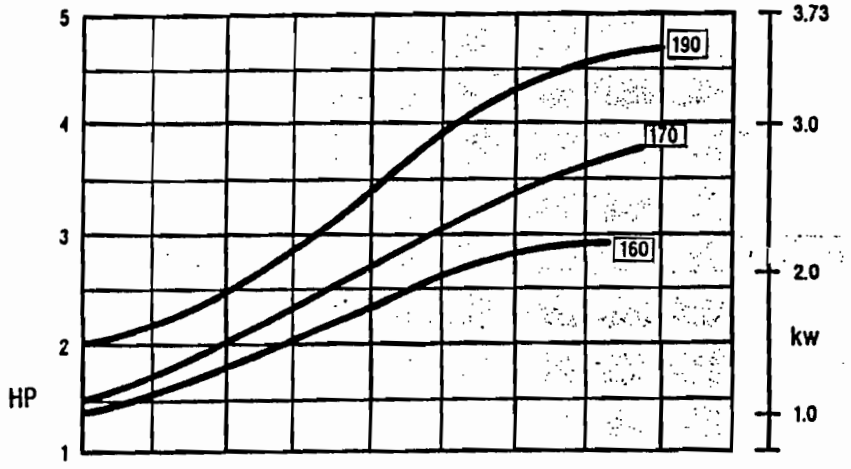
IMPEL MANUFACTURING CO.

" L " SERIES

Model LU-076-xxx-yyy

PUMP DISCHARGE	3 " (76 mm.)
FREE PASSAGE	3 " (76 mm.)
NOMINAL SPEED	1750 rpm.





SPECIFICATIONS

Available Motors (HP)	3		5
STD. Impeller Diameter (mm)	160	170	190
Poles		4	
Service		CONTINUOUS	
Max. Pumped Liquid Temp.		104 °F (40 °C)	
Motor Type		Induction Squirrell Cage	
Windings Connection		Star	
Volts		230/460	
Phase		3	
Hz		60	
Max. Amps			
230 v.	9.2		14
460 v.	4.6		7
Locked Rotor Amps			
230 v.	64		92
460 v.	32		46
Insulation Class		B	
Nema Desing		B	
Code Letter	K		J
Impeller Type		Closed-non Clogging	
Vanes		one	
Elbow Discharge		4" (100mm)	
Bearings Lubrication		Grease	
MATERIALS:			
Case		Cast Iron	
Impeller		Cast Iron	
Shaft		410 SS	
Upper Mechanical Seal		Carbon-Ceramic	
Lower Mechanical Seal		Tungsten Carbide	
Bolts and Nuts		18-8 SS	
Wearing Ring		BRONZE	
Handle		Stainless Steel	
Finishing Coat		Epoxy	

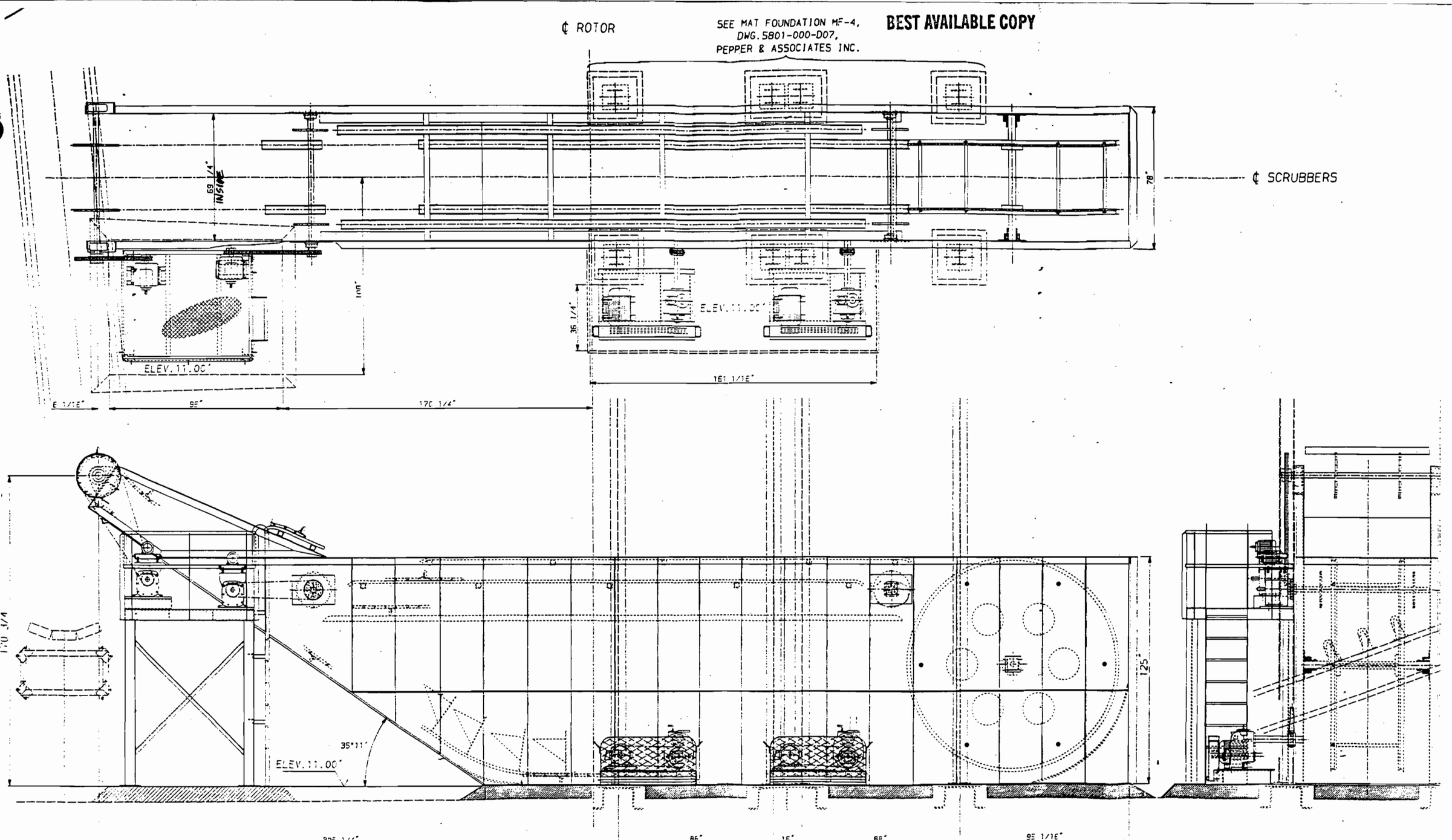
MODEL CODE

L	U	–	076	–	xx	x	–	yyy
Series	Impeller Type		Discharge Size		Motor HP	Poles		Impeller Diameter

Spare / Replacement Parts

180-40A-01	SHREDDER CYCLONE - SHUTTLE CONVEYOR

ITEM	DESCRIPTION	QTY
1	MOTOR 5.0 HP 1750 RPM 184T FRAME 480V 60 HZ	1
2	REDUCER DODGE 425 TXT W/TORQUE ARM & 2 7/16" BORE	1
3	DR SHEAVE 2 GR 3V 3.35 DYNA V W/1 1/8" 1610 TAPER LOCK BUSH	1
4	DN SHEAVE 2 GR 3V 5.3 DYNA V W/1 1/16" 1610 TAPER LOCK BUSH	1
5	BELT 3V X 950	2
6	PILLOW BLOCK MP-39 Ø2 7/16" DR (SEALMASTER OR EQ.)	2
7	PILLOW BLOCK NP-39 Ø2 7/16" DN (SEALMASTER OR EQ.)	2
10	LAG PULLEY Ø18" 38" FACE (DRIVE) W/2 7/16" BORE (HERR. GRVD. VULC. LAGGING)	1
11	WING PULLEY Ø18" 38" FACE (TAIL) W/2 7/16" BORE	1
12	IDLER FLAT Ø 5" ROLLS REX C5020-24(OR SUPERIOR 815-FLT-24)	7
13	IDLER FLAT Ø 5" ROLLS REX C5020-36(OR SUPERIOR 815-FLT-36)	3
15	CNVR BELTING 36" WIDE 65 FT 3-PLY, MOR, 3/16" TC, 1/16" BC (PLYLON 330 OR EQ)	1
16	BELT-CLIPS 190 ES (FLEXCO OR EQ.)	30



REMARKS

FOR TANK DETAILS SEE DWG. 180-385-01
DRAG RETURN IDLER IS SHOWN ON DWG. 180-380-01
IDLERS, SPROCKETS, AND SHAFTS; DWG. 180-380-01
FOR DRIVE ARRANGEMENT SEE DWG. 180-385-01.

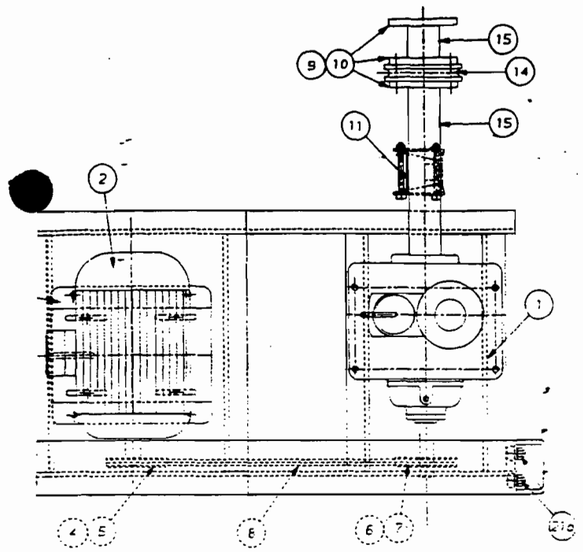
MATERIAL LIST NO. | PARTS LIST NO.

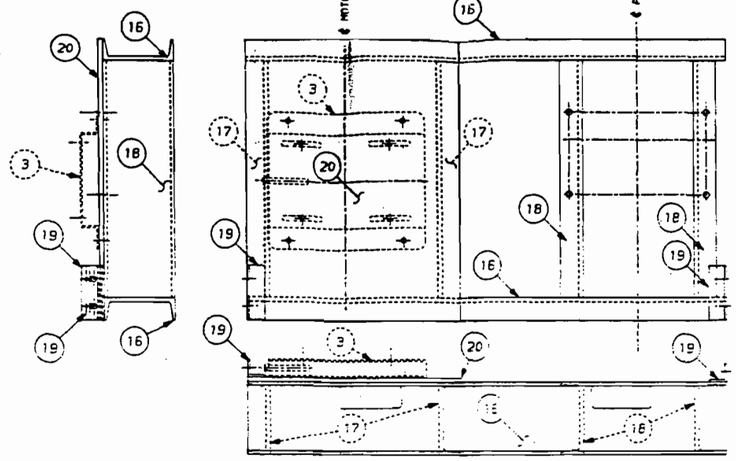
NO.	REVISION	DATE	BY	NO.	REVISION	DATE	BY
1	GENERAL REVISION	12/9/88	TC				

CUSTOMER	RESOURCE RECYCLING
LOCATION	PINELLAS COUNTY, FL
TITLE	SELF-CLEANING WATERTANK, GENERAL ARRANGEMENT.
DWN BY	L. HOEHLER
CHKD BY	
SCALE	
APPROVED BY	
DATE	4/5/89
ISHT NO	
NO OF ISHTS	
DWG NO	5801-385-C

NEWELL INDUSTRIES, INCORPORATED
P O BOX 10829 SAN ANTONIO, TEXAS

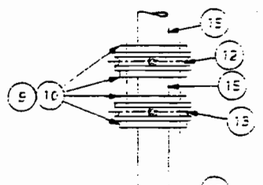
BEST AVAILABLE COPY

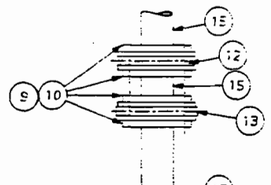


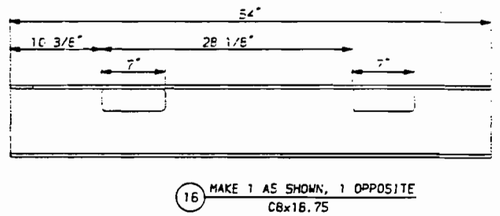


PUMP BASE

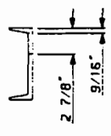
1	1	SELF-PRIMING GORMAN-RUPP MUD PUMP, TYPE T3A60-B
1a	4	HOLD-DOWN BOLT, 5/8"UNCx2 1/2"LONG, W.NUT, BEVEL WASHER AND LOCKWASHE
2	1	ELECTRIC MOTOR, 15 HP, TEFC, FRAME 254T, 1760 RPM
3	1	ADJUSTABLE NEMA MOTOR BASE, DODGE PART No.122097
3a	4	BASE HOLD-DOWN BOLT, 5/8UNCx2"LONG, C/W NUT, FLAT WASHER & LOCKWASHER
4	1	DRIVE SHEAVE, 2G-3V-6.0, BORED FOR ø1610 TAPERLOCK
5	1	DRIVE SHEAVE BUSHING, TAPERLOCK 1610, 1 5/8"BORE
6	1	DRIVEN SHEAVE, 2G-3V-6.9, BORED FOR 2517 TAPERLOCK 16x10
7	1	DRIVEN SHEAVE BUSHING, 2517, 1 1/2"BORE
8	1	DRIVE BELT, POLYBAND 2x3V850
9	7	THREADED PIPE FLANGE, 150ø, 3"DIA, McMC No.4462K31, OR EQUIV.
10	7	PIPE FLANGE GASKET, 3", OR EQUIVALENT
11	1	WEDGE-TIGHT PIPE COUPLING (DRESSER COUPLING), 3", McMC No.5542K23,
12	1	CAST IRON DUAL PLATE CHECK VALVE, McMC No.5023K33, OR EQUIV.
13	1	DUCTILE IRON BUTTERFLY VALVE, 3", McMC No.5024K13, OR EQUIV.
14	1	DeZURICK KNIFE GATE VALVE, ID.No.0300,Fig.800,5,A,CLG, LEVER OPERATED
15	5'	BLACK STEEL PIPE, 125ø
21a	4	HEX HEAD BOLT, 1/2"UNCx1 1/2"LONG, W.NUT, FLAT WASHER & LOCKW.



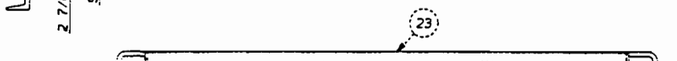




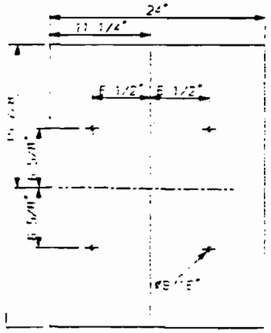
16 MAKE 1 AS SHOWN, 1 OPPOSITE
C8x16.75



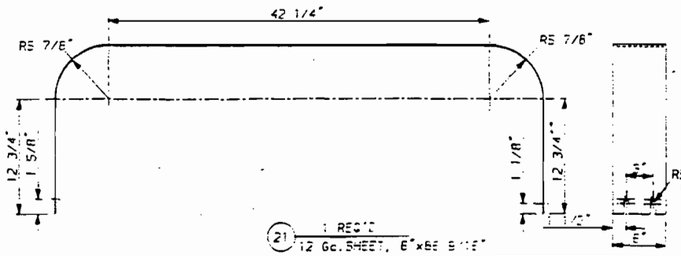
TACK-WELD BOLT HEAD TO ANGLE



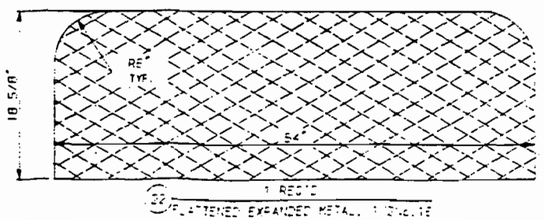
DRIVE GUARD



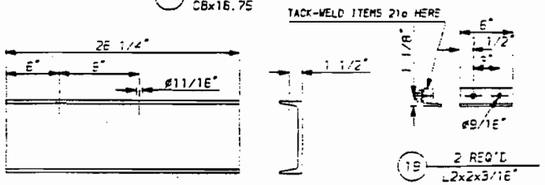
20 1 REQ'D
1/2"PLATE



21 1 REQ'D
12 Ga.SHEET, 8"xBE 9/16"



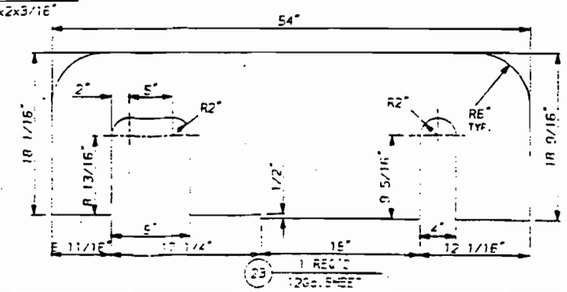
22 1 REQ'D
FLATTENED EXPANDED METAL, 1 DIA.18



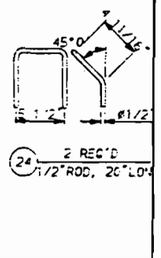
17 2 REQUIRED
C8x16.75

18 MAKE 1 AS SHOWN, 1 OPPOSITE
C8x16.75

19 2 REQ'D
L2x2x3/16"



23 1 REQ'D
12Ga.SHEET



24 2 REQ'D
1/2"ROD, 20"LO

REMARKS
WEIGHTS:

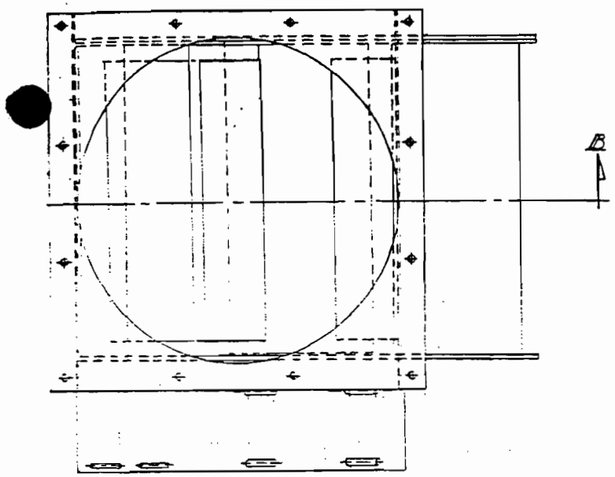
MOTOR	230 LBS
PUMP	420 LBS
SHEAVES AND BELTS	17 LBS
FRAME AND GUARDS	475 LBS
TOTAL APP.	1192 LBS

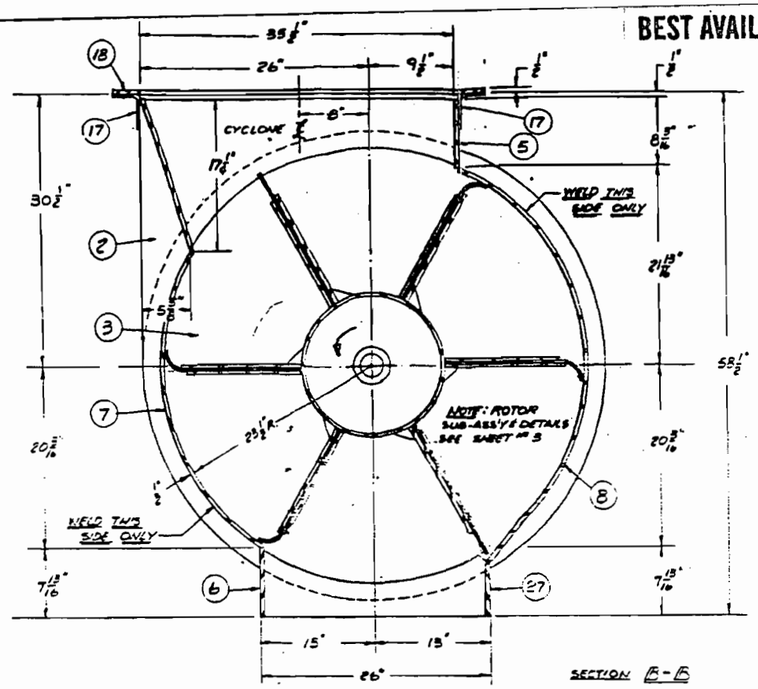
MATERIAL LIST NO | PARTS LIST NO

NO	REVISION	DATE	BY	INC	REVISION	DATE	BY

CUSTOMER	RESOURCE RECYCLING
LOCATION	PINELLAS COUNTY, FL
TITLE	SELF-CLEANING WATER TANK 3"GORMAN-RUPP RECYCLING PUMP.
DWN BY	H.MOEHLER
CHK'D BY	
SCALE	
APPROVED BY	
DATE	7/14/89
ISHT NO	
NO OF ISHT'S	
ISSUE	
DWG NO	180-386-01

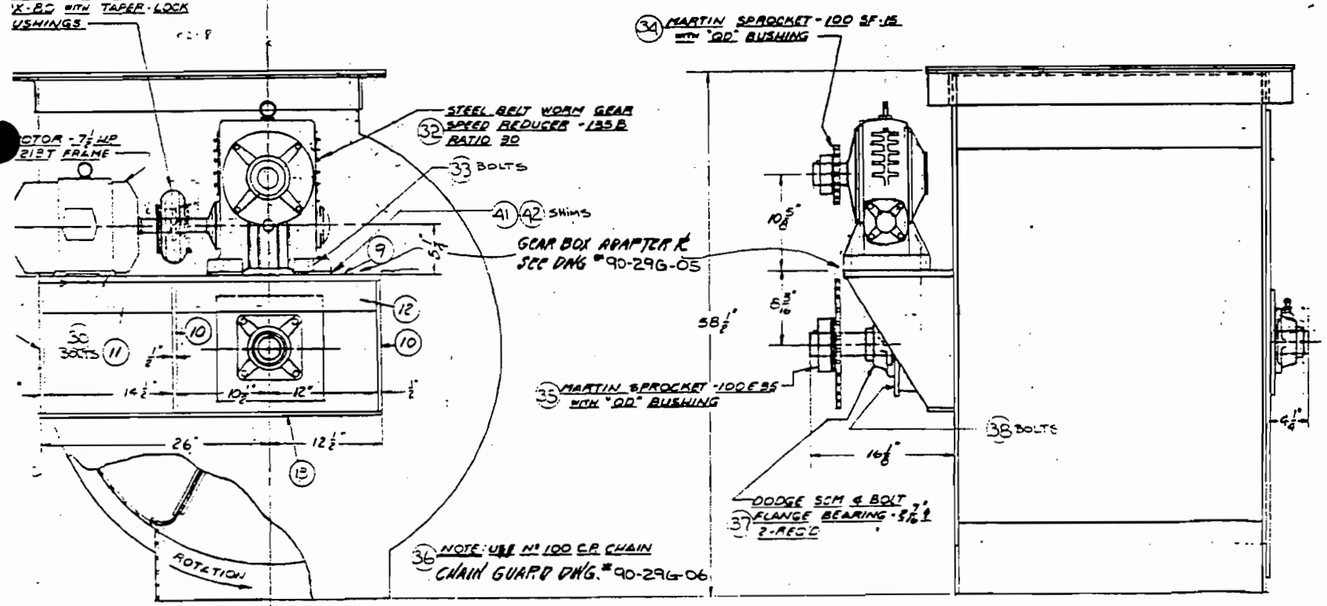
NEWELL INDUSTRIES, INCORPORATED
P.O. BOX 10625 SAN ANTONIO, TEXAS 78210



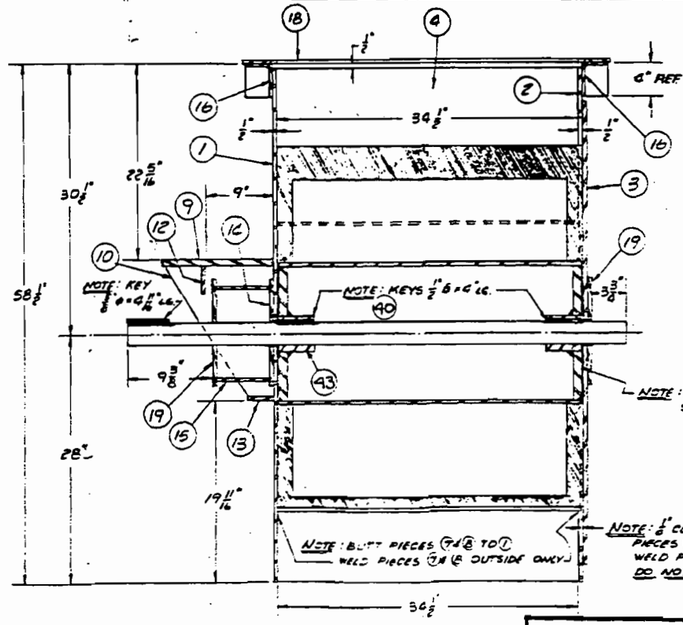


SECTION B-B

ITEM	SECTION	THK/SIZE	LENGTH	WIDTH	U/M	QTY	
1	PLATE	1/2"	58	52	SQ.IN.	1	
2	PLATE	1/2"	58	52	SQ.IN.	1	
3	PLATE	1/2"	52 Ø		SQ.IN.	1	
4	PLATE	1/2"	34.5	18.125	SQ.IN.	1	
5	PLATE	1/2"	34.5	8.1875	SQ.IN.	1	
6	PLATE	1/2"	34.5	7.8125	SQ.IN.	1	
7	PLATE	1/2"	34.5	37	SQ.IN.	1	
8	PLATE	1/2"	53.125	34.75	SQ.IN.	1	
9	PLATE	1"	38.875	12.25	SQ.IN.	1	
10	PLATE	1/4"	15	12.25	SQ.IN.	3	
11	PLATE	1/2"	14.5	3	SQ.IN.	1	
12	PLATE	1/2"	14.5	3	SQ.IN.	1	
13	PLATE	1/2"	14.5	3	SQ.IN.	1	
14	PLATE	1/2"	12	12	SQ.IN.	1	
15	PIPE	10" Ø	5.75		IN	1	
16	ANGLE	3 X 4 X 1/4"	36		IN	2	
17	ANGLE	3 X 4 X 1/4"	41.5		IN	2	
18	PLATE	1/2"	42	42	SQ.IN.	1	
19	PLATE	1/2"	12	12	SQ.IN.	2	
20	PIPE	16" Ø	34.75		IN	1	
21	PLATE	1"	15.25 Ø		SQ.IN.	2	
22	PLATE	1/4"	31.25	13	SQ.IN.	6	MILD STEEL PLATE
23	PLATE	3/8"	31.25	13.5	SQ.IN.	6	
24	BELTING	3/8"	35.375	16.5	SQ.IN.	6	
25	PLATE	1/4"	3	2	SQ.IN.	24	
26	TEFLON	1/8"	15.25 Ø		SQ.IN.	2	
27	ROUND BAR	2 7/16" Ø	56.5		IN	1	CRS (C-1018)
28	BOLT	1/2" Ø-13UNC	1.5		EA	36	W/ NFL-(FOR RUBBER WIPERS)
29	MOTOR	213T-7 1/2 H.P.			EA	1	1800RPM,TEFC, RELIANCE
30	BOLT	3/8" Ø-16UNC	2.5		EA	4	W/NFL-(MOTOR MOUNTING)
31	COUPLING	W/BUSHINGS			EA	1	DODGE PARA-FLEX COUPLING
							PX-80 W/TAPER LOCK BUSHINGS
							MOTOR SIDE 1 3/8"
							REDUCER SIDE 1 1/2"
32	REDUCER	WORM GEAR				1	REYNOLD ROOT MOUNTED WORM GEAR
							REDUCER TYPE W.U. SIZE 5 RATIO 30:1
					OR		RADACON AV-500, 30:1 LEFT HAND
							GEAR REDUCER
					OR		STEEL BELT WORM GEAR
							SPEED REDUCER 135B RATIO 30:1
33	BOLT	3/4" - 10UNC	3 1/2"		EA	4	W/NFL (REDUCER MOUNTING)
34	SPROCKET				EA	1	MARTIN-100SF.15 W/ 2" O.D. BUSHING
							TO SUIT GEARBOX OUTPUT (DRIVE)
35	SPROCKET				EA	1	MARTIN-100E 35 W/O.D. BUSHING
							2 7/16" (DRIVEN)
36	CHAIN	#100			EA	1	#100 CHAIN W/MASTER &
							HALF LINK, 60 PITCHES
37	BEARING	2 7/16"			EA	2	DODGE SCM 4 BOLT FLANGE
							BEARING 2 7/16" Ø
38	BOLT	5/8" X 11UNC	1.5		EA	8	W/NFL (FLANGE BEARING MOUNTING)
39	KEYSTOCK	5/8" X 5/8"	4.6875		EA	1	AIRLOCK DRIVEN SPROCKET
40	KEYSTOCK	1/2" X 1/2"	4		EA	2	AIRLOCK SHAFT TO DRUM
41	PLATE	1/2"				2	GEAR REDUCER SHIM PLATE
42	PLATE	1/4"				2	GEAR REDUCER SHIM PLATE
43	PLATE	4"	4"	4"		2	BUSHINGS FOR SHAFT-DRUM CONNECTION
44	FLATBAR	1/8" X 4"	96"			1	CHAIN GUARD COMPONETS # 2059
45	EXPANDED METAL	1/2" - # 16	37"	20"		1	CHAIN GUARD COMPONENT # 2059
46	BOLT	1/2" - 13 UNC	2"			4	W/ NFL CHAIN GUARD DETAILS



SECTION A-A



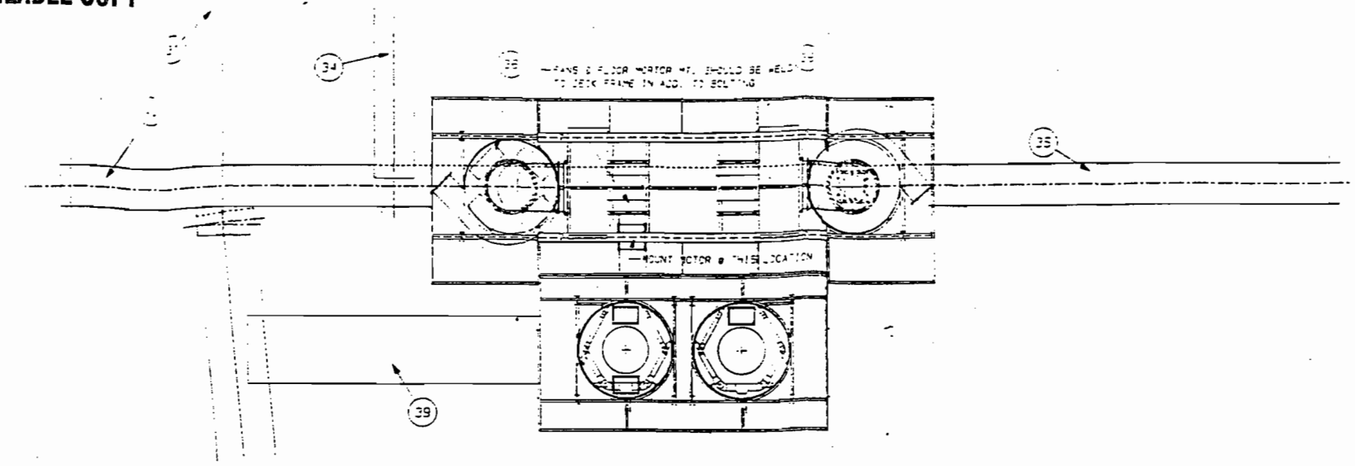
SECTION A-A

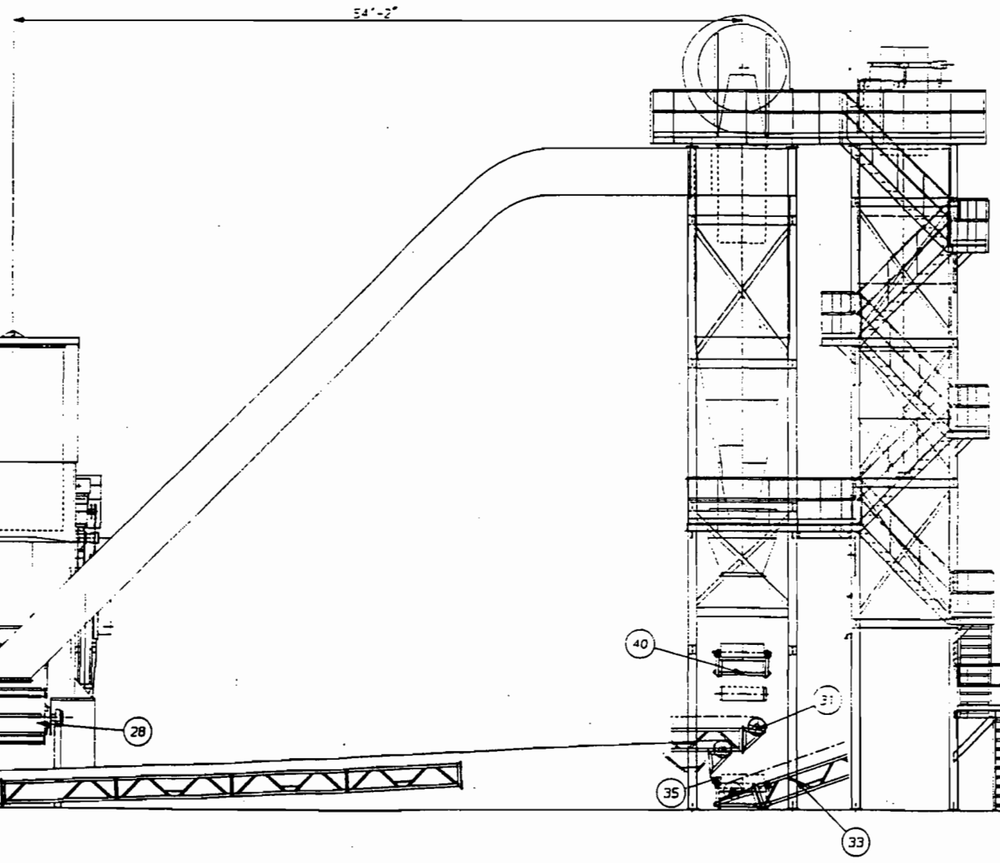
REV.	REVISION	DATE	BY
1	REDRAWN & REC'D	2 JUNE 76	PT

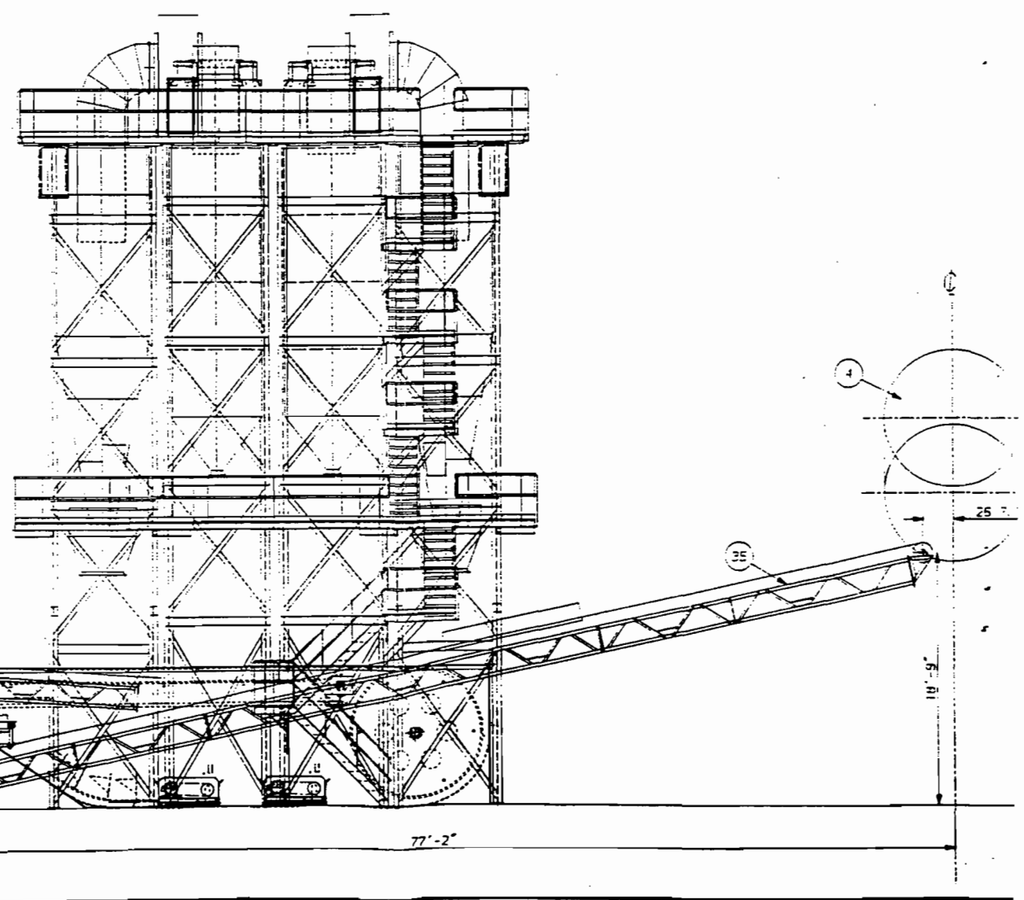
NEWELL MANUFACTURING COMPANY
P. O. BOX 6132 726 PROBANDT ST. SAN ANTONIO, TEXAS 78207

PART: 8 FT. DIA. AIRLOCK

Scale	Drawn By	Checked By
1/2"=1'-0"	P. TREVIÑO	
Date	Sheet No. /	Drawing No.
27 MAY 76	No. of Sheets 5	180-36E-01







REMARKS:

MATERIAL LIST NO | PARTS LIST NO

NO.	REVISION	DATE	BY	NO.	REVISION	DATE	BY

CUSTOMER: RESOURCE RECYCLING

LOCATION: PINELLAS COUNTY, FL

TITLE: ELEVATIONS OF AIR SYSTEM W. SCRUBBER.

DWN BY: K.SCHILER | CH'KD BY:

SCALE: 1/8"=1'-0" | APPROVED BY:

NEWELL INDUSTRIES, INCORPORATED
P.O. BOX 10629 SAN ANTONIO, TEXAS 78

DATE 3/24/89 | SHT. NO. | NO. OF SHT'S.

DWG NO 1B2-35A-01

SCWT
OPERATION
("wet" systems)

The water used to wash the ferrous material at the magnet stand and to separate the trash from the nonferrous product at the water column is collected and recirculated from the self cleaning tank. This steel tank is 8 feet (2.43 m) wide by 10 feet (3 m) deep and 54 feet (16.5 m) long. The tank has a 23,000 gallon (87,064 liters) capacity. The tank, for the most part, is below grade. Portions of its drag chain conveyor and skimmer conveyor systems, with their attendant drive motors, are above grade and exposed. Joined to the side of the tank are three clear water well pump sumps where the water system pumps pick up clean water for re-circulation to the shredder, water column and magnet sprays. Water flow to the sump is through a 24" pipe that passes from wall to wall of the tank penetrating the tank on the sump side. The lower quarter of the pipe is open to the tank. Water flows to the tank by gravity. The pumps are designed to handle the dirty water and possible solids that may be recirculated. All water is recirculated. The only water lost during plant operation is from evaporation and absorption by the trash and dirt. It is our experience that approximately 10 -15 gallons of water are lost per ton of shredded ferrous product. This will vary according to the type and quantity of material being shredded.

DRAG CHAIN

Incorporated into this tank is a drag type conveyor designed to clean the sediment from the bottom of the tank on a continuous basis. This conveyor is 8 feet (2.5 m) wide by 60 feet (18.28 m) long and is powered by a 2 HP (1.5 kw) gearmotor. The drag consists of a loop of chain running on each side of the tank driven by a common shaft at a speed of 10 feet (3 m) per minute. The two chains are joined by scraper bar elements that ride above the tank and enter the tank over a drag return ferris wheel where the scraper elements are taken to the bottom of the tank. As they drag along the bottom they move the sediment collected by the water system to the opposite end of the tank and up an incline to be dumped on to the sludge conveyor.

SKIMMER CHAIN

Under the drag chain return, at the waters surface, is a skimmer conveyor used to move the floating particles on the top of the water to the incline end of the tank where the drag chain exits the water. As each drag element comes up the incline it take some of the floating debris with it to the discharge. The skimmer is similar in construction to the drag chain but is designed so that the lower section of the chain and its scraper bar elements move along just at the waters surface. The skimmer conveyor is 8 feet (2.5 m) wide by 40 feet (12.2 m) long and is powered by a 2 HP (1.5 kw) gearmotor moving the skimmer at 10 feet (3 m) per minute.

SELF CLEANING WATER TANK OPERATION

The self cleaning water tank receives all of the run off water from all uses around the plant. In the ideal situation the tank level is at the middle of the lower skimmer scraper

elements. To maintain a level in the tank make up water must be added continuously at the same rate that evaporation and capture in fibrous waste is taking water away from the system. The amount of make up water will vary with the type of material being processed and with local daily temperature and humidity. Make-up can be expected to be from 10 to 15 gallons per ton of ferrous product. Good record keeping and alert operators will soon determine proper adjustments for make-up water flow.

The skimmer and drag chain are normally started and stopped from the control tower during routine plant operations in accordance with the plant light off procedure outlined in the plant operations section. Although not recommended, either the drag chain or skimmer can be shut down for short periods of time or can be independently operated without seriously affecting overall plant operation. It is recommended that the drag chain skimmer and down stream waste conveyors be aloud to run for as long as practical after plant operations to remove as much sediment as possible. The skimmer and drag chain have local electrical disconnects for emergencies and for isolation during maintenance

SELF CLEANING WATER TANK MAINTENANCE

The self cleaning water tank system should be visually inspected several times per hour during plant operations. The operators should look for any problems that could lead to the need for an extended shutdown. Problems found and noted should be corrected between shifts or during other shutdown or maintenance periods. Operators should watch for;

1. Loose nuts, bolts or fasteners.
2. Proper tension in drag chain, skimmer chain, their speed reducer drive chains and speed reducer drive belts.
3. Motor, motor bearing, and bearing temperatures.
4. Loose or broken scraper paddles on drag or skimmer chains.
5. Accumulations of waste that if caught in the system could cause damage to a system or component.
6. Clogged Pump Sump screen.

DRAG CHAIN MAINTENANCE

Under normal conditions the drag chain itself will require little maintenance other than visual inspection and occasional changing or replacing of a paddle. However, normal operation and wear will require periodic maintenance to the drag chain drive unit.

CHAIN MAINTENANCE

The drag chain is made up of individually detachable links with special links pinned into the strand to hold the drag paddles. Each link is attached to the next with a link pin

secured by a cotter pin. The chains are driven by sprockets on a drive shaft at the extreme end of the goose neck discharge of the self cleaning water tank system. The length of the chain is adjusted during installation and in general should not be changed. If the chain is removed the only precaution in re-installing it is to be sure that all of the paddle are perpendicular to the chain.

NOTE: If the chain breaks it is generally due to overloading from an excessive build up of sediment. Should chain breakage become a problem contact Newell Industries before adding paddles or modifying drag chain speed.

If the chain is to be broken for maintenance it is recommended that the work be performed on the upper span. Create a work area by placing planks across the water tank at a convenient location. Move the portion or the chain to be worked on over the planked area by operating the chain drive. To obtain slack in the chain electrically disconnect and lock or tag the Drag and Skimmer Chain motor drives and then block the drag chain return wheel. With the return wheel blocked move the drag chain drive belt by hand in the normal direction until sufficient slack is obtained to accomplish the work. The assistance of a come-a-long is suggested and may be required. When the work is complete remove the slack prior to removing the block from the return wheel.

DRAG CHAIN LUBRICATION

The Drag Chain itself needs no lubrication except that during extended shutdowns the chain should be sprayed or brushed with a heavy oil to minimize corrosion.

The drive shaft rides in pillow block self aligning bearings mounted on the side end walls of the goose neck. The bearings should be lubricated according to the overall to a plant lubrication schedule with 6 ounces of NLGI grade #2 lithium based grease at a frequency of once per week. See Appendix A-5 on general lubrication information.

DRAG CHAIN MOTOR DRIVE MAINTENANCE

The drag chain motor drive consists of a 2 HP (1.5 kw), gearmotor speed reducer. The speed reducer turns the drag chain drive shaft through a set of sprockets and a roller chain. The speed of the drag chain is approximately 10 feet (3 m) per minute.

DRAG CHAIN DRIVE MOTOR MAINTENANCE

Under normal operating conditions the Drag Chain Drive Motor should not require maintenance beyond lubrication as called for in the overall plant lubrication schedule.

DRAG CHAIN DRIVE MOTOR REPLACEMENT

Should it become necessary to remove the Drag Chain Drive Motor follow the steps outlined below:

1. Secure electrical power to the Drag Chain Drive Motor at the local disconnect switch. Lock or tag the switch OFF.

2. Open the terminal box on the motor, wire mark and disconnect the electrical leads. Remove the power leads from the terminal box.

4. Remove the motor mounting bolts and remove the motor for the necessary work.

5. Replace the motor by reversing these steps

DRAG CHAIN DRIVE REDUCER MAINTENANCE

The Drag Chain drive reducer requires little to no maintenance. The reducer is oil lubricated with an EP C-LP gear oil with a viscosity of ISO VG 220. For best operation the oil should be changed after 10,000 hour or 2 years, which ever is shorter;

Keep the oil level with in specifications listed on the reducer name tag.

DRAG CHAIN DRIVE, CHAIN MAINTENANCE

The Drag Chain Drive chain requires little maintenance beyond periodic lubrication and possible length reduction as components age. The chains length between the reducer and the Drag Chain sprocket shaft is designed to a specific shaft to shaft center distance for new sprockets. When the catenary sag becomes excessive it is necessary to remove a link from the chain and replace it with a half-link. See Appendix A-4 for additional information on chain care, ware and repair. The chain should be lubricated by brushing on a pure mineral oil at regular intervals depending on the season and other environmental conditions with the viscosity of the oil selected according to seasonal temperature;

-20°F to +40°F SAE 20 W

40°F to 100°F SAE 30 W

If one or the other of the sprockets is moved the sprockets should be checked for alignment before the chain is re-installed. This can be done by spanning the two sprockets with a straight edge or string. When in alignment the two sprocket faces will be exactly parallel.

SKIMMER CHAIN MAINTENANCE

The skimmer chain is very similar to the drag chain. It is driven by a sprocket on a drive shaft near the base of the goose neck. The length of the chain is adjusted during installation and in general should not be changed. If the chain is removed be sure that all of the paddles are perpendicular to the chain when re-installed.

NOTE: If the chain breaks it is generally due to an excessive build up of floating debris. Should chain breakage become a problem contact Newell Industries before adding paddles or modifying skimmer chain speed.

If the chain is to be broken for maintenance it is recommended that the work be performed on a work area established above the tank as discussed above for the drag chain. To obtain slack loosen the tail shaft take-up adjustments. When the work is complete the tail shaft take-up must be adjusted so that the sag behind the drive sprocket extends to the base of the gooseneck at least two feet beyond the start of the skimmer return skid bars.

SKIMMER CHAIN LUBRICATION

The Skimmer Chain itself needs no lubrication except that during extended shutdowns the chain should be sprayed or brushed with a heavy oil to minimize corrosion.

The drive shaft rides in self aligning flange bearings mounted on the side walls at the base of the goose neck. The bearings should be lubricated according to the overall plant lubrication schedule with 2 ounces of NLGI grade #2 lithium base grease at a frequency of at least once per week. See Appendix A-5 on general lubrication information. The idler and tailpiece shaft bearings are of the same model and should be greased in this same manner.

SKIMMER CHAIN MOTOR DRIVE MAINTENANCE

The drag chain motor drive consists of a 2 HP, (1.5 kw), gearmotor. The speed reducer turns the skimmer chain drive shaft through a set of sprockets and a roller chain. The speed of the skimmer chain is approximately 10 feet (3 m) per minute.

SKIMMER CHAIN DRIVE UNIT MAINTENANCE

Skimmer drive motor and drive unit maintenance is to be accomplished using the procedures and steps above for the drag chain drive unit above.

WATER PUMP SYSTEM
("Wet" Systems)

The wet processing of scrap requires large volumes of water at high flow rates. This is provided for by a large Self Cleaning Water Tank, described in the previous section, and four self priming pumps. These pumps supply water for injection into the shredder, for the spray lines at the two magnetic drums, and for the water current separator. Most of the water used in the system flows by gravity back to the water tank but some make up water is need on a continuous basis to make up for evaporation and water captured by the waste material.

The pumps take suction on the water tank from screened sumps built on to the side of the tank. The screen prevents large solid objects from entering the pumps. The pumps are designed to handle solid-laden liquids and have a removeable cover plate that allows the impeller to be taken out and cleaned should it become necessary.

WATER PUMP AND WATER SYSTEM OPERATION

The pumps are started and stopped from the control tower during the plants normal start up and shut down procedure. Any or all of the pumps can be operated independent of plant operation for maintenance or repair check outs. Separate isolation switches are mounted near the pumps for emergences and for isolation during maintenance.

Piping and valve line ups are installed by a separate contract connecting the provided pumps to the provided piping on the systems that require water. Valves are provided for the adjustment of flow at the individual equipments served by the pumps.

The pumps and their motors should be inspected daily for unusual noises, overheating, pump oil levels and any other condition that could lead to an unscheduled shutdown.

Pump and motor lubrication schedules should be included in the overall plant lubrication plan.

WATER PUMP MAINTENANCE

For information on the maintenance of the pumps and for a parts listing for the pumps see the Manufacturers manuals supplied at the end of this manual.

CAUTION
Do not operate this machine without guards in place.
Do not remove guards except where required for maintenance.
Do not clean, lubricate, adjust, or repair machine while in motion.

WARNING

Prior to performing any work on the pumps or their motors disconnect the motors electrically at the local disconnect switch and tag or lock the switch in the OFF position.

WATER PUMP MOTOR REPLACEMENT

1. Remove belt guard.

2. Loosen or remove the motor mount bolts. Loosen bolts at least enough to move motor so that the drive belt can be removed without distorting or forcing it.

3. Remove drive belt

4. Open the motor terminal box , mark, disconnect, and remove supply leads from the terminal box.

5. Remove motor.

6. Replace the motor by reversing these steps and go to the sheave alignment section below.

WATER PUMP SHEAVE ALIGNMENT AND BELT TENSION ADJUSTMENT

1. With the motor in position determine if the shaft of the motor is parallel to the shaft of the pump. This can be determined with a straight edge or a string placed near the diameters of the sheaves and spanning the two sheaves so that the straight edge or string touches the sheaves at all edges. (Move the drive (motor) sheave along the shaft as necessary.) (Check both sides of the shaft center lines.)

NOTE: With the manufacturers supplied equipment the sheave faces at the pitch diameter, (see Appendix A-4), is the same thickness, so that when the sheave faces are parallel the belt is also aligned on the sheaves. If another brand or a different style of sheave is used for either of the original sheaves this procedure will only determine that the sheaves (shafts) are parallel.

2. Once the shafts are parallel, (sheave faces parallel), snug the motor mount bolts.

3. If necessary, see note just above, move the motor sheave to get the V-belt groves aligned.

NOTE: If not original equipment the belt alignment will have to be determined by moving the motor sheave along the motor shaft a distance equal to the difference in thickness of the faces of the two sheaves at their pitch diameters. An alternate procedure is to place a piece of straight round stock of appropriate diameter and length into the belt groove of the larger

sheave and then moving it down into the same groove of the smaller sheave. When sheaves are properly aligned it will fall into the small sheave groove exactly.

4. With sheaves aligned, proper belt tension is achieved by loosening the motor mount bolts just enough that the motor can be tapped with moderate blows from a rubber or leather mallet or mechanically pried away from the pump to achieve tension in the drive belt. Continue checking tension and alignment often.

5. Proper belt tension is achieved on the pump drive belts when it takes XX lbs (see table) of force to deflect the belt at its mid point between the sheaves XX of an inch. See table S-1 on the following page and see Appendix A-4 for further discussion.

Pump	Pounds (Old Belt)	Pounds (New Belt)	Deflection Distance
10" RCS	12.7*	18.9**	5 / 8 " (15.8 mm)
4" Magnet Spray	12.7*	18.9**	11/16" (17.5 mm)
4" Mill Water	12.7*	18.9**	9/16 " (14.3 mm)

* 12.7 pounds force = 56.5 Newtons = 5.76 kilograms force
* * 18.9 pounds force = 84 Newtons = 8.5 kilograms force

Table S-1

6. When proper tension is reached recheck alignment and tighten motor mount bolts.

NOTE: If a new belt is installed its tension should be checked to the old belt value after 8 hours of operation. It should be checked for slippage several times during this eight hour period. Do not attempt to over tension the belt to prevent having to adjust it later. Over tensioning can cause damage to the belt and damage to shaft bearings.

Re-connect electrical power to the motor and test run the pump.

WARNING

Return BELT GUARDS to their proper safety position prior to full operation.

WATER PUMP CLOG REMOVAL

The pump is designed for quick clog removal but do not attempt to work on the pump without disconnecting and tagging or locking the local disconnect switch in the OFF position.

1. Disconnect power to the pump motor.

2. Remove the access plate below the pump suction line, (opposite the drive shaft).

3. Inspect the pump suction area and remove any material clogging any of the suction passages.

4. Replace the access cover, reconnect power and continue operation.

WATER PUMP REPLACEMENT

WARNING

Do not operate this machine without guards in place.
Do not remove guards except where required for maintenance.
Do not clean, lubricate, adjust, or repair machine while in motion.

Prior to performing any work on the pumps or their motors disconnect the motors electrically at the local disconnect switch and tag or lock the switch in the OFF position.

1. Remove belt guard.

2. Loosen or remove the motor mount bolts. Loosen bolts at least enough to move motor so that the drive belt can be removed without distorting or forcing it.

3. Remove drive belt

4. Remove bolts from and disconnect inlet and discharge flanges.

5. Remove the pump mounting bolts and remove the pump for repair or replacement.

Pump replacement is the reverse of these steps but requires sheave and belt tension adjustments before restoring power. See pertinent articles above.

-Q-
AIR RECLAMATION

AIR SYSTEMS
(Shredder, Air Separator and Scrubber)

The Air Systems and the Scrubber, although generally treated as auxiliaries, are an important and vital part of the Dry Shredding separation system. The Air Systems provide for a significant amount of the separation process and provide the vehicle for the transport of the waste material to the waste disposal area. The Scrubber, if used, is usually necessary to meet Federal, State and local air pollution standards. In some locals an additional bag house filter is required to meet standards.

The Air Systems consist of a large centrifugal fan, a cyclone separator and the associated duct work. The fans are usually located on top of the cyclone separators, but in special cases have been located on the ground. Regardless of the fans location or mounting position it takes suction on the cyclone through a penetration in the top of the cyclone reaching down into the upper section of the cyclone.

The cyclone separator is of standard high efficiency design and will include some means of collecting and disposing of the waste material. Some will have a collection hopper at the bottom, that will require periodic emptying, while others will have a rotating vane air lock that allows the waste to continuously leave the system.

The size of the fan, cyclone and duct work are determined by the size of the shredder and the anticipated rate of production. The air flow rate is also determined by the production rate but may have to be adjusted to the to the type of material that will be processed. The air flow rate is chosen as optimal for the cyclone by the selection of the sheave and pulley sizes at the time of order. Should the air flow rate need to be changed the sheave and pulley sizes can be changed, within limits, to make the adjustments.

The Air System(s) you have may be very basic, as described in the first paragraph, or it/they may be somewhat more complicated to meet special requirements or desires. Added devices may include air splitters, air locks, scrubbers, bag houses and special pickup hoods. The fans, air lock and scrubber are described below. If other special equipments have been delivered supplemental and/or manufacturers information will be included at the back of the manual to give you information on these special items.

OPERATION

The Air Systems are activated and deactivated in accordance with the standard plant startup and shutdown procedures. They may be operated independently for repair, maintenance or adjustment without affecting other operations or equipments. The air system fans and the air lock drive motor will have local cut out switches for emergencies and for component isolation during maintenance and repair work.

Some large fans have have large motors requiring a reduced voltage starter. These units may sound as if they are shifting gears when they start up, but this is normal phenomena for them. However if any other noise, jerkiness or vibration comes from a fan it is well worth checking at the first available opportunity.

MAINTENANCE

-GENERAL

Air system maintenance will consist mainly of inspections, while running in full operation, checking for unusual noises in the fan or fan motor, cracks in welds, integrity of explosion panels, condition of paint and the general condition of the cyclone, cyclone fan, ducting, scrubber and the associated supports and fasteners. The Air Lock, if included in your system should be inspected regularly too. Check the motor and motor bearings for overheating, check the reduction gear for oil leaks, noises, and the oil level.

During shutdown periods all of the components of the Air System need a closer inspection, especially to check the interior conditions of the cyclone, scrubbers and the fans. Excessive build up in the cyclones, or the scrubber, can lead to inefficiencies and carry overs of dirt, dust and particles to the atmosphere. Buildups of material on the fan blades, to the point that they have caked up and may come off in pieces, can mean potential trouble from a fan that could become seriously out of balance. Remove excessive buildups with water hoses and/or scrapers. These buildups on the fan blades and in the fan housing can also lend to inefficiencies.

Another item to watch for is the abrading action of the fines moving in the ducts and into the cyclones. Over time this "sand blasting" can wear its way through very thick metals. Watch for signs of extensive abrasion in the bends of the ducting and at the inlet area of the cyclones. Generally "tracks" can be seen where the abrasive materials have polished the metal surface. Should it be determined that an area is getting very thin, the whole section should be cut out and replaced. In the duct work, most often a bend is a separate piece that can be replaced.

FAN -REPLACEMENT

Under normal circumstances an Air System fan should last the life of the plant, providing normal reasonable care is given. If through the fault of a major accident, or for any other reason, it becomes necessary to replace a fan or the fan motor use the outline provided below.

1). Disconnect electrical power and lock the electrical disconnect at its main breaker.

2). Open the terminal box on the motor, mark the leads, disconnect all leads, and remove the supply leads from terminal box.

NOTE: If the entire fan is being removed, the motor, sheaves and belts do not need disturbed at this point. Go to the next numbered paragraph. If only the motor needs removed follow the outline of the sub-paragraphs below.

(a) Take the tension out of the drive belts by adjusting the motor mounting plate. Remove the drive belts

MAINTENANCE

(b) Remove the lower motor mounting bolts. Loosen the upper bolts. Insert a lifting eye into the motor and attach appropriate rigging. Take the weight of the motor and carefully remove the upper motor mounting bolts.

(c) Lower the motor to the ground, and proceed with the necessary work.

(d) Replace at the motor using the above steps in reverse.

(e) Connect the electrical supply to the motor.

(f) Apply electrical power momentarily to the motor and observe the direction of rotation of the motor shaft.

(g) If rotation direction is incorrect change over the electrical supply connections to the motor and check again.

(h) When rotation is proved correct install the the drive belts and check and adjust sheave alignment and belt tension.

3). Remove the bolts from the fan to cyclone duct.

4.) Remove the fan pedestal bolts from the support floor.

5.) With proper cranes, straps and rigging remove the fan.

6). Replace the fan by reversing these steps.

It is assumed that if the entire fan, pedestal, motor etc. is removed to a shop area, and that it will return with all adjustments made and will only require bolting in place and electrical connection, to be returned to service. Sheave alignment and belt tension adjustment, in the shop or in place, are covered below.

FAN - SHEAVE ALIGNMENT

With the driven sheave in place and the drive belts on, motor sheave alignment and belt tension is adjusted by turning the motor mounting plate turnbuckle, and by moving the motor sheave along the motor shaft until it is exactly parallel and in line with the driven sheave.

Sheave alignment can be determined with a straight edge or a string placed near the diameters of, and spanning the two sheaves, so that the straight edge or string touches the sheaves at all edges. (Check both sides of the shaft center line.)

MAINTENANCE

With the Newell supplied equipment the sheave faces at the pitch diameter is the same thickness, so that when this condition is met the belt is also aligned on the sheaves. If another brand or a different style of sheave is used for either of the original sheaves this procedure will only determine that the sheaves (shafts) are parallel. In this case belt alignment will have to be determined by moving the motor sheave along the motor shaft a distance equal to the difference in thickness of the faces of the two sheaves at their pitch diameters. An alternate procedure is to place a piece of straight round stock, of appropriate diameter and length, into the belt groove of the larger sheave and then moving it down and into the same groove of the smaller sheave. When sheaves are properly aligned it will fall into the small sheave groove exactly.

FAN- BELT ADJUSTMENT

With sheaves aligned proper belt tension is achieved by loosening or tightening the turnbuckle attached to the motor mount plate. Loosen or tighten the turnbuckle as necessary until proper tension is achieved.

Proper belt tension for air system fans varies from installation to installation because of the custom nature of air systems. The belt tensions for a given installation will be supplied separately.

When proper tension is reached tighten the jamb nut on the turnbuckle. Recheck alignment and adjust motor mount plate bolts as necessary to achieve correct alignment and belt tension.

NOTE: If a new belt is installed its tension should be checked to the old belt value after approximately 8 hours of operation. A new belt should be checked for slippage several times during this eight hour period. Do not attempt to over tension the belt to prevent having to adjust it later. Over tensioning can cause damage to the belt and damage to shaft bearings.

AIR SCRUBBER

The Newell Scrubber System is made up from a Newell Scrubber and a Self Cleaning Water Tank. The Newell Scrubber consists of concentric cylinders, the outer one being sealed to the inner one at the top, and the inner cylinder passing down through the outer one to a point just short of the length of the outer cylinder. The bottom of the outer cylinder is coned into a discharge transition.

In operation dirty air is fed tangentially into the top of the outer cylinder. It then passes around and down between the two cylinders through a field of water spray nozzles which, in combination with centrifugal force, scrub dirt and dust particles from the air. The dirty water continues to fall and drains from the bottom of the scrubber. The majority of the air flows up the center of the inner cylinder and is discharged to the atmosphere. The waste material removed by the scrubber leaves with the water and drains to a settling tank, the Self Cleaning Water Tank. The material that settles out of the water is removed from the settling tank by a self cleaning scraper conveyor that reaches into the bottom of the tank. The water from the tank is pumped back up to the scrubber nozzles.

- OPERATION

The scrubber for an air system is included in those air systems with cyclones that have a fine dust carry over from the cyclone to the atmosphere. By adding a water spray scrubber unit the air discharge quality can be made much higher. The scrubber itself is passive in operation, in that it has no moving parts. However it does depend on a constant flow of water from some source; usually from the self cleaning water tank which is included with the scrubber. The Scrubber is in operation when the associated air system is operating and the scrubber has a flow of water to it in the proper amount.

-MAINTENANCE

Maintenance on the scrubber unit consists of visual inspections for signs of excessive corrosion, loose or missing fasteners, and the general integrity of the support structure.

SELF CLEANING WATER TANK

The water used to "scrub" the Air System air is collected and recirculated from the self cleaning tank. This steel tank is 5 feet 9-1/2 inches (1.76 m) wide by 10 feet (3 m) deep and 47 feet 9 inches (14.6 m) long. The tank has a 16,000 gallon (60,563 liters) capacity. The tank is built above grade. The scraper chain conveyor and skimmer conveyor systems, with their attendant drive motors and reduction gears are above grade and exposed. Joined to the side of the tank is the water pump suction where a pump picks up clean water for re-circulation to the scrubber sprays. Water flows from the scrubber to the tank by gravity. The pump is designed to handle the dirty water and possible solids that may be recirculated. All water is recirculated. The only water lost during plant operation is from evaporation and absorption by the trash and dirt.

-SCRAPER CHAIN

Incorporated into this tank is a scraper type conveyor designed to clean the sediment from the bottom of the tank on a continuous basis. This conveyor is 5 feet 9 inches (1.75 m) wide by 48 feet (14.7 m) long and is powered by a 2 HP (1.5 kw) gear/motor. The scraper consists of a loop of chain running on each side of the tank driven by a common shaft at a speed of 18 feet (5.5 m) per minute. The two chains are joined by scraper bar elements that ride above the tank and enter the tank over a scraper return ferris wheel where the scraper elements are taken to the bottom of the tank. As they scrap along the bottom they move the sediment collected by the water system to the opposite end of the tank and up an incline to be dumped into a sludge bunker or onto a waste/sludge conveyor.

-SKIMMER CHAIN

Under the scraper chain return, at the waters surface, is a skimmer conveyor used to move the floating particles on the top of the water to the incline end of the tank where the scraper chain exits the water. As each scraper element comes up the incline it take some of the floating debris with it to the discharge. The skimmer is similar in construction to the scraper chain but is designed so that the lower section of the chain and its scraper bar elements move along just at the waters surface. The skimmer conveyor is 5 feet 9 inches (1.75 m) wide by 28 feet 6 inches (8.7 m) long and is powered by a 2 HP (1.5 kw) gear/motor moving the skimmer at 38 feet (11.6 m) per minute.

-OPERATION

The self cleaning water tank receives all of the run off water from the scrubber. In the ideal situation the tank level is at the middle of the lower skimmer scraper elements. To maintain a level in the tank make up water must be added continuously at the same rate that evaporation and capture in fibrous waste is taking water away from the system. The amount of make up water will vary with the type of material being processed and with local daily temperature and humidity. Make-up can be expected to be from 1.0 to 1.5 gallons per ton of ferrous product. Good record keeping and alert operators will soon determine proper adjustments for make-up water flow.

SELF CLEANING WATER TANK

The skimmer and scraper chain are normally started and stopped from the control tower during routine plant operations in accordance with the plant light off procedure outlined in the plant operations section. Although not recommended, either the scraper chain or skimmer can be shut down for short periods of time or can be independently operated without seriously affecting overall plant operation. It is recommended that the scraper chain skimmer and down stream waste conveyors be aloud to run for as long as practical after plant operations to remove as much sediment as possible. The skimmer and scraper chain have local electrical disconnects for emergencies and for isolation during maintenance.

- MAINTENANCE

The self cleaning water tank system should be visually inspected several times per hour during plant operations. The operators should look for any problems that could lead to the need for an extended shutdown. Problems found and noted should be corrected between shifts or during other shutdown or maintenance periods. Operators should watch for;

1. Loose nuts, bolts or fasteners.

2. Proper tension in scraper chain, skimmer chain, their speed reducer drive chains and speed reducer drive belts.

3. Motor, motor bearing, and bearing temperatures.

4. Loose or broken scraper paddles on scraper or skimmer chains.

5. Accumulations of waste that if caught in the system could cause damage to a system or component.

6. Clogged Pump Sump screen.

SCRAPER CHAIN

Under normal conditions the scraper chain itself will require little maintenance other than visual inspection and occasional changing or replacing of a paddle. However, normal operation and wear will require periodic maintenance to the scraper chain drive unit.

-MAINTENANCE

The scraper chain is made up of individually detachable links with special links pinned into the strand to hold the scraper paddles. Each link is attached to the next with a link pin secured by a cotter pin. The chains are driven by sprockets on a drive shaft at the extreme end of the goose neck discharge of the self cleaning water tank system. The length of the chain is adjusted during installation and in general should not be changed. If the chain is removed the only precaution in re-installing it is to be sure that all of the paddle are perpendicular to the chain.

NOTE: If the chain breaks it is generally due to overloading from an excessive build up of sediment. Should chain breakage become a problem contact Newell Industries before adding paddles or modifying scraper chain speed.

If the chain is to be broken for maintenance it is recommended that the work be performed on the upper span. Create a work area by placing planks across the water tank at a convenient location. Move the portion or the chain to be worked on over the planked area by operating the chain drive. To obtain slack in the chain electrically disconnect and lock or tag the Scraper and Skimmer Chain motor drives and then block the scraper chain return wheel. With the return wheel blocked move the scraper chain drive belt by hand in the normal direction until sufficient slack is obtained to accomplish the work. The assistance of a come-a-long is suggested and may be required. When the work is complete remove the slack prior to removing the block from the return wheel.

-LUBRICATION

The Scraper Chain itself needs no lubrication except that during extended shutdowns the chain should be sprayed or brushed with a heavy oil to minimize corrosion.

The drive shaft rides in pillow block self aligning bearings mounted on the side end walls of the goose neck. The bearings should be lubricated according to the overall to a plant lubrication schedule with 6 ounces of NLGI grade #2 lithium based grease at a frequency of once per week. See Appendix A-5 on general lubrication information.

- DRIVE MOTOR

The scraper chain motor drive consists of a 2 HP (1.5 kw), gearmotor speed reducer. The speed reducer turns the scraper chain drive shaft through a set of sprockets and a roller chain. The speed of the scraper chain is approximately 10 feet (3 m) per minute.

SCRAPER CHAIN

-DRIVE MOTOR MAINTENANCE

Under normal operating conditions the Scraper Chain Drive Motor should not require maintenance beyond lubrication as called for in the overall plant lubrication schedule.

-DRIVE MOTOR REPLACEMENT

Should it become necessary to remove the Scraper Chain Drive Motor follow the steps outlined below:

1. Secure electrical power to the Scraper Chain Drive Motor at the local disconnect switch. Lock or tag the switch OFF.

2. Open the terminal box on the motor, wire mark and disconnect the electrical leads. Remove the power leads from the terminal box.

4. Remove the motor mounting bolts and remove the motor for the necessary work.

5. Replace the motor by reversing these steps

-DRIVE REDUCER MAINTENANCE

The Scraper Chain drive reducer requires little to no maintenance. The reducer is oil lubricated with an EP C-LP gear oil with a viscosity of ISO VG 220. For best operation the oil should be changed after 10,000 hour or 2 years, which ever is shorter;

Keep the oil level with in specifications listed on the reducer name tag.

-DRIVE CHAIN

The Scraper Chain Drive chain requires little maintenance beyond periodic lubrication and possible length reduction as components age. The chains length between the reducer and the Scraper Chain sprocket shaft is designed to a specific shaft to shaft center distance for new sprockets. When the catenary sag becomes excessive it is necessary to remove a link from the chain and replace it with a half-link. See Appendix A-4 for additional information on chain care, ware and repair. The chain should be lubricated by brushing on a pure mineral oil at regular intervals depending on the season and other environmental conditions with the viscosity of the oil selected according to seasonal temperature;

-20°F to +40°F SAE 20 W -40°F to 100°F SAE 30 W

If one or the other of the sprockets is moved the sprockets should be checked for alignment before the chain is re-installed. This can be done by spanning the two sprockets with a straight edge or string. When in alignment the two sprocket faces will be exactly parallel.

SKIMMER CHAIN

-MAINTENANCE

The skimmer chain is very similar to the scraper chain. It is driven by a sprocket on a drive shaft near the base of the goose neck. The length of the chain is adjusted during installation and in general should not be changed. If the chain is removed be sure that all of the paddles are perpendicular to the chain when re-installed.

NOTE: If the chain breaks it is generally due to an excessive build up of floating debris. Should chain breakage become a problem contact Newell Industries before adding paddles or modifying skimmer chain speed.

If the chain is to be broken for maintenance it is recommended that the work be performed on a work area established above the tank as discussed above for the scraper chain. To obtain slack loosen the tail shaft take-up adjustments. When the work is complete the tail shaft take-up must be adjusted so that the sag behind the drive sprocket extends to the base of the gooseneck at least two feet beyond the start of the skimmer return skid bars.

-LUBRICATION

The Skimmer Chain itself needs no lubrication except that during extended shutdowns the chain should be sprayed or brushed with a heavy oil to minimize corrosion.

The drive shaft rides in self aligning flange bearings mounted on the side walls at the base of the goose neck. The bearings should be lubricated according to the overall plant lubrication schedule with 2 ounces of NLGI grade #2 lithium base grease at a frequency of at least once per week. See Appendix A-5 on general lubrication information. The idler and tailpiece shaft bearings are of the same model and should be greased in this same manner.

- MOTOR DRIVE

The scraper chain motor drive consists of a 2 HP, (1.5 kw), gearmotor. The speed reducer turns the skimmer chain drive shaft through a set of sprockets and a roller chain. The speed of the skimmer chain is approximately 38 feet (11.6 m) per minute. Skimmer drive motor and drive unit maintenance is to be accomplished using the procedures and steps above for the scraper chain drive unit above.

AIR LOCK

The air lock, at the bottom of the air system cyclone, allows for continuous removal of the materials trapped by the cyclone while not loosing the low air pressure in the cyclone. The air lock is essentially a vane rotor rotating in a cylindrical cavity having a hole in the top and a hole in the bottom. Material falling into the top cavity between the vanes, when they are up, is rotated in the air lock body through a position with no opening to a position at the bottom with an opening to the outside of the cyclone, generally into a hopper or a waiting transport.

-OPERATION

The air lock should be turned on and in operation any time the cyclone is in operation. This is so to prevent the build up of material in the bottom of the cyclone, which could cause a carryover of dust to the atmosphere or scrubber. The air lock is turned on and off in accordance and in sequence with the normal startup and shutdown procedures.

The air lock can be operated independently for maintenance or repair check outs but the operator should be cautioned that it may contain dust, dirt or debris at any time. (Material may fall loose from the cyclone walls even when the cyclone is shutdown.)

-MAINTENANCE

The air lock, as all other equipment, needs inspected on a periodic basis. The operator, at least daily during operation, should look for deterioration, lose nuts and bolts, unusual noise, oil leaks, sprocket alignment and chain wear. During shutdowns the condition of the rubber edges of the individual vanes should be inspected for wear.

The oil level in the reduction gear should be checked once per week and oil added to maintain proper level. See manufacturers information at the end of the manual.

The motor, too, should be inspected regularly and lubricated in accordance with the manufacturers recommendations.

-VANE MAINTENANCE

When the rubber edges of the individuals vanes in the air lock have become worn to the point of no longer being effective they will need to be replaced. Symptoms of excessive wear, in general, is constant blow by of air into the bottom of the cyclone during operation. If the rubber edge of a single vane is damaged it may only be noticed during a through inspection. If there is severe damage to adjacent vane blades, allowing for periodic excessive blow by at the bottom of a cyclone, it may be noticed as a periodic visible change in the exhaust of the cyclone fan, or the exhaust of the scrubber.

AIR LOCK

Replacement can be accomplished from the bottom of the air lock. In some installations there is an access door at the bottom of the cyclone that allows for conducting the work from the top of the air lock. For working from the bottom scaffolding must be erected. In either case power must be positively secured and properly tagged for the air lock motor. The motor can be turned by hand to line up the vane(s) to be worked on. Properly drilled replacement rubber edges will simplify the work. Refer to the engineering drawings for the layout of the hole pattern and dimensions.

Remove the rubber gasket to be replaced by removing the bolts from around the edges of the vanes. Remove the old rubber piece and replace it. Replace the bolts, snugging them only till the split lock washers are forced flat. Further tightening only compresses the rubber, possibly to the point of distortion.

CAUTION

Do not operate this machine without guards in place.
Do not remove guards except where required for maintenance.
Do not clean, lubricate, adjust, or repair machine while in motion.

- DRIVE MOTOR REPLACEMENT

In the event that the drive motor for the air lock requires replacement scaffolding will have to be erected to allow access to the motor.

1. Secure the power to the air lock motor, open and tag the breaker to the air lock motor. Lock and tag the switch OFF.

2. Open the terminal box on the motor, wire mark and disconnect the electrical leads. Remove the power leads from the terminal box.

4. Disconnect the coupling from the motor shaft.

5. Remove the motor mounting bolts and remove the motor for the necessary work.

To reinstall the motor reverse the steps above.

See manufacturers information at the end of the manual.

AIR LOCK

- DRIVE REDUCER REPLACEMENT

Should it become necessary to replace the air lock drive gear reducer, scaffolding will have to be erected to allow for the work. Once the proper scaffolding is in place:

1. Disconnect the motor as in steps 1, 2 and 3 above.
2. Find the masterlink and part the drive chain.
3. Remove the reducer mounting bolts.
4. With slings or straps and a hoisting device pick the reducer up and lower it to the ground or onto a waiting vehicle.

To reinstall the reducer reverse the steps above.

See manufacturers information at the end of the manual.

Spare / Replacement Parts

180-36B-01	SHREDDER AIR SYSTEM -36" AIRLOCK

ITEM	DESCRIPTION	QTY
31	COUPLING W/BUSHINGS DODGE PANA-FLEX COUPLING PX-80 W/TAPER LOCK BUSHINGS MOTOR SIDE 1 3/8" REDUCER SIDE 1 1/2"	1
32	REDUCER WORM GEAR REYNOLD FOOT MOUNTED WORM GEAR REDUCER TYPE W.U. SIZE 5 RATIO 30:1 OR RADACON AV-500, 30:1 LEFT HAND GEAR REDUCER OR STEEL BELT WORM GEAR SPEED REDUCER 135B RATI0 30:1	1
34	SPROCKET MARTIN-100SF.15 W/ 2"" Q.D. BUSHING TO SUIT GEARBOX OUTPUT (DRIVE)	1
35	SPROCKET MARTIN-100E 35 W/Q.D. BUSHING 2 7/16"" (DRIVEN)"	1
36	CHAIN #100 CHAIN W/MASTER & HALF LINK, 60 PITCHES"	1
37	BEARING 2 7/16 " DODGE SCM 4 BOLT FLANGE	2

180-36C 01	SHREDDER AIR SYSTEM - FAN & DRIVE

ITEM	DESCRIPTION	QTY
1	FAN SIZE # 100 INDUSTRIAL HIGH EFFICIENCY FAN. COMPARABLE TO AN IMPCO MODEL TYPE. FAN ARRANGEMENT NO. 5 OR PHELPS FAN MODEL W-712 FAN ARRANGEMENT FIG #3 (CW BOTTOM HORIZONTAL)	1
2	MOTOR 200 HP 1750 RPM 445T FRAME SIZE. 480V, 60 HZ, 1750 RPM	1

Spare / Replacement Parts

180-37C 01	CRUSHER AIR SYSTEM FAN & DRIVE

ITEM	DESCRIPTION	QTY
1	**FAN** SIZE # 100 INDUSTRIAL HIGH EFFICIENCY FAN. COMPARABLE TO AN IMPCO MODEL TYPE. FAN ARRANGEMENT NO. 6 OR PHELPS FAN MODEL W-712 FAN ARRANGEMENT FIG #4 (CCW BOTTOM HORIZONTAL)	1
2	**MOTOR** 100 HP 1750 RPM 404T FRAME SIZE. 480V, 60 HZ, 1750 RPM	1

180-38D-01	SELF CLEANING WATER TANK -DRAG, AND SKIMMER SHAFTS

ITEM	DESCRIPTION	QTY
4	**SPROCKET** REX#720S,6" PITCH 23 HARDENED TEETH SIZE K HUB 3 15/16" BORE	2
5	**BEARING** SEALMASTER MFP C-63 3 15/16" PILLOW BLOCK BEARING	2
6	**SPROCKET** REX#720S, 6" PITCH 19 HARDENED TEETH SIZE H HUB, 2 15/16" BORE	2
7	**BEARING** SEALMASTER MSF-47C FLANGE BEARING 2 15/16"" BORE."	4

Spare / Replacement Parts

180-38E-01	SELF CLEANING WATERTANK -DRIVE PLATFORM

ITEM	DESCRIPTION		QTY
1	REDUCER DODGE TR400 SCRAPER DRIVE ,105.9:1 REDUCTION		1
2	MOTOR MT. DODGE TXM4		1
3	MOTOR 2 HP/1750RPM/145T /SCRAPER DRIVE MOTOR		1
	MOTOR ASSY. BOLTS 5/16" UNC 3"LG. C/W NUT,FL-WSHER &LKWSHER		4
4	DR.SHEAVE 2G-3V-3.65/BORED FOR#1610 TAPERLOCK		1
5	BUSHING /8" BORE/DR. SHEAVE /TAPERLOCK 1610		1
6	DN. SHEAVE 2G-3V-10.6/BORED FOR 2517 TAPERLOCK		1
7	BUSHING 1 5/8" BORE/DRIVEN SHEAVE BUSHING 2517.		1
8	BELT 2x 3V530 /DRIVE BELT POLYBAND		1
9	SPROCKET MARTIN D100B17 2 1/2" BORE DRIVE SPROCKET		1
10	SPROCKET MARTIN D100C60 DRIVEN SPROCKET 3 15/16" BORE		1
11	CHAIN ANSI 100-2 DOUBLE STRAND 15' DRIVE CHAIN		1
12	SPROCKET REX#720S,23 TEETH 3 15/16"BORE		2
13	REDUCER DODGE TR400 105.9:1 REDUCTION SKIMMER DRIVE REDUCER		1
14	MOTOR MT. DODGE TXM4		1
15	MOTOR 2HP,1750RPM,FRAME 145T SKIMMER DRIVE MOTOR		1
	MOTOR ASSY. BOLTS, 5/16"UNCx3"LG. C/W NUT, FL WSHER & LKWSHER		4
16	DR.SHEAVE 2G-3V-3.65 BORED FOR #1610 TAPERLOCK		1
17	BUSHING 7/8" BORE FOR 2517 TAPERLOCK DRIVE SHEAVE BUSHING/2517 T.L.		1
18	DN.SHEAVE 2G-3V-10.6 FOR 2517 TAPERLOCK		1
19	BUSHING 1 5/8" BORE DRIVEN SHEAVE 2517 TAPERLOCK		1
20	BELT 2x3V530 DRIVE BELT POLYBAND		1
21	SPROCKET MARTIN D100B19 2 1/2" BORE DRIVE SPROCKET		1
22	SPROCKET MARTIN D100C26 2 15/16" BORE DRIVEN SPROCKET		1
23	CHAIN ANSI 100-2, DOUBLE STRAND DRIVE CHAIN	10'	1
24	SPROCKET REX#720S,19 TEETH, 2 15/16" BORE SKIMMER CHAIN SPROCKET		2
25	CHAIN REX#720SZ,W.720S-F2 ATTACHMTS ATTACHMENTS EVERY 5TH PITCH	300'	1

Spare / Replacement Parts

26	CHAIN REX#720SZ,W.720S-F2 ATTACHMTS ATTACHMENTS EVERY 5TH PITCH	170'	1

180-38G-01	SELF CLEANING WATERTANK -RECYCLING PUMP

ITEM	DESCRIPTION	QTY
1	PUMP TYPE T3A60-B SELF PRIMING GORMAN-RUPP MUD PUMP.	2
1A	BOLT 5/8"UNC 2.5 W/NUT, BEVEL WASHER,LKWSHER	8
2	MOTOR 15 HP. TEFC ,FRAME 254T ELECTRIC MOTOR, 1760RPM	2
3	MOTOR BASE NEMA ADJUSTABLE, DODG #122097	2
3A	BOLT 5/8"UNC 2 C/W NUT,FL &LKWSHER	8
4	SHEAVE 2G-3V-6.0 BORED FOR #1610 T.L. DRIVE SHEAVE	2
5	BUSHING 1 5/8" BORE ,1610 TAPERLOCK DRIVE SHEAVE BUSHING	2
6	SHEAVE 2G-3V-6.9 BORED FOR 2517 T.L. DRIVEN SHEAVE	2
7	BUSHING 1 1/2" BORE 2517 TAPERLOCK DRIVEN SHEAVE BUSHING	2

180-38G-01 (cont'd)	SELF CLEANING WATERTANK -RECYCLING PUMP

ITEM	DESCRIPTION	QTY
8	DRIVE BELT 2 x 3V850 DRIVE BELT POLYBAND	2
9	PIPE FLANGE 150#, 3" DIA,McMC#4462K31 THREADED PIPE FLANGE	14
10	GASKET 3" PIPE FLANGE GASKET	14
11	COUPLING 3" , McMC#5542K23, WEDGE TIGHT PIPE COUPLING DRESSER COUPLING	2
12	CHECK VALVE McMC#5023K33 CAST IRON DUAL PLATE CHECK VALVE	2
13	VALVE 3" , McMC# 5024K13,OR EQUIV DUCTILE IRON BUTTERFLY VALVE	2
14	VALVE ID.#0300,FIG.800,S,A,CLG DeZURICK KNIFE GATE VALVE	2

11 Aug 92

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL

GORMAN-RUPP

OM-01041-0807

CD

March 13, 1981

Rev. - A

STARR PUMP CO., INC.
P.O. Box 15502
4726-D North Lois Avenue
TAMPA, FLORIDA 33684

- Stadium

Osborne.

Daina

Lawyer guy

Resource Recycling
P. O. Box 2180
Pinellas Park, Fl. 34664

Attn: Don Wolfram

Basic Self-Priming Centrifugal Pump

Model T3A3-B

naofc.

older Gentleman.

IMPELLER #11406

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

SECTIONAL DRAWING

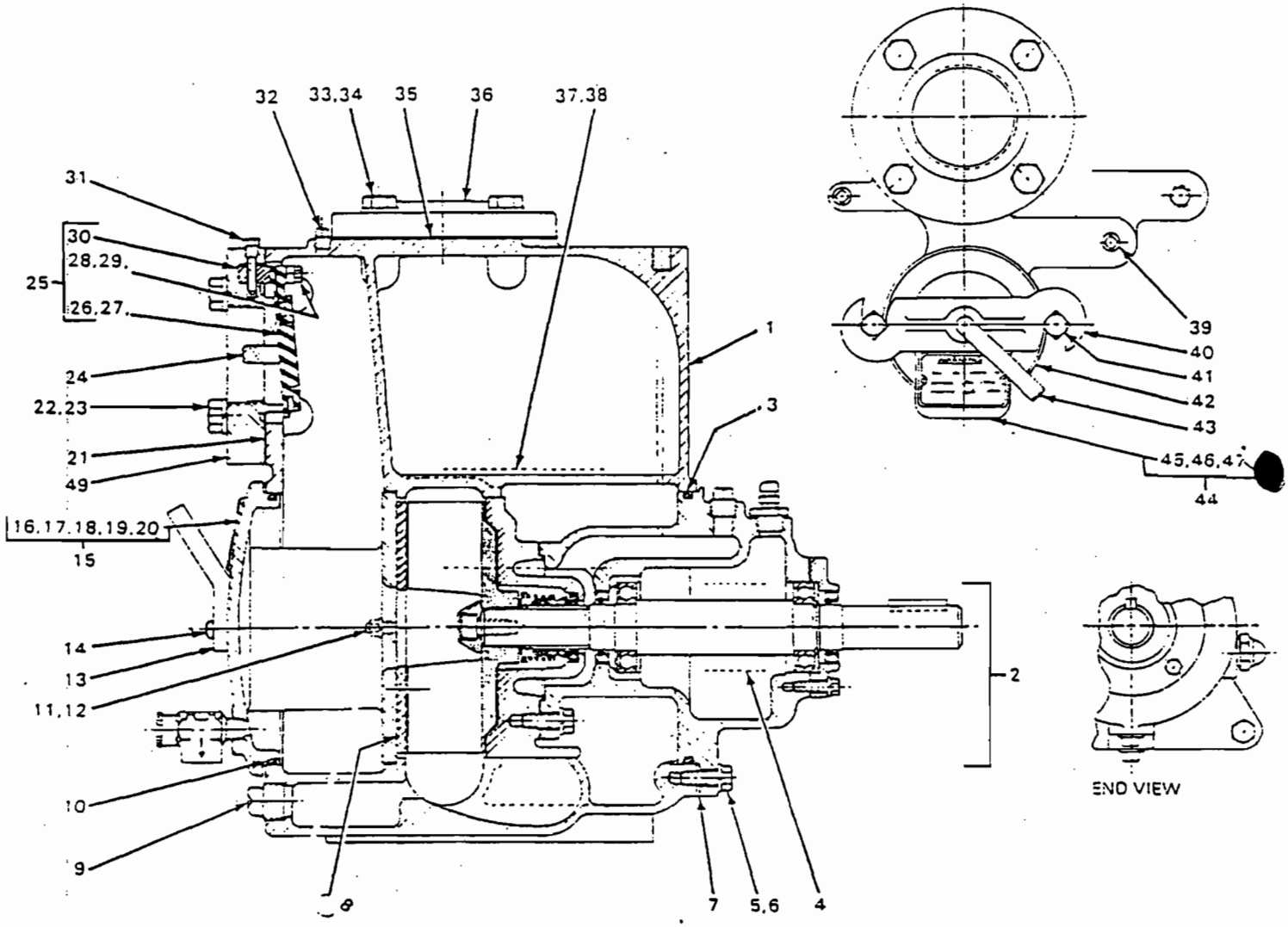


Figure 1. Pump Model T3A3-8

PARTS LIST

ROTATING ASSEMBLY FOR PUMP MODEL T3A3B 60-B

(From S/N 740693 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	★IMPELLER	11406	11000	1
2	★SEAL ASSEMBLY	46512-050 ~~[illegible]-A~~	—	1 — 186.50
3	★SEAL PLATE GASKET	10959-G	20000	1
4	★BALL BEARING	S-250	—	1
5	BEARING HOUSING	11399-A	10010	1
6	★VENTED SEAL CAVITY PLUG	4823-A	11990	1
7	★BEARING HOUSING AIR VENT	S-1530	—	1
8	REDUCER BUSHING	AP-0802	11990	1
9	★SNAP RING	S-244	—	1
10	★IMPELLER SHAFT	11398	16040	1 — $197.60 xx
11	★SHAFT KEY	N-0608	15990	1
12	★OIL SEAL	S-1352	—	1 — $ 1hr = 35.00 xx
13	HEX HEAD CAPSCREW	B-0605	15991	4
14	LOCKWASHER	J-06	15991	4
15	★BEARING CAP	11408	10010	1
16	★BEARING CAP GASKET	11408-G	18000	1
17	★BALL BEARING	S-1749	—	1
18	★OIL SEAL	S-1352	—	1
19	HEX HEAD CAPSCREW	B-0805	15991	4
20	LOCKWASHER	J-08	15991	4
21	★SEAL PLATE	11837-D	10010	1
22	★IMPELLER CAPSCREW	DM-1004-S	15991	1
23	IMPELLER WASHER	10278	15030	1
24	★PIPE PLUG	P-12	11990	1
25	BEARING HOUSING DRAIN PLUG	P-08	11990	1
26	SEAL CAVITY DRAIN PLUG	P-08	11990	1
27	★OIL LEVEL SIGHT GAUGE	S-1471	—	1
28	★IMPELLER SHIM SET	37-J	17090	1
29	★SHAFT SLEEVE	11876-A	16000	1
30	★BEARING HOUSING O-RING	S-1748	—	1
31	★ROTATING ASSY ADJUSTING SHIMS	13130	17000	4
32	★SHAFT SLEEVE O-RING	S-2088	—	1

★INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

SECTIONAL DRAWING

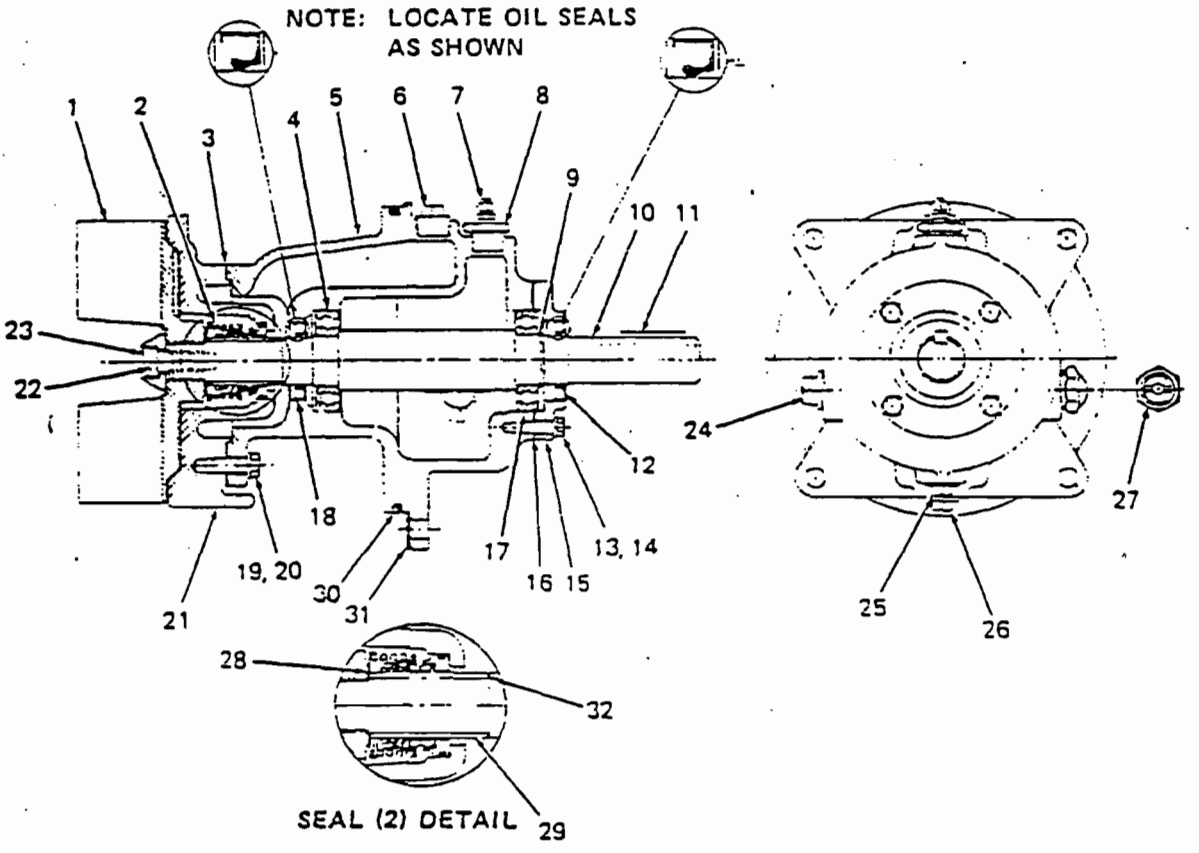


Figure 2. Rotating Assembly for Pump Model T3A3-B

PARTS LIST

ROTATING ASSEMBLY FOR PUMP MODEL T3A~~38~~ 60-B

(From S/N 740693 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	★IMPELLER	11406	11000	1
2	★SEAL ASSEMBLY 46512-050 ~~T2384~~A	—		1 — 186.50
3	★SEAL PLATE GASKET	10959-G	20000	1
4	★BALL BEARING	S-250	—	1
5	BEARING HOUSING	11399-A	10010	1
6	★VENTED SEAL CAVITY PLUG	4823-A	11990	1
7	★BEARING HOUSING AIR VENT	S-1530	—	1
8	REDUCER BUSHING	AP-0802	11990	1
9	★SNAP RING	S-244	—	1
10	★IMPELLER SHAFT	11398	16040	1 — $197.60 XX
11	★SHAFT KEY	N-0608	15990	1
12	★OIL SEAL	S-1352	—	1 — $ 1 hr = 35.00 XX
13	HEX HEAD CAPSCREW	B-0605	15991	4
14	LOCKWASHER	J-06	15991	4
15	★BEARING CAP	11408	10010	1
16	★BEARING CAP GASKET	11408-G	18000	1 °
17	★BALL BEARING	S-1749	—	1 °
18	★OIL SEAL	S-1352	—	1 °
19	HEX HEAD CAPSCREW	B-0805	15991	4
20	LOCKWASHER	J-08	15991	4
21	★SEAL PLATE	11837-D	10010	1
22	★IMPELLER CAPSCREW	DM-1004-S	15991	1
23	IMPELLER WASHER	10278	15030	1
24	★PIPE PLUG	P-12	11990	1
25	BEARING HOUSING DRAIN PLUG	P-08	11990	1
26	SEAL CAVITY DRAIN PLUG	P-08	11990	1
27	★OIL LEVEL SIGHT GAUGE	S-1471	—	1
28	★IMPELLER SHIM SET	37-J	17090	1
29	★SHAFT SLEEVE	11876-A	16000	1
30	★BEARING HOUSING O-RING	S-1748	—	1
31	★ROTATING ASSY ADJUSTING SHIMS	13130	17000	4
32	★SHAFT SLEEVE O-RING	S-2088	—	1

★INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

PARTS LIST

PUMP MODEL T3A3-B

(From S/N 740693 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	11405-B	10010	1
2	ROTATING ASSEMBLY	11409-E	–	1
3	★BEARING HSNG O-RING	S-1748	–	1
4	ROTATION DECAL	2613-CU	00000	1
5	HEX HEAD CAPSCREW	B-0805½	15991	4
6	LOCKWASHER	J-08	15991	4
7	★ROTATING ASSY SHIM SET	13130	17000	4
8	★WEAR PLATE	11407-A	15990	1
9	VOLUTE DRAIN PLUG	P-16	11990	1
10	★COVER O-RING	S-1748	–	1
11	LOCKWASHER	J-06	15991	2
12	HEX NUT	D-06	15991	2
13	COVER HAND NUT	10701	15040	2
14	STUD	C-1010	15991	2
15	★COVER ASSEMBLY	42111-901	–	1
16	COVER	11397-A	10010	1
17	WARNING PLATE	2613-EV	13990	1
18	DRIVE SCREW	BM#04-03	15990	4
19	★ PRESSURE RELIEF VALVE	26662-005	–	1
20	CAUTION DECAL	2613-FG	–	1
21	★SUCTION FLANGE GSKT	11412-G	21020	1
22	HEX HEAD CAPSCREW	B-1009	15991	4
23	LOCKWASHER	J-10	15991	4
24	PIPE PLUG	P-04	11990	1
25	★CHECK VALVE ASSEMBLY	46411-060	–	1
26	CHECK VALVE	NOT AVAILABLE		1
27	SPACER SLEEVE	NOT AVAILABLE		2
28	BACK UP PLATE	NOT AVAILABLE		1
29	NYLOCK CAPSCREW	NOT AVAILABLE		2
30	CHECK VALVE ADAPTER	NOT AVAILABLE		1
31	★CHECK VALVE PIN	11557-A	17010	1
32	ACCESSORY PLUG	P-04	11990	1
33	HEX HEAD CAPSCREW	B-1007	15991	4
34	LOCKWASHER	J-10	15991	4
35	★DISCHARGE FLNG GSKT	1674-GE	21020	1
36	DISCHARGE FLANGE	1753-A	10010	1
37	NAME PLATE	2613-D	13990	1
38	DRIVE SCREW	BM#04-03	15990	4
39	PIPE PLUG	P-04	11990	1
40	FILL COVER CLAMP BAR	38111-004	11000	1
41	MACHINE BOLT	A-1014	15991	2
42	★FILL COVER GASKET	50-G	19210	1
43	FILL COV CLAMP SCREW	31912-009	–	1
44	★FILL COVER ASSEMBLY	42111-344	–	1
45	FILL COVER PLATE	NOT AVAILABLE		1
46	WARNING PLATE	NOT AVAILABLE		1
47	DRIVE SCREW	NOT AVAILABLE		2
48	SUCTION FLANGE	11412	10010	1
OPTIONAL:				
	AIR RELEASE VALVE	GRP33-07	–	1
	AIR RELEASE VALVE	GRP33-07A	–	1
	AIR RELEASE VALVE	GRP33-07B	–	1
	FLANGED SUCTION SPOOL	11412-A	10010	1
	FLANGED DISCH SPOOL	10845	10010	1
	DISASSEMBLY TOOL	12859	24000	1
	CASING HEATER 120V	47811-006	–	1
	CASING HEATER 240V	47811-007	–	1

★INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

SECTIONAL DRAWING

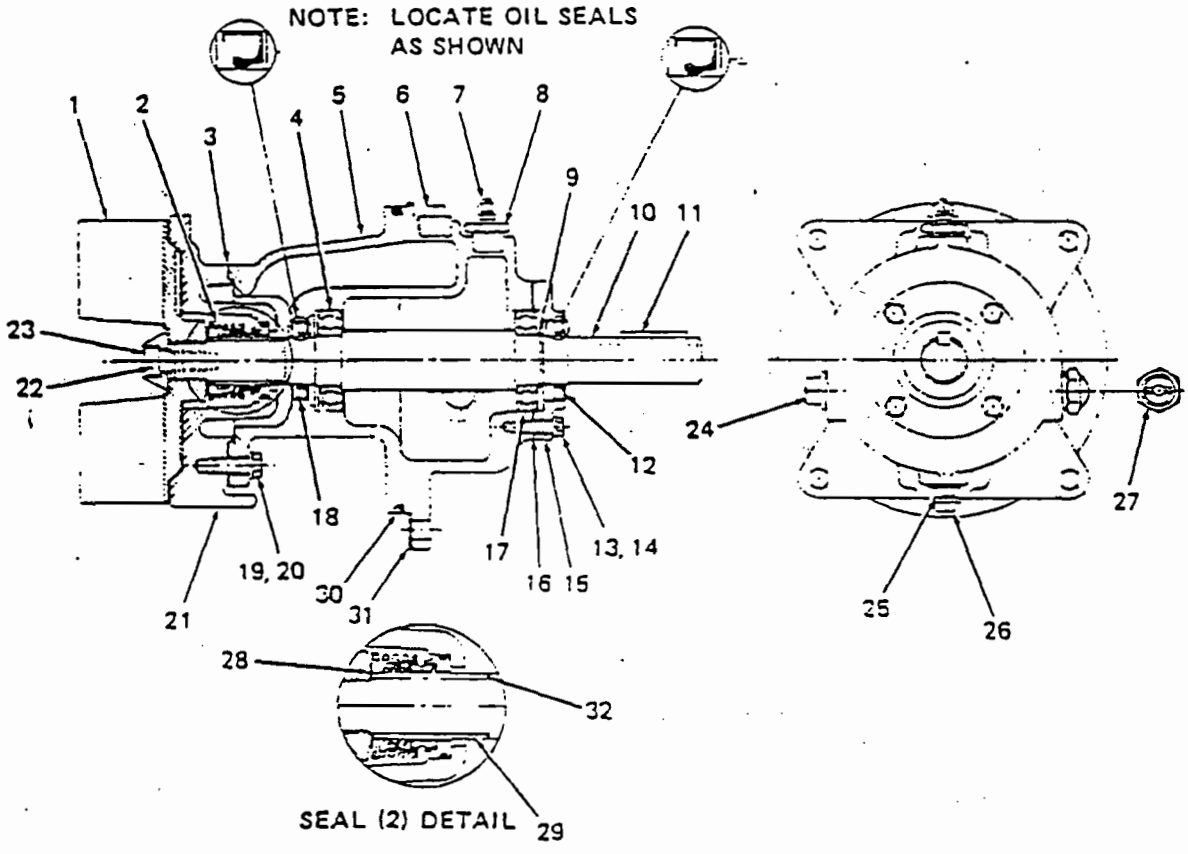


Figure 2. Rotating Assembly for Pump Model T3A3-B

36+37

STARR PUMP CO INC

4726-D N. LOIS AVE
P.O. BOX 15502
TAMPA, FLORIDA 33684
813-877-9416

FACSIMILE COVER SHEET

DATE 6/28/94

NO. OF PAGES: 3 (INCLUDING THIS PAGE)

TO: Chuck Yarden

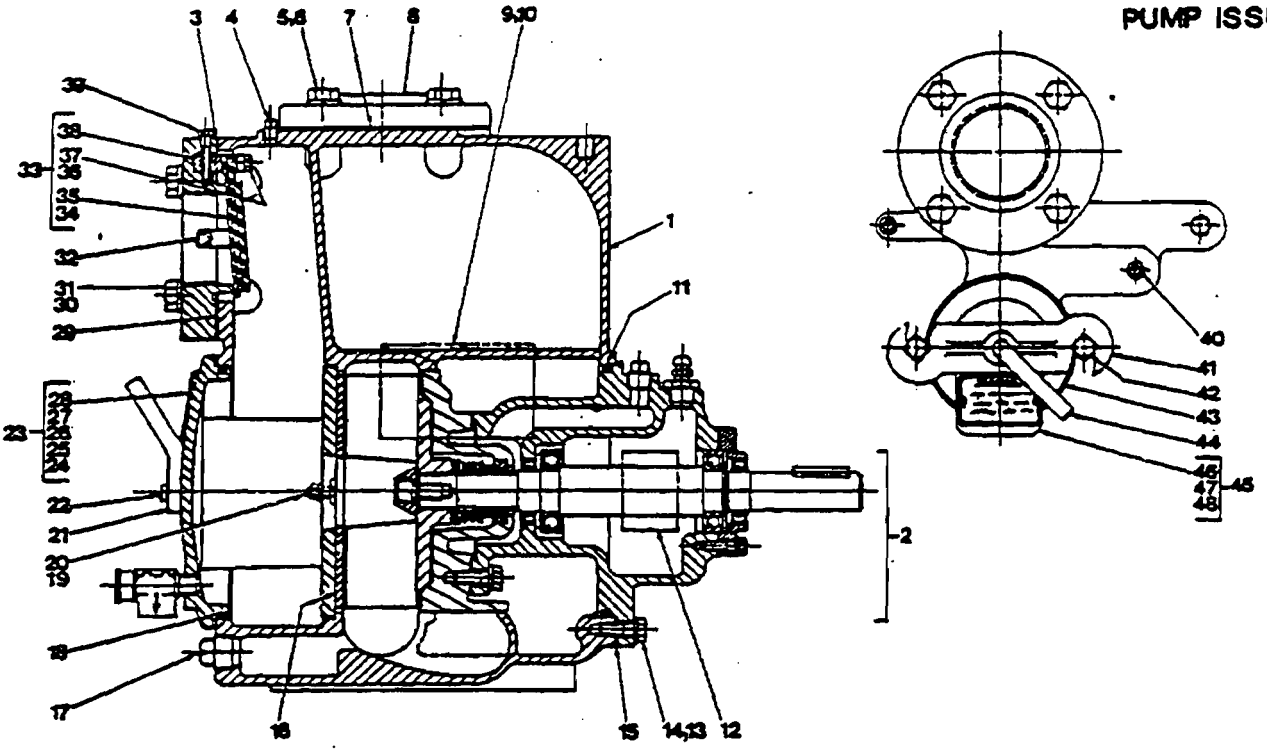
LOCATION: Resource Recycling FAX NUMBER: 573-2527

FROM: Dana Starr FAX NUMBER: (813) 874-9259

SPECIAL INSTRUCTIONS/COMMENTS/REMARKS:

Parts list for Gorman-Rupp T3A3-B

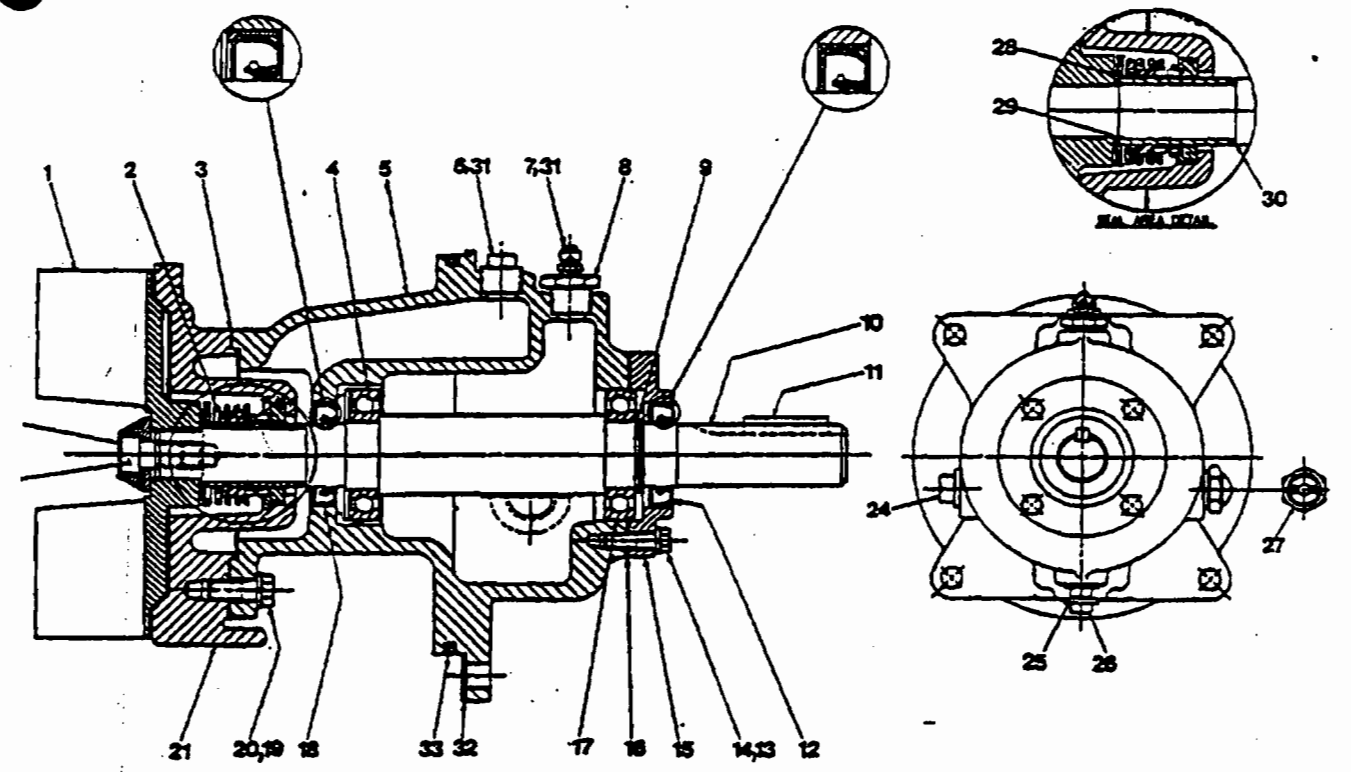
Thank you
D. B. Starr



If your pump serial number is followed by an "N", your pump is NOT a standard production model. Contact the Gorman-Rupp Company to verify part numbers.

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING	11405-B	10010	1
2	ROTATING ASSY.	11409-E		1
3	SUCTION FLANGE	11412	10010	1
4	PIPE PLUG	P00004	11990	1
5	HEX HD CAPSCREW	B01007	15991	4
6	LOCKWASHER	J00010	15991	4
7	*DISCH FLANGE GSKT	25113-033	-----	1
8	DISCHARGE FLANGE	1753-A	10010	1
9	NAME PLATE	38818-040	13990	1
10	DRIVE SCREW	BM#04-03	15990	4
11	*ROT ASSY O-RING	S01748	-----	REF
12	ROTATION DECAL	2613-CU	00000	1
13	HEX HD CAPSCREW	B00805 1/2	15991	4
14	LOCKWASHER	J00008	15991	4
15	*ROT ASSY SHIM SET	13130	17000	REF
16	*WEAR PLATE ASSY	11407-A	13990	1
17	CASING DRAIN PLUG	P00016	11990	1
18	*BACK COVER O-RING	S01748	-----	1
19	LOCKWASHER	J00006	15990	2
20	HEX NUT	D00006	15990	2
21	HAND NUT	10701	15040	2
22	STUD	C01010	15991	2
23	*BACK COVER ASSY	42111-901	-----	1
24	-BACK CVR PLATE	NOT AVAILABLE		1
25	-WARNING PLATE	2613-EV	13990	1
26	-DRIVE SCREW	BM#04-03	15991	4
27	-RELIEF VALVE	26662-003	-----	1
28	-CAUTION DECAL	2613-FG	-----	1
29	*SUCT FLANGE GSKT	11412-G	19370	1
30	HEX HD CAPSCREW	B01009	15991	4
31	LOCKWASHER	J00010	15991	4
32	PIPE PLUG	P00004	11990	1
33	*CHECK VALVE ASSY	46411-060	-----	1
34	-MLD CHECK VALVE	NOT AVAILABLE		1
35	-SPACER SLEEVE	NOT AVAILABLE		2
36	-BACK UP PLATE	NOT AVAILABLE		1
37	-NYLOCK CAPSCREW	NOT AVAILABLE		2
38	-ADAPTOR	NOT AVAILABLE		1
39	CHECK VALVE PIN	11537-A	17010	1
40	PIPE PLUG	P00004	11990	1
41	CLAMP BAR	38111-004	11000	1
42	MACHINE BOLT	A01014	15991	2
43	*FILL COVER GSKT	50-G	19210	1
44	CLAMP BAR SCREW	31912-009	15000	1
45	FILL CVR PLT ASSY	42111-344	-----	1
46	-COVER PLATE	NOT AVAILABLE		1
47	-WARNING PLATE	38816-097	13990	1
48	-DRIVE SCREW	BM#04-03	15991	2
OPTIONAL:				
	DISASSEMBLY TOOL	12859	24000	1
	SST IMP SHAFT (LESS SLEEVE)	11398-A	17060	1
	SST SPACER WASHER	38329-040	17130	1
	SPOOL FLANGES:			
	-SUCTION	11412-A	10010	1
	-DISCHARGE	10845	10010	1
	CASING HEATERS:			
	-120V	47811-006	-----	1
	-240V	47811-007	-----	1
	CHECK VALVE ASSY:			
	-NEO SOLID TYPE	46411-043	-----	1
	-VITON SOLID	46411-086	-----	1
	-VITON BLOW-OUT	46411-074	-----	1
	WEAR PLATE ASSY:			
	-STAINLESS STEEL	11407-A	17188	1
	-ALLOY STEEL	46451-337	24160	1
	PRESS RELIEF VALVES:			
	-SEWAGE TYPE	46431-628	-----	1
	-STAINLESS STEEL	26662-101	-----	1
	HI TEMP SHUT-DOWN KITS:			
	-145°F	48313-186	-----	1
	-130°F	48313-256	-----	1
	-120°F	48313-257	-----	1
	AIR RELEASE VALVES:			
	-10# COMP SPRING	GRP33-07A	-----	1
	-25# COMP SPRING	GRP33-07	-----	1
	-80# COMP SPRING	GRP33-07B	-----	1

*INDICATES PARTS RECOMMENDED FOR STOCK



ITEM NO.		PART NAME	PART NUMBER	MATL CODE	QTY
1	*	IMPELLER	11406	11000	1
2	*	SEAL ASSEMBLY	12364-A	-----	1
3	*	SEAL PLATE GSKT	10959-G	20000	1
4	*	INBOARD BALL BEARING	25252-015	-----	1
5		BEARING HOUSING	11399-A	10010	1
6		VENTED SEAL CAVITY PLUG	4823-A	11990	1
7		BRG HOUSING AIR VENT	S01530	-----	1
8		REDUCER BUSHING	AP00802	11990	1
9		SNAP RING	S00244	-----	1
10	*	IMPELLER SHAFT	11398	16040	1
11	*	IMPELLER SHAFT KEY	N00608	15990	1
12	*	OUTBOARD OIL SEAL	S01352	-----	1
13		HEX HD CAPSCREW	B00605	15991	4
14		LOCKWASHER	J00006	15991	4
15		BEARING CAP	11408	10010	1
16	*	BEARING CAP GSKT	11408-G	18000	1
17	*	OUTBOARD BALL BEARING	S01749	-----	1
18	*	INBOARD OIL SEAL	S01352	-----	1
19		HEX HD CAPSCREW	B00805	15991	4
20		LOCKWASHER	J00006	15991	4
21		SEAL PLATE	11837-D	10010	1
22	*	IMPELLER CAPSCREW	BM01004-S	15991	1
23	*	IMPELLER WASHER	10278	15030	1
24		PIPE PLUG	P00012	11990	1
25		BRG HOUSING DRAIN PLUG	P00008	11990	1
26		SEAL CAVITY DRAIN PLUG	P00008	11990	1
27		OIL LEVEL SIGHT GAUGE	S01471	-----	1
28	*	IMPELLER SHIM SET	37-J	17090	REF
29	*	SEAL SLEEVE	11876-A	16000	1
30	*	SEAL SLEEVE O-RING	S02088	-----	REF
31		SHIPPING PLUG	11495-B	11990	2
32	*	ROTATING ASSY SHIM SET	13130	17000	4
33	*	BRG HOUSING O-RING	S01748	-----	1

*INDICATES PARTS RECOMMENDED FOR STOCK

PARTS LIST

PUMP MODEL T3A3-B

(From S/N 740693 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	VOLUTE CASING	11405-B	10010	1
2	ROTATING ASSEMBLY	11409-E	—	1
3	★BEARING HSNG O-RING	S-1748	—	1
4	ROTATION DECAL	2613-CU	00000	1
5	HEX HEAD CAPSCREW	B-0805½	15991	4
6	LOCKWASHER	J-08	15991	4
7	★ROTATING ASSY SHIM SET	13130	17000	4
8	★WEAR PLATE	11407-A	15990	1
9	VOLUTE DRAIN PLUG	P-16	11990	1
10	★COVER O-RING	S-1748	—	1
11	LOCKWASHER	J-06	15991	2
12	HEX NUT	D-06	15991	2
13	COVER HAND NUT	10701	15040	2
14	STUD	C-1010	15991	2
15	★COVER ASSEMBLY	42111-901	—	1
16	COVER	11397-A	10010	1
17	WARNING PLATE	2613-EV	13990	1
18	DRIVE SCREW	BM#04-03	15990	4
19	★ PRESSURE RELIEF VALVE	26662-005	—	1
20	CAUTION DECAL	2613-FG	—	1
21	★SUCTION FLANGE GSKT	11412-G	21020	1
22	HEX HEAD CAPSCREW	B-1009	15991	4
23	LOCKWASHER	J-10	15991	4
24	PIPE PLUG	P-04	11990	1
25	★CHECK VALVE ASSEMBLY	46411-060	—	1
26	CHECK VALVE	NOT AVAILABLE		1
27	SPACER SLEEVE	NOT AVAILABLE		2
28	BACK UP PLATE	NOT AVAILABLE		1
29	NYLOCK CAPSCREW	NOT AVAILABLE		2
30	CHECK VALVE ADAPTER	NOT AVAILABLE		1
31	★CHECK VALVE PIN	11557-A	17010	1
32	ACCESSORY PLUG	P-04	11990	1
33	HEX HEAD CAPSCREW	B-1007	15991	4
34	LOCKWASHER	J-10	15991	4
35	★DISCHARGE FLNG GSKT	1674-GE	21020	1
36	DISCHARGE FLANGE	1753-A	10010	1
37	NAME PLATE	2613-D	13990	1
38	DRIVE SCREW	BM#04-03	15990	4
39	PIPE PLUG	P-04	11990	1
40	FILL COVER CLAMP BAR	38111-004	11000	1
41	MACHINE BOLT	A-1014	15991	2
42	★FILL COVER GASKET	50-G	19210	1
43	FILL COV CLAMP SCREW	31912-009	—	1
44	★FILL COVER ASSEMBLY	42111-344	—	1
45	FILL COVER PLATE	NOT AVAILABLE		1
46	WARNING PLATE	NOT AVAILABLE		1
47	DRIVE SCREW	NOT AVAILABLE		2
48	SUCTION FLANGE	11412	10010	1
OPTIONAL:				
	AIR RELEASE VALVE	GRP33-07	—	1
	AIR RELEASE VALVE	GRP33-07A	—	1
	AIR RELEASE VALVE	GRP33-07B	—	1
	FLANGED SUCTION SPOOL	11412-A	10010	1
	FLANGED DISCH SPOOL	10845	10010	1
	DISASSEMBLY TOOL	12859	24000	1
	CASING HEATER 120V	47811-006	—	1
	CASING HEATER 240V	47811-007	—	1

★INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

SECTIONAL DRAWING

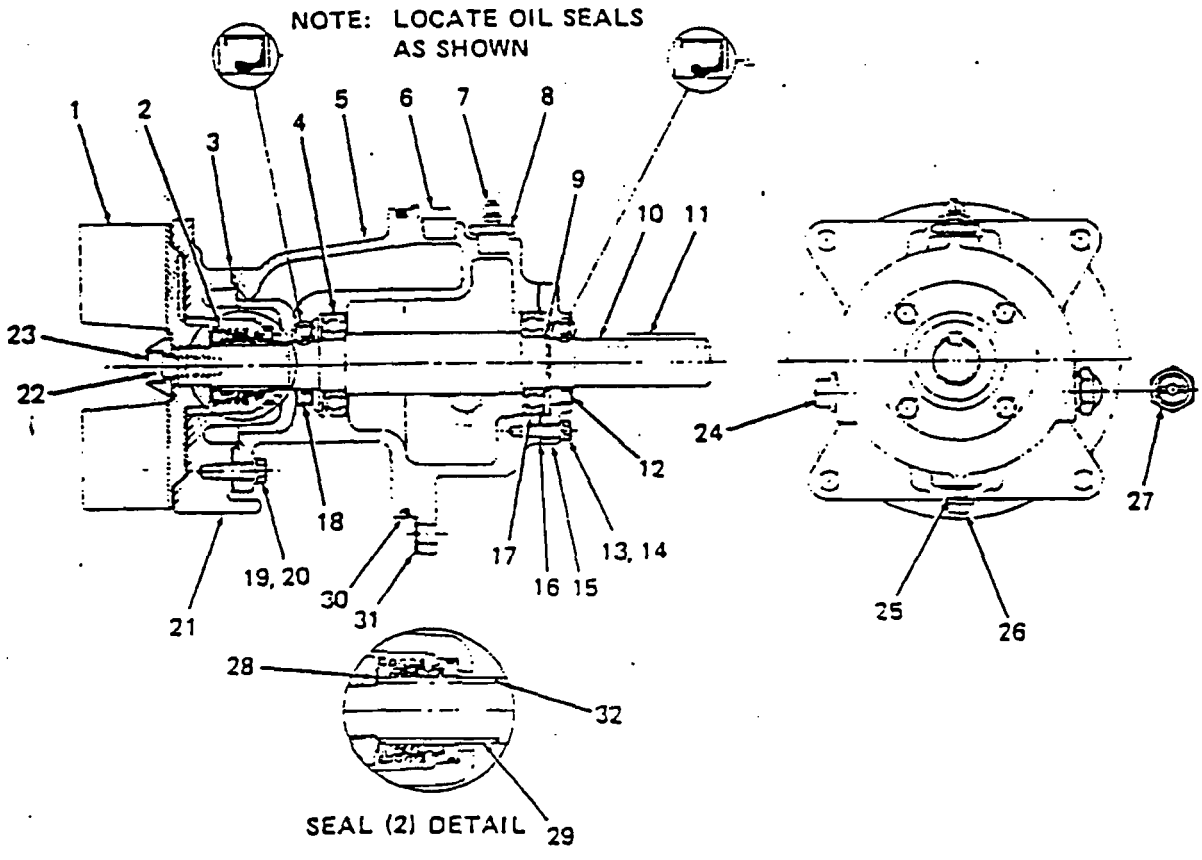
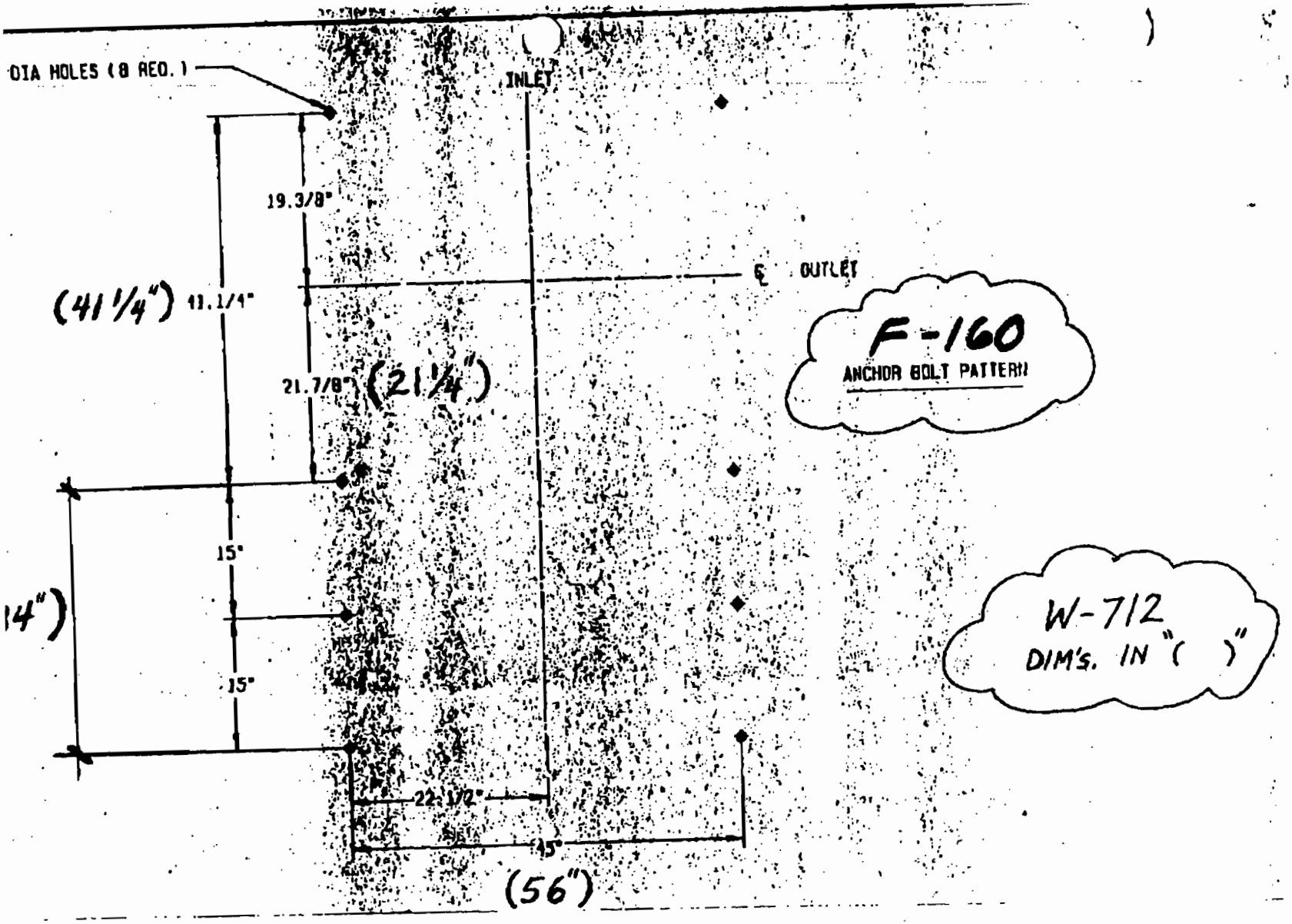


Figure 2. Rotating Assembly for Pump Model T3A3-B

BEST AVAILABLE COPY



F-160
ANCHOR BOLT PATTERN

W-712
DIM's. IN " ( ) "

MEMO

To: Don Wolfram

From: Rusty Manning

RE: Mill #180 Fans

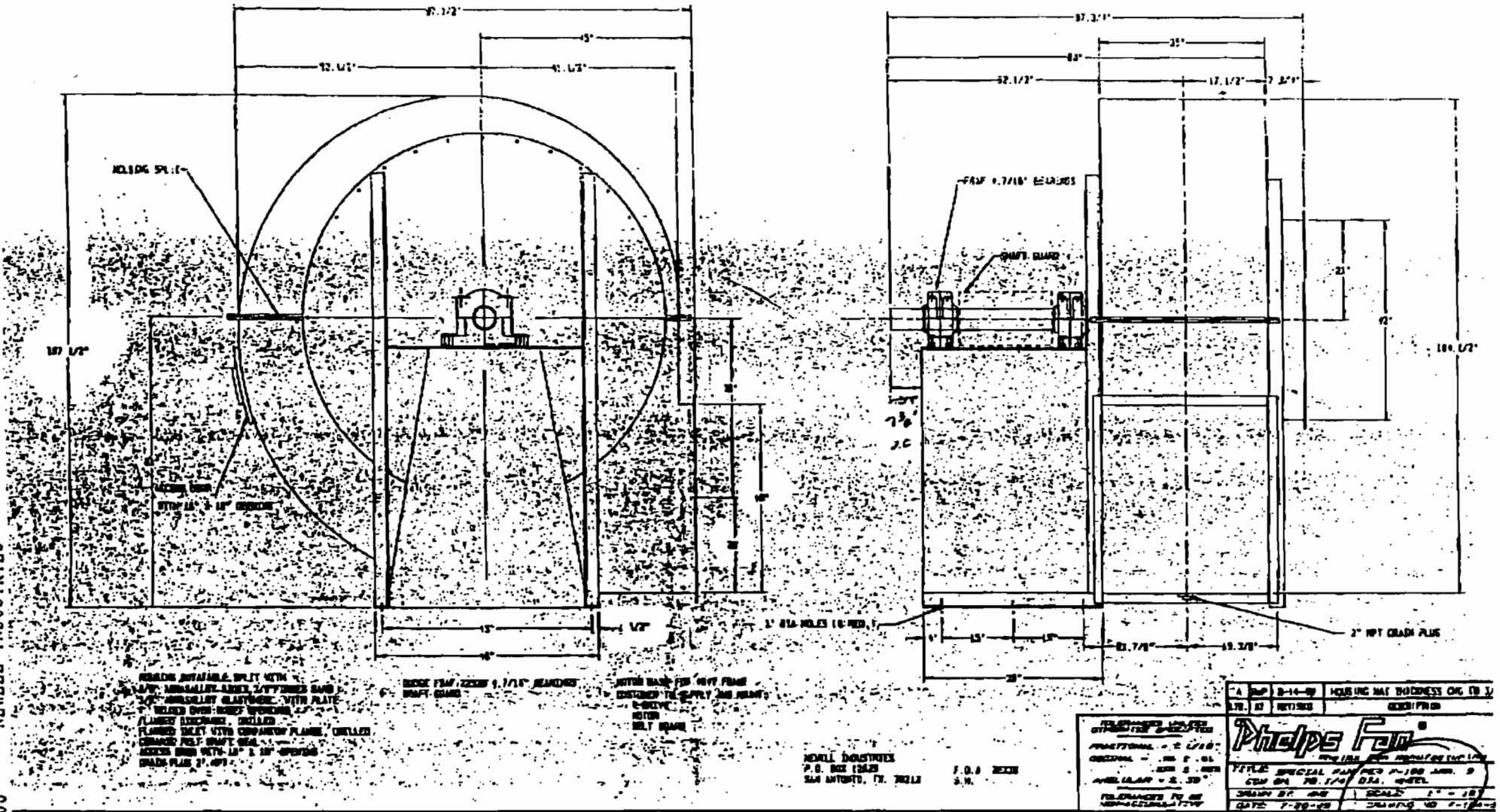
Date: July 17, 1989

Don,

This memo is to inform you of the fans that were purchased for mill #180. See below for details.

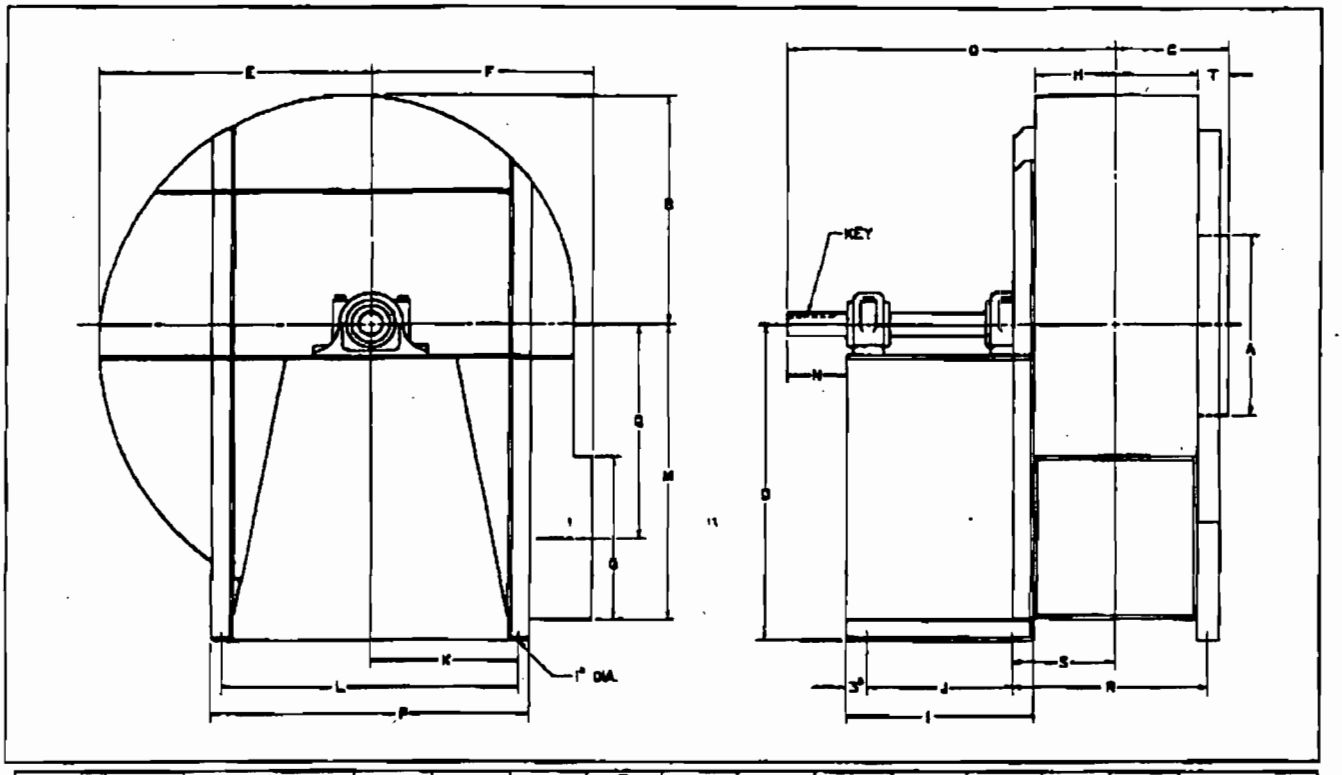
Fan with 100 hp motor	Phelps Fan Company Special Fan per Phelp's Fan drawing # F-160 complete with: 4 7/16" Ø shaft and bearings 1/4" thick rotatable housing, split 3/8" thick Abrasalloy impeller, with plate welded over gusset openings Flanged discharge drilled Flanged inlet with companion flange, drilled shaft seal Access door Drain Extended shaft with 10" overhang on pulley end Arrangement #9, with motor mount on side of fan base for a #404 T frame electric motor. Counter Clock Wise Rotation bottom horizontal discharge styled as figure #4
Fan with 200 hp motor	Phelps Fan Company Special Fan per Phelp's Fan drawing # F-160 complete with: 4 7/16" Ø shaft and bearings 1/4" thick rotatable housing, split 3/8" thick Abrasalloy impeller, with plate welded over gusset openings Flanged discharge drilled Flanged inlet with companion flange, drilled shaft seal Access door Drain Extended shaft with 10" overhang on pulley end Arrangement #1, without motor mount - the motor must be mounted on the same surface as the fan Clock Wise Rotation bottom horizontal discharge styled as figure #3

Don, Phelps Fan Co. will send approval drawings within the next 2 to 3 days. I will forward to you as soon as they come in.



Phelps Fan
GENERAL INDUSTRIAL FANS

Model W-451 through W-1042



FAN SIZE	WHEEL DIA	A I.D.	A O.D.	B	C	BH BAU	D UB TAU	TH TAD	E	F	G	H	I	J	KEY
W-451	45⅛	25½	28	33	15$^{27}/_{32}$	45½	39$^{1}/_{16}$	35⅛	37¾	31¼	23⅜	23$^{1}/_{16}$	27	21	¾x⅜x7
W-505	50½	28½	29	36⅜	17¼	50⅛	45	39¼	42	35½	26$^{7}/_{16}$	26	32	26	⅜x⅜x8
W-575	57½	32½	33	41⅜	18$^{15}/_{16}$	56¼	50¼	44⅜	47¾	39⅜	30$^{9}/_{16}$	29⅜	34	28	⅞x$^{7}/_{16}$x10
W-643	64⅜	36½	37	48⅜	20¾	63⅛	56⅛	49⅜	53⅜	43⅛	33⅜	33	37	31	1x½x11
W-712	71¼	40½	41	51⅜	22½	69⅜	62⅛	54⅜	58½	48¼	37½	36½	40	34	1x½x11
W-782	78¼	44½	45	56⅞	24$^{9}/_{16}$	76⅛	68	59⅞	65	52⅜	40$^{13}/_{16}$	40⅛	44	38	1¼x⅝x12
W-852	85⅛	48½	49	61$^{15}/_{16}$	26$^{1}/_{32}$	83	74	64⅛	70¾	58$^{1}/_{16}$	44$^{1}/_{16}$	43$^{11}/_{16}$	48	42	1¼x⅝x12
W-937	93¾	53½	54	68⅛	28$^{5}/_{16}$	91	81	70⅛	77⅛	62⅜	48⅞	48⅛	53	47	1½x⅝x13
W-1042	104⅛	58½	60	75⅜	30$^{31}/_{32}$	101	90	78⅛	86$^{9}/_{16}$	68$^{15}/_{16}$	54⅜	53$^{1}/_{16}$	59	53	1¾x⅞x13

FAN SIZE	K	L	M	N	O	P	Q	R	S	T	SHAFT STD.	SHAFT HVY.
W-451	20⅜	41½	42½	8½	47$^{3}/_{32}$	44½	30$^{1}/_{16}$	27$^{1}/_{16}$	14$^{1}/_{32}$	4¼	2$^{7}/_{16}$	3$^{1}/_{16}$
W-505	20½	41	47⅛	10⅜	55⅜	44	34½	30⅜	16	4½	3$^{3}/_{16}$	3$^{1}/_{16}$
W-575	22½	46	53⅜	12	60$^{1}/_{16}$	48	38$^{1}/_{32}$	34⅛	17$^{1}/_{16}$	4½	3$^{7}/_{16}$	3$^{15}/_{16}$
W-643	25½	51	60⅛	13	66½	54	43$^{9}/_{16}$	37¾	19½	4½	3$^{15}/_{16}$	4$^{1}/_{16}$
W-712	28	56	66⅜	13	71½	59	48	41¼	21½	4½	4$^{7}/_{16}$	4$^{15}/_{16}$
W-782	28½	57	73⅛	14	78$^{1}/_{16}$	60	52$^{23}/_{32}$	44⅞	23$^{1}/_{16}$	4¼	4$^{15}/_{16}$	4$^{15}/_{16}$
W-852	34½	68	79⅜	14	83$^{27}/_{32}$	72	57$^{13}/_{32}$	48$^{1}/_{16}$	24$^{25}/_{32}$	4½	4$^{15}/_{16}$	5$^{7}/_{16}$
W-937	37½	75	87⅝	15	92$^{1}/_{16}$	78	63$^{9}/_{16}$	52⅞	27$^{1}/_{16}$	4½	5$^{7}/_{16}$	6$^{7}/_{16}$
W-1042	44½	89	97$^{1}/_{16}$	15	100$^{23}/_{32}$	92	70¼	58$^{1}/_{16}$	29$^{23}/_{32}$	4½	6$^{7}/_{16}$	7½

Note: For Flanges Dimensions See Back Page

BEST AVAILABLE COPY

MODEL W-712

WHEEL—71¼" DIAMETER
INLET—41" O.D.
OUTLET AREA—9.474 SQ. FT.
MAXIMUM RPM STANDARD DUTY—820*
MAXIMUM RPM HEAVY DUTY—1050*

COMBINATION PERFORMANCE TABLES FOR STANDARD AND HEAVY DUTY FANS

CFM	OV	S.P. 1 RPM	S.P. 1 BHP	S.P. 2 RPM	S.P. 2 BHP	S.P. 3 RPM	S.P. 3 BHP	S.P. 4 RPM	S.P. 4 BHP	S.P. 5 RPM	S.P. 5 BHP	S.P. 6 RPM	S.P. 6 BHP	S.P. 7 RPM	S.P. 7 BHP	S.P. 8 RPM	S.P. 8 BHP	S.P. 9 RPM	S.P. 9 BHP	S.P. 10 RPM	S.P. 10 BHP
7579	800	[illegible]	[illegible]	286	4.21	324	5.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9474	1000	[illegible]	[illegible]	[illegible]	[illegible]	325	7.84	374	10.88	418	14.33	0	0	0	0	0	0	0	0	0	0
11369	1200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	376	12.38	418	16.05	458	19.81	494	23.84	0	0	0	0	0	0
13264	1400	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	421	17.82	460	22.01	498	26.35	529	30.85	561	35.6	590	40.28
15158	1600	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	462	24.13	498	28.81	531	33.66	562	38.8	592	43.71
17053	1800	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21.78	[illegible]	28.48	[illegible]	[illegible]	533	36.47	564	41.78	594	47.24
18948	2000	231	6.14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24.03	[illegible]	28.98	500	34.18	536	38.68	567	44.87	596	50.75
20843	2200	240	7.22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	28.57	472	31.72	507	37.13	539	42.77	570	48.64	598	54.33
22738	2400	250	8.46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	477	34.77	511	40.39	542	46.19	573	52.31	602	58.53
24632	2600	260	9.86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	482	37.98	516	43.88	547	50.03	576	56.18	606	62.76
26527	2800	270	11.43	328	17.07	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	26.05	[illegible]	[illegible]	521	47.88	552	54.13	581	60.88	608	67.1
28422	3000	281	13.21	336	19.18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	65.31	611	72.28
30317	3200	292	15.18	344	21.48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	70.13	616	77.48
32212	3400	303	17.38	353	24.01	398	30.82	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76.26	624	82.87
34106	3600	316	19.82	363	26.74	407	34.02	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	574	[illegible]	[illegible]	80.44	[illegible]	[illegible]
36001	3800	327	22.62	373	29.7	415	37.33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37896	4000	339	25.47	384	33.01	426	40.86	463	49.11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
39791	4200	352	28.88	395	36.67	436	44.82	471	53.31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
41686	4400	363	32.03	408	40.4	446	48.94	480	57.76	514	66.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
43580	4600	375	35.73	417	44.5	456	53.32	490	62.57	523	71.94	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45475	4800	387	39.72	429	48.9	465	58.12	499	67.58	532	77.35	562	87.22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	127.46
47370	5000	398	44.02	440	53.74	476	63.28	509	73.08	541	83.1	571	93.34	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
49265	5200	412	48.83	452	58.92	487	68.75	519	78.78	550	88.23	580	98.76	608	110.44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	142.51
51160	5400	424	53.58	464	64.44	497	74.36	528	84.82	560	95.69	589	106.49	617	117.6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	150.48
53054	5600	436	58.62	476	70.31	508	80.68	540	91.41	570	102.48	598	113.7	626	126.08	652	[illegible]	[illegible]	[illegible]	701	158.94
54949	5800	449	64.44	489	76.66	519	87.09	551	98.38	580	109.6	608	121.28	634	132.88	661	144.82	[illegible]	[illegible]	709	[illegible]
56844	6000	461	70.23	501	83.17	531	94.16	562	105.68	590	117.06	618	129.18	644	141.19	669	153.4	694	165.73	718	178.08
58739	6200	476	77	512	89.8	543	101.82	572	113.37	601	125.19	628	137.47	653	149.91	678	162.33	703	175.1	726	187.82
60634	6400	488	84.2	524	97.07	555	109.5	583	121.46	611	133.73	638	146.12	663	159.01	688	171.61	711	184.83	735	197.98
62528	6600	502	91.64	536	104.76	566	117.8	594	129.68	622	142.68	648	155.17	673	168.48	697	181.73	720	194.92	744	208.52
64423	6800	516	99.85	548	112.84	580	128.63	606	138.85	633	152.04	658	164.98	683	178.38	707	192.06	730	205.68	752	219.45
66318	7000	530	108.53	561	121.37	592	135.71	616	148.47	644	161.63	668	175.23	693	188.66	717	202.70	739	216.63	761	230.78
68213	7200	544	117.6	573	130.33	604	146.34	630	158.58	655	172.08	680	185.92	703	199.66	727	213.88	749	228.43	771	242.84
70108	7400	558	127.18	588	139.74	617	156.44	642	169.12	665	182.42	691	197.08	714	211.15	737	229.65	760	240.47	781	255.31
72002	7600	572	137.28	597	148.81	628	166.32	654	180.17	677	193.88	701	208.87	725	223.21	747	237.57	769	252.95	790	268.23
73897	7800	586	147.88	610	158.98	640	176.18	666	191.72	688	206.88	712	220.75	735	235.75	767	250.55	779	265.9	800	281.62
75792	8000	600	159.04	622	170.78	652	187.88	679	203.78	701	218.39	724	233.52	746	248.8	788	264.04	788	279.3	810	295.48

CFM	OV	S.P. 12 RPM	S.P. 12 BHP	S.P. 14 RPM	S.P. 14 BHP	S.P. 16 RPM	S.P. 16 BHP	S.P. 18 RPM	S.P. 18 BHP	S.P. 20 RPM	S.P. 20 BHP	S.P. 22 RPM	S.P. 22 BHP	S.P. 24 RPM	S.P. 24 BHP	S.P. 26 RPM	S.P. 26 BHP	S.P. 28 RPM	S.P. 28 BHP	S.P. 30 RPM	S.P. 30 BHP
7579	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9474	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11369	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13264	1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15158	1600	647	54.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17053	1800	640	58.44	700	70.17	747	82.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18948	2000	651	62.88	701	76	748	87.81	793	101.03	836	114.83	0	0	0	0	0	0	0	0	0	0
20843	2200	653	66.9	703	78.98	750	93.48	794	107.23	837	121.48	877	136.09	916	151.05	0	0	0	0	0	0
22738	2400	656	71.2	706	84.8	753	99.04	797	113.81	838	128.4	878	143.67	918	159.28	963	173.22	988	191.48	1023	208.05
24632	2600	659	78.21	708	[illegible]	755	104.7	799	119.8	840	135.6	880	151.48	918	167.57	964	184.17	990	201.08	1024	218.3
26527	2800	662	81.28	711	96.79	758	110.87	801	126.29	843	142.52	882	159.14	920	176.11	957	193.43	991	210.76	1025	228.83
28422	3000	665	86.44	716	101.68	761	117.28	804	133.16	845	149.65	884	166.9	922	184.51	959	202.46	994	220.74	1027	239.36
30317	3200	670	92.38	718	107.88	764	123.88	807	140.68	849	157.61	887	174.77	924	193.01	961	211.6	998	230.52	1029	249.75
32212	3400	675	98.53	723	114.43	767	130.88	810	148.17	851	165.79	890	183.7	927	201.83	963	220.86	998	240.41	1032	260.28
34106	3600	680	104.88	727	121.64	772	138.42	814	156.80	854	174.21	893	192.83	930	211.72	966	230.88	1000	250.42	1034	270.93
36001	3800	686	111.43	732	128.88	776	[illegible]	818	164.38	858	182.81	898	202.13	934	221.72	969	241.88	1004	261.7	1036	281.71
37896	4000	691	118.39	737	137.38	781	[illegible]	823	173.41	862	192.21	900	211.8	937	231.9	972	252.46	1007	273.28	1040	294.34
39791	4200	697	125.38	743	144.42	786	163.23	828	182.7	867	202.28	904	222.02	940	242.25	976	263.53	1010	285.05	1043	308.82
41686	4400	703	132.81	749	152.6	791	172.08	833	192.24	872	212.58	909	233.07	945	253.78	979	274.17	1013	297	1046	319.46
43580	4600	710	140.07	755	160.64	796	181.42	838	202.02	877	223.11	914	244.38	950	265.82	984	287.44	1018	309.14	1049	332.33
45475	4800	717	148.4	761	169.14	804	190.68	844	212.44	882	233.83	919	255.97	955	278.17	989	300.54	1022	323.08	0	0
47370	5000	724	156.58	767	177.91	810	200.23	850	222.74	887	245.01	924	267.62	958	290.8	994	313.93	1027	337.22	0	0
49265	5200	732	165.02	778	187.73	816	210.08	856	233.33	894	256.81	929	279.95	966	303.7	998	327.81	1031	351.88	0	0
51160	5400	739	173.78	782	197.28	823	220.95	862	244.22	899	268.48	936	292.19	970	316.5	1004	341.58	1036	366.4	0	0
53054	5600	746	182.86	790	207.11	830	231.68	868	255.41	908	280.42	941	305.61	976	330.98	1009	356.84	1041	381.44	0	0
54949	5800	754	192.24	797	217.28	837	242.61	876	267.82	912	292.1	948	318.85	982	344.79	1015	371.09	1046	396.8	0	0
56844	6000	762	202.83	804	227.81	846	253.81	883	279.98	918	305.3	954	332.03	988	358.92	1021	385.98	0	0	0	0
58739	6200	771	213.23	812	238.87	852	266.46	889	292.4	926	318.62	960	345.74	994	373.41	1027	401.23	0	0	0	0
60634	6400	779	224.23	819	[illegible]	860	277.49	897	306.18	933	333.07	968	361.16	1000	388.24	1033	418.84	0	0	0	0
62528	6600	787	235.8	828	262.86	867	289.83	904	318.34	940	347	975	376.83	1008	404.84	1039	432.79	0	0	0	0
64423	6800	796	247.39	837	275.28	874	302.88	912	331.88	948	361.33	982	390.92	1015	420.88	1046	449.12	0	0	0	0
66318	7000	805	259.58	845	288.21	883	316.96	919	346.81	956	376.06	989	406.42	1022	436.94	0	0	0	0	0	0
68213	7200	813	272.19	853	301.74	892	331.24	927	360.13	962	391.17	996	422.32	1029	453.82	0	0	0	0	0	0
70108	7400	822	285.21	862	316.82	900	345.98	936	378.28	970	406.7	1004	438.85	1036	470.72	0	0	0	0	0	0
72002	7600	831	298.88	871	329.95	909	361.12	944	392.28	977	422.63	1011	455.38	1044	488.28	0	0	0	0	0	0
73897	7800	840	312.85	879	344.72	917	376.75	952	408.71	987	440.88	1019	472.58	0	0	0	0	0	0	0	0
75792	8000	850	327.58	888	359.98	925	392.84	961	425.64	995	458.43	1028	490.17	0	0	0	0	0	0	0	0

Areas of maximum efficiency are shaded.
Solid lines indicate division between Standard Duty and Heavy Duty fans.
Caution! Do Not Exceed maximum RPM as shown on name plate attached to fan.
*When elevated temperatures are required, maximum fan speed must be reduced as shown on Table #1 in front of this catalogue

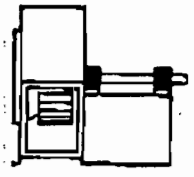
Phelps Fan Manufacturing Company
P.O. Box 9588
9417 New Benton Highway
Little Rock, Arkansas 72219
(501) 568-5550

DRIVE ARRANGEMENTS FOR CENTRIFUGAL FANS

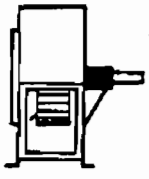
SW — Single Width DW — Double Width
SI — Single Inlet DI — Double Inlet

Arrangements 1, 3, 7 and 8 are also available with bearings mounted on pedestals or base set independent of the fan housing.

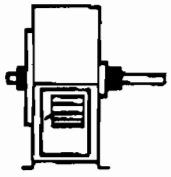
For designation of rotation and discharge, see 99-2406.
For motor position, belt or chain drive, see 99-2407.
For designation of position of inlet boxes, see 99-2405.



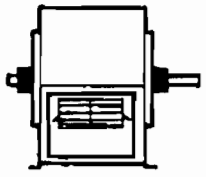
ARR. 1 SWSI For belt drive or direct connection. Impeller overhung. Two bearings on base.



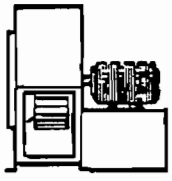
ARR. 2 SWSI For belt drive or direct connection. Impeller overhung. Bearings in bracket supported by fan housing.



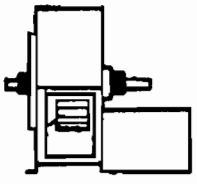
ARR. 3 SWSI For belt drive or direct connection. One bearing on each side and supported by fan housing.



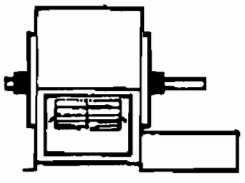
ARR. 3 DWDI For belt drive or direct connection. One bearing on each side and supported by fan housing.



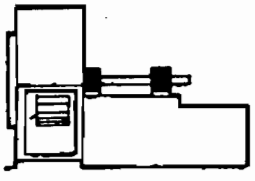
ARR. 4 SWSI For direct drive. Impeller overhung on prime mover shaft. No bearings on fan. Prime mover base mounted or integrally directly connected.



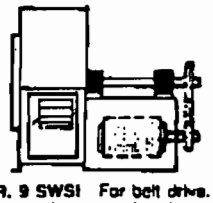
ARR. 7 SWSI For belt drive or direct connection. Arrangement 3 plus base for prime mover.



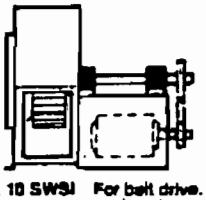
ARR. 7 DWDI For belt drive or direct connection. Arrangement 3 plus base for prime mover.



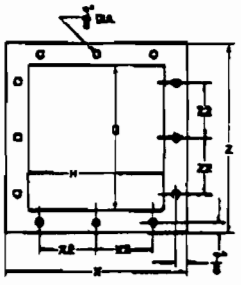
ARR. 8 SWSI For belt drive or direct connection. Arrangement 1 plus extended base for prime mover.



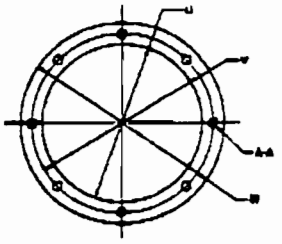
ARR. 9 SWSI For belt drive. Impeller overhung, two bearings, with prime mover outside base.



ARR. 10 SWSI For belt drive. Impeller overhung, two bearings, with prime mover inside base.



DISCHARGE FLANGE

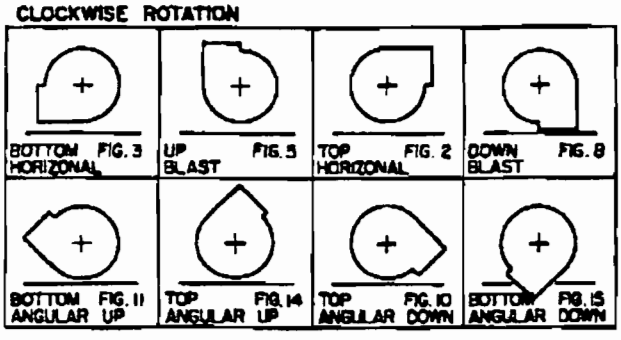


INLET FLANGE

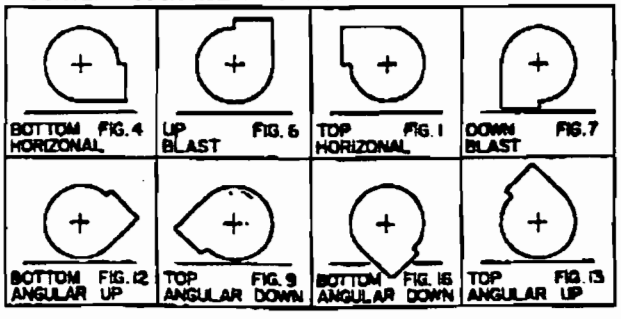
FAN SIZE	U	V	W	X	X2	Z	Z2	AA HOLES NO.	AA HOLES DIA
W-122	7	9	11	9⅞	2½	8⅞	2½	8	⅜
W-140	9	11	13	10⅜	3	10⅜	3	8	⅜
W-170	11	13	15	11⅞	4	11⅞	4	8	⅜
W-226	13	15	17	14 1⁄16	5½	14⅜	5½	8	⅞
W-261	15	17	19	16½	6	16 1⁄16	6	8	⅞
W-296	17	19	21	18¼	7	18½	7	8	⅞
W-330	19	21	23	20	8	20⅝	8	16	⅞
W-365	21	23	25	21⅜	9	22⅛	9	16	⅝
W-400	23	25	27	23 1⁄16	10	24	10	16	⅝

FAN SIZE	U	V	W	X	X2	Z	Z2	AA HOLES NO.	AA HOLES DIA
W-451	26	28	30	27⅜	3½	27⅝	4	16	⅝
W-505	29	31	33	30	3½	30⅞	4	16	⅝
W-575	33	35	37	33⅜	4	34⅝	5	16	⅝
W-643	37	39	41	37	4½	37⅝	5	16	⅝
W-712	41	43	45	40½	5	41¼	6	24	⅝
W-782	45	47	49	44⅛	6	44 13⁄16	6	24	⅝
W-852	49	51	53	47 1⁄16	6	48⅞	7	24	⅝
W-937	54	56	58	52⅛	7	53⅛	8	24	⅝
W-1042	60	62	64	57⅞	8	59⅛	8	24	⅝

CLOCKWISE ROTATION



COUNTER CLOCKWISE ROTATION



CUSTOMER:RESOURCE RECY | BILL OF MATERIAL | 180-36C-03

DWG.# 180-36C 03 | TITLE: TOP SERVICE DECK (2) FOR AIR SYSTEM

QTY FOR: 1 UNITS | DATE: 9/1/89 | REV:

ITEM	SECTION	DESCRIPTION THK/SIZE	LENGTH	WIDTH	UM	QTY	REMARKS	WEIGHT/UM	TOTAL WT
33	PIPE	1 1/4" Ø	103.875		IN	2	SCH 40.	2.27	39.30
34	PIPE	1 1/4" Ø	76		IN	4	SCH 40.	2.27	57.51
35	PIPE	1 1/4" Ø	135.25		IN	4	SCH 40.	2.27	102.34
36	FB	1/4" X 4"	103.875		IN	1		3.4	29.43
37	FB	1/4" X 4"	77.375		IN	2		3.4	43.85
38	FB	1/4" X 4"	138		IN	2		3.4	78.20
39	PIPE	1 1/4" Ø	59.375		IN	2	SCH 40.	2.27	22.46
40	PIPE	1 1/4" Ø	14.875		IN	2	SCH 40.	2.27	5.63
41	FB	1/4" X 4"	63.75		IN	1		3.4	18.06
42	FB	3/16" X 6"	154		IN	1		4.68	60.06
43	EXP.METAL		63.5	31	SQ.IN.	1	STD .SHOP EXPANDED METAL	0	0.00
44	ANGLE	3 X 3 X 1/4"	60		IN	1		4.9	24.50
45	FB	3/16" X 6"	205		IN	1		4.68	79.95
46	EXP. METAL		89	31	SQ.IN.	1	STD. SHOP EXPANDED METAL	0	0.00
47	ANGLE	3 X 3 X 1/4"	120		IN	1		4.9	49.00
48	FAN	SIZE #100 (PREVIOUSLY ISSUED)				1	SIZE # 100 INDUSTRIAL HIGH EFFICIENCY FAN. COMPARABLE TO AN IMPCO MODEL TYPE. FAN ARRANGEMENT NO. 6		0.00
						OR	PHELPS FAN MODEL W-712 FAN ARRANGEMENT FIG #4 (CCW BOTTOM HORIZONTAL)		
							ANY ALTERNATE SUPPLIER FOR THE FAN MUST BE SUBMITTED TO ENGINEERING FOR APPROVAL BY PRESENTING FULL FAN DOCUMENTATION (IE- DIMENSIONS, CURVES AND PERFORMANCE DETAILS)		

ISSUED TO: | PREPARED BY:GASTON |

CUSTOMER:RESOURCE RECY | BILL OF MATERIAL | 180-36C-03

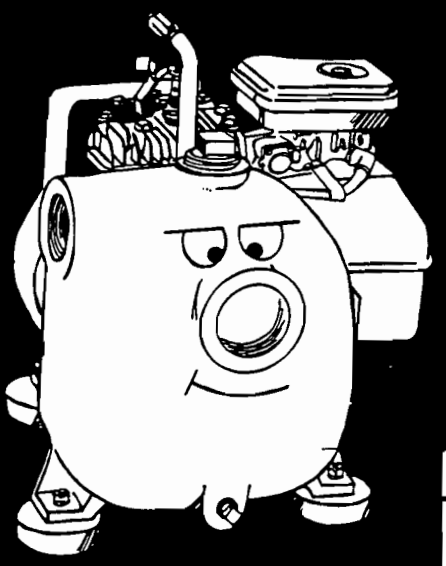
DWG.# 180-36C 03 | TITLE: TOP SERVICE DECK (2) FOR AIR SYSTEM

QTY FOR: 1 UNITS | DATE: 9/1/89 | REV:

ITEM	SECTION	DESCRIPTION THK/SIZE	LENGTH	WIDTH	UM	QTY	REMARKS	WEIGHT/UM	TOTAL WT
49	MOTOR	100 HP	1750 RPM			1	404T FRAME SIZE.		0.00
		(PREVIOUSLY ISSUED)					480V, 60 HZ, 1750 RPM		0.00
50	DR. SHEAVE	10.3" WITH 3020, 2 7/8" Ø BORE, 5-G.				1			0.00
51	DN. SHEAVE	28" WITH 4040,4 7/16" Ø BORE, 5-G.				1			0.00
52	BELT	5V X 1400 5-STR BELT				1			0.00
53	BOLT	7/8" Ø-UNC	2.5		EA	8	WITH NUT & LKWSHER		0.00
54	BOLT	3/4" Ø-UNC	2.25		EA	4	WITH NUT & LKWSHER		0.00
55	FAN	SIZE #100				1	SIZE # 100 INDUSTRIAL HIGH		0.00
		(PREVIOUSLY ISSUED)					EFFICIENCY FAN. COMPARABLE TO		
							AN IMPCO MODEL TYPE.		
							FAN ARRANGEMENT NO. 5		
						OR	PHELPS FAN MODEL W-712		
							FAN ARRANGEMENT FIG #3		
							(CW BOTTOM HORIZONTAL)		
							ANY ALTERNATE SUPPLIER FOR THE		
							FAN MUST BE SUBMITTED TO		
							ENGINEERING FOR APPROVAL BY		
							PRESENTING FULL FAN DOCUMENTATION		
							(IE- DIMENSIONS, CURVES AND PERFORMANCE		
							DETAILS)		
56	MOTOR	200 HP	1750 RPM			1	445T FRAME SIZE.		0.00
		(PREVIOUSLY ISSUED)					480V, 60 HZ, 1750 RPM		0.00
57	MOTOR MOUNT	FOR 445T NEMA FRAME				1	LINCOLN MOTOR MOUNT		0.00
58	DR. SHEAVE	11.8" WITH 3535,3 3/8" Ø BORE, 6-G				1			0.00
59	DN. SHEAVE	28" WITH 4040, 4 7/16" Ø BORE, 6-G				1			0.00
60	BELT	5V X 1900 6-STR BELT				1			0.00
61	BOLT	7/8" Ø-UNC	2.5		EA	8	WITH NUT & LKWSHER		0.00
62	BOLT	3/4" Ø-UNC	2.25		EA	8	WITH NUT & LKWSHER		0.00
								TOTAL WT:	7064.55

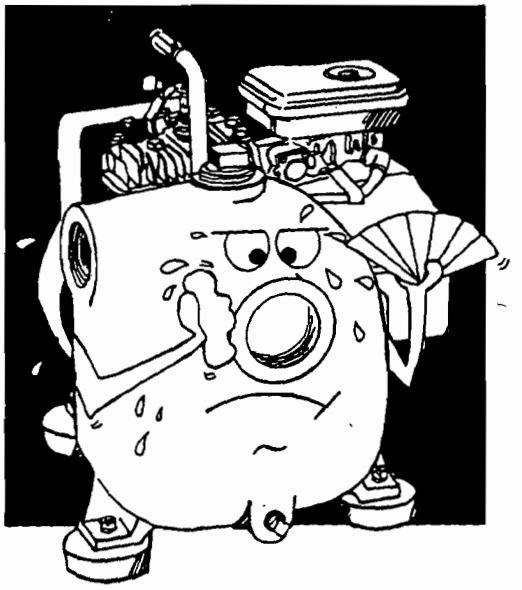
ISSUED TO: | PREPARED BY:GASTON | Page 3 of

GORMAN-RUPP



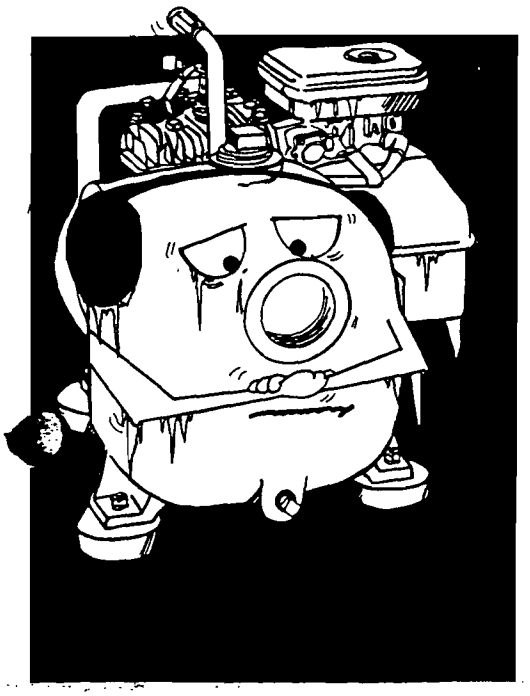
PUMP SAFETY HANDBOOK

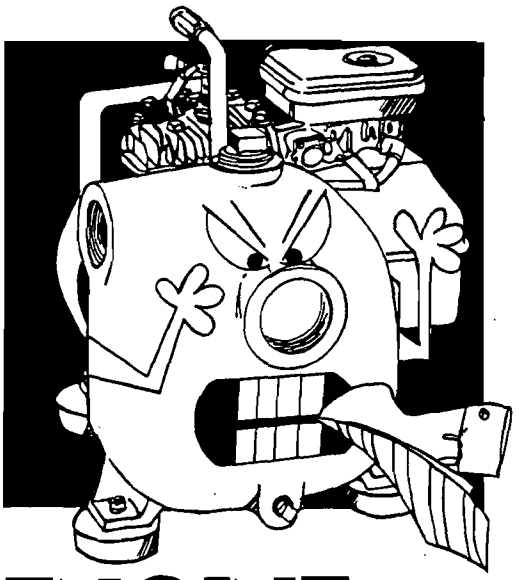
PUMPS IN GENERAL



1. Overheated pumps can cause severe burns and injury. If overheating of pump casing occurs:
   - A. stop pump immediately
   - B. allow to cool completely
   - C. slowly and cautiously vent pump
   - D. refer to instruction manual before restart.
2. Do not operate pump without guards and shields in place.
3. Approach cautiously any pump that has been in operation.
4. Pump only liquids designed for operation of pump.
5. Do not pump flammable or corrosive liquids unless pump and piping are designed for such.
6. Operating pump with suction and discharge closed is one cause of severe overheating.
7. Note direction of rotation — operating pump in wrong direction can cause impeller to unscrew and damage volute casing.
8. Locate the pump in an accessible location, as close to the liquid as possible.
9. Check all lubricants before installation and in accordance with maintenance programs.
10. When lifting pumps, use only lifting equipment in good repair and with adequate capacity.
11. Never operate a self-priming pump unless the volute is filled with liquid. The pump will not prime when dry.
12. Do not remove the cover plate or drain plugs from any overheated pump. Allow pump to cool. Check pump temperature before opening fill port or drain plug.
13. A pump should not be operated against a closed valve for any period of time.
14. Check the suction strainer regularly.
15. Secure the pump after it is in its operating position.

16. Check the pump thoroughly at delivery for any shipping damage.
17. Don't work in underground pump systems by yourself.
18. Never wear loose clothing around machinery.
19. Always read and keep Pump Maintenance and Parts Manual.
20. When overhauling pumps, never delete warning tags.
21. Experienced personnel only should operate machinery.
22. When working on pumps with electric motors and panels, LOCK control handle in OFF position:
    A. if control cannot be locked pull main fuse.
    B. take V-belts off.
23. Drain pump completely of water before freezing weather.

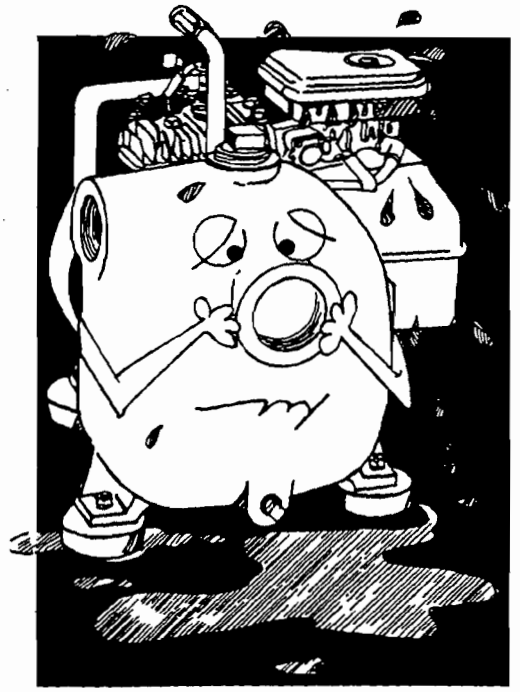


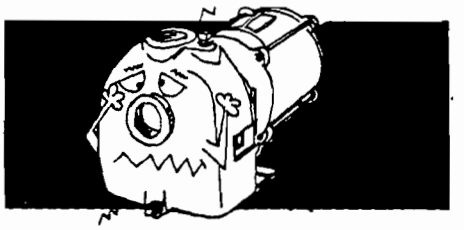


ENGINE DRIVEN PUMPS

1. When operating internal combustion engines in an enclosed area, always make provisions to pipe exhaust fumes to outside.
2. Overfilling of fuel tank should be avoided.
3. Disconnect spark plug during repair.
4. Never refuel a hot or running engine.
5. Experienced personnel only should operate machinery.
6. Never tamper with the governor setting to gain more power. The governor establishes safe operating limits.

7. Always store gasoline in an approved safe container and location.
8. Make sure all fuel lines are secure.
9. Follow engine manufacturer recommended maintenance and operations.
10. Always use correct type of fuel for engine.
11. Normal heat from an exhaust can be a hazard.
12. Do not jump-start engine battery.
13. Do not shut down high head pumps quickly:
    A. throttle back slowly
    B. by-pass line should be opened
    C. should have check valve
    D. slowly close gate valve on discharge if it has one.



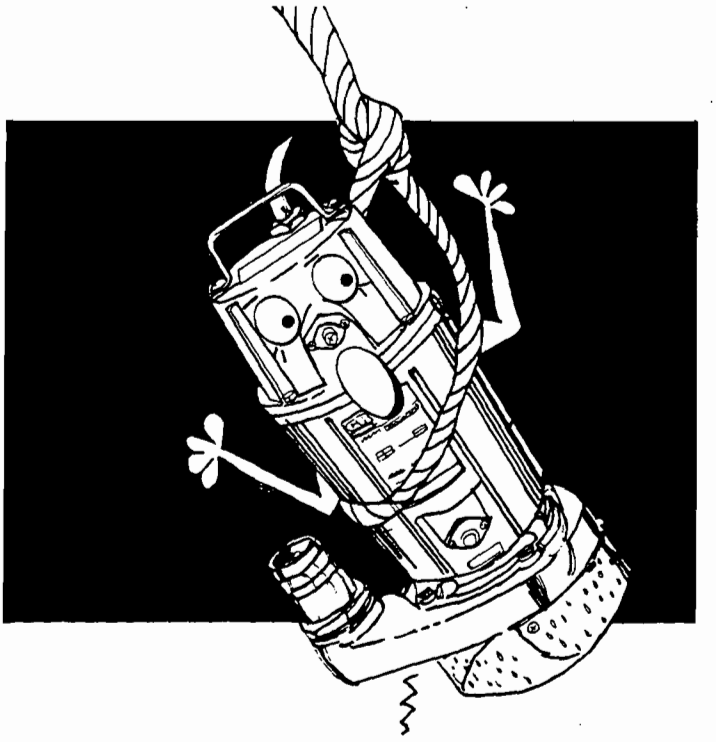


ELECTRIC MOTOR DRIVEN

1. Whenever electricity is present there is a possibility of electrocution.
2. Allow only qualified personnel to install, wire and operate pump and motor.
3. Always ground electrical units.
4. Never use gas piping as an electrical ground.
5. Be sure to connect motor to right phase and voltage.
6. If circuit breaker or fuse is tripped, examine problem before restarting pump.
7. Do not run pump if voltage is not within limits.
8. Make all electrical installation in accordance with national electrical code and local codes.
9. Make sure the related electrical circuits are dead and locked out before performing any maintenance.
10. Follow motor manufacturer recommended maintenance and operations.

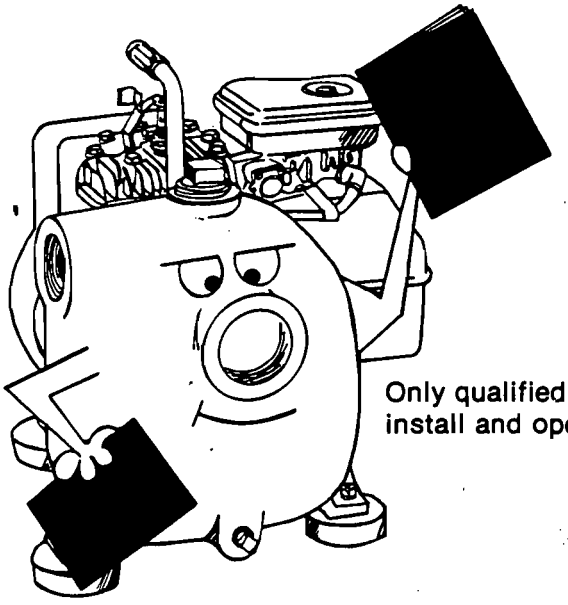
NADA

U.S.A.



SUBMERSIBLES

1. Never attempt to raise pump by electrical cord.
2. Always use proper Gorman-Rupp control box.
3. Always check rotation on 3 phase pumps.
4. Make sure the related electrical circuits are dead and locked out before performing any maintenance.
5. Do not hold reset button if overload control trips off. Do not reset until 10 minutes have elapsed.
6. Never put pump directly on soft, loose bottom.
7. Do not run pump if voltage is not within limits.
8. Check oil level only when pump is cool.
9. Use only recommended transformer oil.
10. Control box must be mounted in vertical position.



Only qualified personnel should install and operate pumps.

Be sure you have read all of Installation, Operation and Maintenance Manual as well as these safety instructions before you begin to operate your new pump. Once you have read them all, you should only have to apply some ordinary common sense to avoid any mishaps. We, at Gorman-Rupp, have gone to considerable expense to insure the safety and reliability of all our pumps. But your safety ultimately rests in your hands, so do your part and you will enjoy trouble-free pumping for years to come. Thank you.

GORMAN-RUPP

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA

SM-00593

Printed In U.S.A.

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

VOID

IN RE:

PINELLAS COUNTY RESOURCE RECOVERY FACILITY MODIFICATION OF TERMS AND CONDITIONS OF CERTIFICATION NO. PA 83-18 PINELLAS COUNTY, FLORIDA

OGC FILE NO: 85-0470

FINAL ORDER MODIFYING
CONDITIONS OF CERTIFICATION

The Florida Department of Environmental Regulation, after notice and opportunity for hearing, modifies the conditions of certification for the Pinellas County Resource Recovery Facility pursuant to Section 403.516(1), Florida Statutes, and Section VII of the Conditions of Certification, which delegated modifications of emission limitation conditions to the Department.

1. On August 17, 1984, and May 8, 1985, Pinellas County submitted letters to the Department requesting modification of the existing Conditions of Certification for its Resource Recovery Facility to amend emission limitations and compliance monitoring.

2. After review of the request and existing data, the Department proposed to grant relief to Pinellas County by making the following modifications to the conditions of certification.

A. Condition XIV.A.1. shall be changed to read:

1. Emission Limitations upon Operation of Unit 3

a. Stack emissions from ~~each unit~~ Units 1 or 2 shall not exceed the following:

(1) Particulate matter: in grains per standard cubic foot dry gas corrected to 12% CO_2 - 0.08.

(2) SO_2-170 lbs/hr each unit

(3) Odor: there shall be no objectionable odor

VOID

(4) Visible emissions: stack opacity shall be no greater than 20% except as provided for during start-up, shutdown, or malfunctions when the provisions of 17-2.250, FAC, shall apply

b. Emissions from Unit 3 shall not exceed the following:

(1) Particulate matter: in grains per standard cubic foot dry gas corrected to 12% CO_2 - 0.03.

(2) SO_2-170 lbs/hr

(3) Nitrogen oxides - 254 lbs/hr

(4) Carbon monoxide - 66 lbs/hr

(5) Lead - 4.4 lbs/hr

(6) Mercury - 3200 grams/day when more than 2205 lbs/day of municipal sludge is fired. Compliance shall be determined in accordance with 40 CFR 6.1, Method 101, Appendix B

(7) Odor - there shall be no objectionable odor

(8) Visible emissions - stack opacity shall be no greater than 20% except as provided for during start-up, shutdown or malfunctions when the provisions of 17-2.250, FAC, shall apply.

~~b.~~ c. The height of the boiler exhaust stack shall be less than 161 feet above grade.

~~c.~~ d. The incinerator boilers shall not be loaded in excess of their rated capacity of 87,500 pounds of municipal solid waste per hour each.

d. ~~e.~~ The incinerator boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, rated capacity and certification number.

e. ~~f.~~ Compliance with the limitations for particulates, opacity, sulfur oxides, nitrogen oxides, carbon monoxide, and lead shall be determined in accordance with Florida Administrative Code Rule 17-2.700, DER Methods 1, 2, 3, 5, 6, 9, or 40 CFR Part 60, Appendix A, Methods 1-7, 9, 10, and 12. ~~Method 7.~~ The stack test shall be performed at ± 10% of the maximum steam rate of 250,000 pounds per hour.

Any party to this Order has the right to seek judicial review of this Order pursuant to Section 120.68, Florida Statutes by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department in the Office of the General Counsel, 2600 Blair Stone Road, Tallahassee, Florida, 32301; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The Notice of Appeal must be filed within 30 days from the date the Final Order is filed with the clerk of the Department.

DONE AND ORDERED the 28 day of July, 1986, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52 (9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Pamela Lee for Peggy Brazil — Clerk
7/30/86 — Date

Victoria J. Tschinkel
VICTORIA J. TSCHINKEL
Secretary

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301
Telephone: 904/488-9730

Copies furnished:

Van B. Cook, Esquire
County Attorney
315 Court Street
Clearwater, Florida 33516

Julia Cobb, Esquire
Department of Environmental
Regulation
Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32301

C. Laurence Keesey, Esquire
Department of Community Affairs
Howard Building
2571 Executive Center Circle East
Tallahassee, Florida 32301

Kent Zaiser, Esquire
Southwest Florida Water
Management District
2379 Broad Street
Brooksville, Florida 33512-9712

Michael Twomey
Public Service Commission
G-22 Fletcher Building
101 East Gaines Street
Tallahassee, Florida 32301

VOID

State of Florida Department of Environmental Regulation
Pinellas County
Resource Recovery Facility
Case No. PA 78-11 and PA 83-18
CONDITIONS OF CERTIFICATION (2/29/84)

VOID

Table of Contents

VOID

State of Florida
Pinellas County
Resource Recovery Facility
Case No. PA 78-11 and PA 83-18
CONDITIONS OF CERTIFICATION

I. CHANGE IN DISCHARGE

All discharges or emissions authorized herein shall be consistent with the terms and conditions of this certification. The discharge of any pollutant not identified in the application, or more frequent than, or at a level in excess of that authorized herein, shall constitute a violation of the certification. Any anticipated facility expansions, production increases, or process modifications which may result in new, different, or increased discharges or pollutants, change in fuel, or expansion in steam generating capacity must be reported by submission of a new or supplemental application pursuant to Chapter 403, Florida Statutes.

II. NON-COMPLIANCE NOTIFICATION

If, for any reason, the permittee does not comply with or will be unable to comply with any limitation specified in this certification, the permittee shall notify the Southwest Florida District Manager of the Department by telephone during the working day that said noncompliance occurs and shall confirm this in writing within seventy-two (72) hours of becoming aware of such conditions, and shall supply the following information:

A. A description of the discharge and cause of noncompliance; and

B. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying event.

VOID

III. FACILITIES OPERATION

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this certification. Such systems are not to be bypassed without prior Department approval.

IV. ADVERSE IMPACT

The permittee shall take all reasonable steps to minimize any adverse impact resulting from noncompliance with any limitation specified in this certification, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

V. RIGHT OF ENTRY

The permittee shall allow the Secretary of the Florida Department of Environmental Regulation and/or authorized representatives, upon the presentation of credentials:

A. To enter upon the permittee's premises where an effluent source is located or in which records are required to be kept under the terms and conditions of this permit, and

B. To have access to and copy any records required to be kept under the conditions of this certification, and

C. To inspect and test any monitoring equipment or monitoring method required in this certification and to sample any discharge or pollutants, and

D. To assess any damage to the environment or violation of ambient standards.

VOID

VI. REVOCATION OR SUSPENSION

This certification may be suspended or revoked pursuant to Section 403.512, Florida Statutes, or for violations of any of its conditions.

VII. CIVIL AND CRIMINAL LIABILITY

This certification does not relieve the permittee from civil or criminal penalties for noncompliance with any conditions of this certification, applicable rules or regulations of the Department or Chapter 403, Florida Statutes, or regulations thereunder.

Subject to Section 403.511, Florida Statutes, this certification shall not preclude the institution of any legal action or relieve the permittee from any responsibilities, or penalties established pursuant to any other applicable State Statutes, or regulations.

VIII. PROPERTY RIGHTS

The issuance of this certification does not convey any property rights in either real or personal property, nor any exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights nor any infringement of Federal, State or local laws or regulations.

IX. SEVERABILITY

The provisions of this certification are severable, and if any provision of this certification or the application of any provision of this certification to any circumstances, is held invalid, the application of such provision to other circumstances and the remainder of the certification shall not be affected

thereby.

VOID

X. DEFINITIONS

The meaning of terms used herein shall be governed by the definitions contained in Chapter 403, Florida Statutes and any regulations adopted pursuant thereto. In the event of any dispute over the meaning of a term in these general or special conditions which is not defined in such statutes or regulations, such dispute shall be resolved by reference to the most relevant definitions contained in any other state or federal statute or regulation or, in the alternative by the use of the commonly accepted meaning as determined by the Department.

XI. REVIEW OF SITE CERTIFICATION

The certification shall be final unless revised, revoked or suspended pursuant to law. At least every five years from the date of issuance of certification the Department shall review all monitoring data that has been submitted to it during the preceding five-year period for the purpose of determining the extent of the permittee's compliance with the conditions of this certification and the environmental impact of this facility. The Department shall submit the results of its review and recommendations to the permittee. Such review will be repeated at least every five years thereafter.

XII. MODIFICATION OF CONDITIONS

Pursuant to Subsection 403.516(1), F.S., the Board hereby delegates the authority to the Secretary to modify any condition of this certification dealing with sampling, monitoring, reporting, specification of control equipment, related time schedules, emission limitations subject to notice and opportunity for hearing, or any special studies conducted, as necessary to attain the objectives of Chapter 403, Florida Statutes.

VOID

All other modifications shall be made in accordance with Section 403.516, Florida Statutes.

XIII. CONSTRUCTION

The facility shall be constructed, as a minimum, pursuant to the design standards presented in the application.

A. Control Measures

1. Stormwater Runoff

To control runoff during construction which may reach and thereby pollute Waters of the State, necessary measures shall be utilized to settle, filter, treat or absorb silt-containing or pollutant-laden stormwater to insure against spillage or discharge of excavated material that may cause turbidity in excess of 50 Jackson Turbidity Units above background in Waters of the State. Control measures may consist of sediment traps, barriers, berms, and vegetation plantings. Exposed or disturbed soil shall be protected and stabilized as soon as possible to minimize silt and sediment laden runoff. The pH shall be kept within the range of 6.0 to 8.5.

2. Burning

Open burning in connection with land clearing shall be in accordance with Chapter 17-5, FAC, and County Ordinance 76-18. No additional permits shall be required, but prior to each act of burning, the Division of Forestry shall be contacted to determine if satisfactory conditions exist for burning. Open burning shall not occur if the Division of Forestry has issued a ban on burning due to fire hazard conditions.

3. Sanitary Wastes

VOID

Disposal of sanitary wastes from construction toilet facilities shall be in accordance with applicable regulations of the appropriate local health agency.

4. Solid Wastes

Solid wastes resulting from construction shall be disposed of in accordance with the applicable regulations of Chapter 17, FAC.

5. Noise

Construction noise shall not exceed local noise ordinance specifications, nor those noise standards imposed by zoning.

6. Dust

The County shall emply proper dust-control techniques to minimize fugitive dust emissions.

7. Transmission Lines

The directly associated transmission lines from the Resource Recovery Facility electric generators to the existing Florida Power Corporation Gandy substation shall be cleared, maintained and prepared without the use of herbicides.

B. Environmental Control Program

An environmental control program shall be established under the supervision of a qualified person to assure that all construction activities conform to good environmental practices and the applicable conditions of certification.

VOID

If unexpected or harmful effects or evidence or irreversible environmental damage are detected during construction, the permittee shall notify the DER Southwest Florida District Office, 7601 Highway 301 North, Tampa, Florida, 33610, by telephone during the working day that the effect or damage occurs and shall confirm this in writing within seventy-two (72) hours of becoming aware of such conditions, and shall provide in writing an analysis of the problem and a plan to eliminate or significantly reduce the harmful effects of damage.

C. Reporting

1. Starting three (3) months after certification, a quarterly construction status report shall be submitted to the Southwest Florida District Office of the Department of Environmental Regulation. The report shall be a short narrative describing the progress of construction.

2. Upon completion of construction the DER Southwest Florida District Office will be notified in order that a pre-operational inspection can be performed.

XIV. OPERATION

A. Air

The operation of the Resource Recovery Facility shall be in accordance with all applicable provisions of Chapter 17-2, 17-5, and 17-7, Florida Administrative Code. In addition to the foregoing, the permittee shall comply with the following specific conditions of certification:

1. Emission Limitations upon Operation of Unit 3

a. Stack emissions from each unit shall not exceed the following:

VOID

(1) Particulate matter: in grains per standard cubic foot dry gas corrected to 12% CO_2
Units 1 and 2 - 0.08
Unit 3 - 0.03

(2) SO_2: 83 lbs/hr of Sulfur Dioxide

(3) Nitrogen Oxides: 132 lbs/hr

(4) Carbon Monoxide: 66 lbs/hr

(5) Lead: 1.3 lbs/hr

(6) Mercury: 3200 grams/day when more than 2205 lbs/day of municipal sludge is fired. Compliance shall be determined in accordance with 40 CFR 61, Method 101, Appendix B.

(7) Odor: there shall be no objectionable odor.

(8) Visible emissions: opacity shall be no greater than 10% except that visible emissions with no more than 20% opacity may be allowed for up to three minutes in any one hour except during start up or upsets when the provisions of 17-2.250, FAC shall apply. Opacity compliance shall be demonstrated in accordance with Florida Administrative Code Rule 17-2, 700(6)(2)9;, DER Method 9.

b. The height of the boiler exhaust stackes shall not be less than 161 feet above grade.

c. The incinerator boilers shall not be loaded in excess of their rated capacity of 87,500 pounds per hour each.

VOID

d. The incinerator boilers shall have a metal name plate affixed in a conspicuous place on the shell showing manufacturer, model number, type waste, rated capacity and certification number.

e. Compliance with the limitations for particulates, sulfur oxides, nitrogen oxides, carbon monoxide and lead shall be determined in accordance with Florida Administrative Code Rule 17-2.700, DER Methods 1,2, 3, 5, 6, and 40 CFR 60, Appendix A, Method 7. The stack test shall be performed at $\pm$ 10% of the maximum steam rate of 250,000 pounds per hour.

2. Electrostatic Precipitators

For Unit 3 the electrostatic precipitator shall be designed and constructed to achieve a maximum emission rate of 0.03 grains per dscf. In the event that the ESP fails to perform as specified, or if other parameters of the facility's operation are subsequently modified, additional control will be necessitated.

For Units 1 and 2 the three-field electrostatic precipitator shall be designed and constructed to allow the installation of a fourth field in the event that the three-field ESP fails to perform as specified, or if other parameters of the facility's operation are subsequently modified, necessitating additional control.

VOID

3. Air Monitoring Program

a. The permittee shall install and operate continuously stack monitoring devices for oxygen and opacity. The monitoring devices shall meet the applicable requirements of Chapter 17-2, 710, FAC, and 40 CFR 60.45, and 40 CFR 60.13, including certification of each device.

b. The permittee shall provide sampling ports into the stack and shall provide access to the sampling ports in accordance with Section 17-2.700(4), FAC.

c. The permittee shall have a sampling test of the stack emissions performed by a commercial testing firm within 90 days of the start of operation of the boilers and annually from the date of testing thereafter.

d. The permittee shall operate two continuous SO_2 monitors and one continuous wind direction and velocity monitor in the immediate vicinity of the site. The monitors shall be specifically located as designated by the DER and shall conform to 40 CFR 53. Monitoring shall begin upon commencement of operation.

4. Reporting

a. Two copies of the results of the stack tests shall be submitted within forty-five days of testing to the DER Southwest Florida District Office.

b. Stack monitoring shall be reported to the DER Southwest District Office on a quarterly basis in accordance with Section 17-2.710, FAC, and 40 CFR, Part 60, Subsection 60.7.

c. SO_2 monitoring shall be reported to the DER Southwest Florida District Office on a monthly basis.

VOID

B. Fuel

The Resource Recovery Facility shall utilize refuse such as garbage and trash (as defined in Chapter 17-7, FAC) as its fuel. Use of alternate fuels would necessitate modification of these Conditions of Certification.

C. Cooling Tower

1. Makeup Water Constituency

The Resource Recovery Facility shall utilize only treated sewage effluent or stormwater runoff from the stormwater holding pond as cooling tower makeup water. The effluent shall have received prior to use in the tower, as a minimum, secondary treatment, as well as treatment described in Condition XIV.C.2. below. Use of waters other than treated sewage effluent or site stormwater, i.e., higher quality potable waters or lower quality less-than-secondarily treated sewage effluent, will require a modification of conditions agreed to by the Southwest Florida Water Management District and the Department and must be approved by the Governor and Cabinet.

2. Chlorination

Chlorine levels in the cooling tower makeup water shall continuously be monitored, prior to insertion in the cooling owers. Sewage effluent from the Northeast St. Petersburg Wastewater Treatment Plant used as makeup shall be treated if necessary to maintain a 1.0 mg/liter total chlorine residual after fifteen minutes contact time. Makeup water from the Largo Wastewater Treatment Plant shall be treated to maintain a 1.0 mg/liter free chlorine residual after fifteen minutes contact time. Chlorination should occur at an effluent turbidity of 5 Nephelometric Turbidity Units or less.

VOID

3. Special Studies

Upon satisfactory demonstration to the Department that the number of viruses entering the towers in the effluent makeup from the upgraded Largo Plant can be reduced to an undetectable level with the use of a lesser amount of chlorination, the above requirement may be altered to 1.0 mg/liter total chlorine residual after a 15 minute contact time or alternate levels as approved by the department. This demonstration may occur through performance of special studies approved by the Department. Alteration of the chlorination requirements must still insure adequate treatment for the control of bacterial growth in the cooling towers.

D. Water Discharges

1. Surface Water

a. Any discharges from the site stormwater/leachate treatment system via the emergency overflow structure which result from an event LESS than a ten-year, 24-hour storm (as defined by the U.S. Weather Bureau Technical Paper No. 40, or the DOT drainage manual, or similar documents) shall meet State Water Quality Standards, Chapter 17-3, FAC.

b. Sampling of water quality in the aeration pond, the cattail ponds, and an analysis of the tissues of the cattails utilized as part of the leachate/stormwater treatment system shall be conducted prior to pumping of leachate or stormwater through this system to verify background levels and concentrations of any metals, especially heavy metals, already present in the ponds or the vegetation. Within three months after commencement of stormwater/leachate pumping through this system, and quarterly thereafter, the pond waters and cattail tissues, as well as root detritus or other sediments on the bottom of the ponds shall again be sampled to determine the degree and effectiveness of heavy metal uptake treatment in this system, and for correlation with

groundwater monitoring data. If analyses indicate that toxic levels of materials are present in the cattail tissues, root detritus, or other pond precipitates, then these materials shall be incinerated or otherwise removed from contact with the natural environment and groundwaters. Results of analyses conducted shall be sent to the Department for review of system effectiveness.

c. Leachate, stormwater, or other site wastewaters which are to be spray irrigated shall be treated to conform to any rules promulgated by the State for the land application of wastewaters in areas not commonly accessible to the public.

d. Cooling tower blowdown shall not be discharged to surface waters.

e. Upon satisfactory demonstration to the Department that surface water quality will not be deteriorated, a special pilot operation, in the field, to determine the environmental effect of land application of process blowdown water from the Resource Recovery Facility may be allowed. This demonstration will require submittal of background and system design data, and provisions for monitoring as approved by the Department.

2. Groundwaters

a. All discharges to groundwaters, such as landfill leachate, shall be collected and treated as necessary, or otherwise be of high enough quality, to be able to meet the Water Quality Standards of Chapter 17-3.101, FAC, (Class G-II Groundwaters) at the boundary of the site.

b. If the groundwater monitoring system in the vicinity of the aeration/cattail ponds indicates that groundwater quality beyond the boundary of the site has been deteriorated by substances leaching from these ponds, then these ponds shall be lined or other Departmentally approved methods employed to reduce

further leaching sufficient to insure attainment of groundwater quality standards at the boundary of the site.

3. Groundwater Monitoring Program

a. Sampling of the shallow aquifer groundwater quality shall be conducted in at least four wells in the site vicinity. One of these wells shall be up hydrologic slope from the landfill area to provide current background data; one shall be located in the immediate vicinity of the aeration/cattail ponds; and two shall be located down hydrologic slope from the landfill/spray irrigation areas. Specific location of these wells may be proposed by the applicant, but must be approved by the Department.

b. Operational background monitoring shall commence at least one year prior to operation of the resource recovery facility. Construction of monitoring wells and the collection of samples shall be in accordance with EPA recommended methods as contained in Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities (EPA/530/SW-611). The wells shall be deep enough to insure that groundwater samples can be obtained with the groundwater table elevation at its estimated lowest point and shall be protected from damage or destruction. Samples shall be anlyzed in accordance with the methods described in Chapter 17-4, FAC. Analyses shall be performed by laboratories which are approved by the Department of Health and Rehabilitative Services to conduct analyses pursuant to Section 403.863, F.S., the State Public Water Supply Laboratory Certification Program.

c. The wells shall be monitored on a quarterly basis for the following parameters:

Conductivity	Arsenic	Selenium
Nitrates	Barium	Silver
Iron	Cadmium	Chlorides

VOID

COD	Chromium	pH
Nickel	Lead	Copper
Aluminum	Mercury	Zinc
Total Coliform Bacteria		

d. Reports shall be submitted in duplicate within 30 days of receipt of analysis results to the Department for distribution to the appropriate review personnel.

e. The monitoring program may be reviewed annually by the Department, and a determination made as to the necessity and extent of continuation of the program. Aspects of the program relation to sampling, monitoring, reporting, and related time schedules may be modified in accordance with the provisions of condition number XII.

E. Solid/Hazardous Waste

1. Operation of the associated landfill shall be done in accordance with all applicable portions of Chapter 17-7, FAC, including prohibitions, procedures for closing of the landfill, and final cover requirements, or, as provided in this condition (XIV.E.) in its entirety.

2. Putrescible wastes shall receive daily cover. No cover shall be required for the landfilling of only ash or construction/demolition debris. Daily cover shall consist of a six inch layer of compacted earth or other material approved by the DER placed at the end of each working day.

3. Rodent and insect control shall be provided as necessary to protect the health and safety of site employees and the public. Pesticides used to control rodents, flies, and other vectors shall be as specified by the Florida Department of Agriculture and Consumer Services.

VOID

4. A monthly report shall be prepared detailing the amount and type (putrescible, special wastes, boiler residue, etc.) of materials landfilled at the site, and the treatment provided (see condition XIV.E.2. above). These reports shall be furnished to the DER Southwest District Office quarterly, commencing 120 days after the Resource Recovery Facility becomes operational and is producing residues.

5. Unless approved by the Department with subsequent modification of conditions, this facility shall not accept materials currently defined as "Hazardous Wastes", i.e., pesticides, volatile or radioactive material, etc.

6. No putrescible wastes shall be placed below the maximum groundwater level unless permanent leachate controls are installed. Methodology for permanent leachate controls shall be submitted to the Department for review. Such methodology shall not be implemented until approved by the Department. In the absence of permanent leachate controls, demolition debris and other non-putrescible items (other than boiler residue) shall be utilized to separate the putrescible waste from the groundwater. Boiler residue may be placed below the maximum groundwater level without permanent leachate controls provided that the permittee demonstrates that the residue will not contribute to a violation of water quality criteria at the boundary of a zone of discharge extending to the site boundary. Fly ash which has been segregated or separated from bottom ash shall not be placed below the maximum groundwater level without permanent leachate controls.

7. Separate cells and lifts shall be maintained for landfilling putrescible wastes.

8. All cells will be constructed to promote leachate drainage to a low end of the cell; all leachate formed at the low end of an active cell shall be pumped to the aeration pond for treatment.

VOID

9. A chemical analysis of the boiler residue shall be conducted within 30 days after commencement of operation, testing at the minimum for levels of Cadmium, Chromium, Zinc and Lead to determine the nature and potential toxicity or hazardousness of the materials created in the combustion process.

10. Results from the residue analysis shall immediately be sent to the Department and will be used to determine whether or not these materials constitute a "Hazardous Waste" as defined by Chapter 17-30, FAC; results of these analyses may also be used for correlation with groundwater monitoring information and in any subsequent modification of conditions.

11. If residue material are determined to be a "Hazardous Waste", then measures shall be taken to treat or dispose of the residues pursuant to rules promulgated by either Federal or State authorities.

12. If the nature of materials received at the facility becomes altered, either due to modification of conditions, i.e, the facility is allowed to incinerate already known hazardous wastes such as pesticides, or if groundwater monitoring reveals unusual groundwater conditions which may be attributable to the landfilling of this residue, then a subsequent analysis may be required at that time.

13. There shall be no discharge to the environment of polychlorinated biphenyl compounds.

F. Operational Safeguards

The overall design and layout of the facilities shall be such as to minimize hazards to humans and the environmenta. Security control measures shall be utilized to prevent exposure of the public to hazardous conditions. The Federal Occupational

VOID

Safety and Health Standards will be complied with during construction and operation. The safety standards specified under Section 440.56, Florida Statutes, by the Industrial Safety Section of the Florida Department of Commerce will be complied with during operation.

G. Transmission Lines

The directly associated transmission lines from the Resource Recovery Facility electric generators to the Florida Power Corporation Gandy Substation shall be kept cleared without the use of herbicides.

H. Noise

Operational noises shall not exceed local noise ordinance limitations nor those noise standards imposed by zoning.

XV. STATUS OF EXISTING PERMITS

No permit may be issued for sanitary waste landfilling other than this Certification, for the area known as Bridgeway Acres II.

3/12

VOID

STATE OF FLORIDA

Department of Administration

Division of Administrative Hearings

Oakland Building, 2009 Apalachee Parkway

TALLAHASSEE

32301

Bob Graham
Governor

Nevin G. Smith
Secretary of Administration

March 8, 1984

Victoria Tschinkel, Secretary
Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Re: Case No. 83-2355
In Re: Pinellas County Resource Project:
Application for Power Plant Site
Certification.

Dear Ms. Tschinkel:

Enclosed are copies of my Stipulation to Recommended Order and Recommended Order Regarding Site Certification entered in the above-styled case.

Please furnish the Division of Administrative Hearings a copy of the Final Order entered in this case.

Sincerely,

WILLIAM E. WILLIAMS
Hearing Officer

/mc

Enclosures

xc: Honorable Bob Graham
Cabinet Members
Van B. Cook, Esq.
Julia D. Cobb, Esq.
C. Laurence Keesey, Esq.
Mr. Tom Herndon
Hamilton S. Oven, Jr., P.E.
Bonnie Davis, Esq.
Karen A. Lloyd, Esq.

RECEIVED
MAR 12 1984
COUNTY ATTORNEY

VOID

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

IN RE:	]	
	]	
Pinellas County Resource Project: Application for Power Plant Site Certification.	]	DOAH CASE NO.: 83-2355

STIPULATION TO RECOMMENDED ORDER

The Undersigned counsel to the parties to this proceeding hereby stipulate to the entry of the attached Recommended Order regarding site certification.

Van B. Cook

VAN B. COOK
Chief Assistant County Attorney
315 Court Street
Clearwater, Florida 33516
For the Applicant, Pinellas County

Julia D. Cobb

JULIA D. COBB
2600 Blair Stone Road
Tallahassee, Florida 32301
Assistant General Counsel for
Department of Environmental Regulation

Mary Clark for

C. LAURENCE KEESEY
2571 Executive Center Circle East
Tallahassee, Florida 32301
For the Department of Community Affairs

STATE OF FLORIDA

DIVISION OF ADMINISTRATIVE HEARINGS

VOID

IN RE: Pinellas County Resource Project: Application for Power Plant Site Certification

Case No. 83-2355

RECOMMENDED ORDER
REGARDING SITE CERTIFICATION

Pursuant to notice, the Division of Administrative Hearings, by its duly designated Hearing Officer, William E. Williams, held a public hearing in this cause on February 29, 1984, in Clearwater, Florida.

APPEARANCES

For the Applicant:	Van B. Cook Chief Assistant County Attorney 315 Court Street Clearwater, Florida 33516
For the Department of Environmental Regulation:	Julie Cobb Assistant General Counsel 2600 Blair Stone Road Tallahassee, Florida 32301
For the Department of Community Affairs:	C. Laurence Keesey, Esq. 2571 Executive Center Circle East Tallahassee, Florida 32301
For Southwest Florida Water Management District:	None
For Public Service Commission	None

VOID

On or about September 6, 1983, the Applicant, Pinellas County, filed an amended application for power plant site certification to expand its existing resource recovery facility with the Department of Environmental Regulation. The Division of Administrative Hearings received a request from the Department of Environmental Regulation for the appointment of a Hearing Officer to conduct the hearings required by Chapter 403, Part II, Florida Statutes. On September 19, 1983, the Division of Administrative Hearings received a statement from the Department of Environmental Regulation declaring the application to be complete as of September 6, 1983.

On January 19, 1984, the Applicant filed a Motion to Expedite the certification hearing required by Chapter 403, Part II, Florida Statutes. On January 25, 1984, the undersigned entered an Order scheduling a certification hearing for February 29, 1984 and requiring a pre-hearing stipulation, and issued a Notice of Hearing. A pre-hearing stipulation was filed on or about February 24, 1984.

A certification hearing as required by Section 403.508(3), Florida Statutes, was held pursuant to proper notice in Clearwater, Florida. The notice published in the Florida Administrative Weekly was four days less than the required 30 day notice. Upon motion of the Applicant, and no other party entering an objection, this defect was waived. The purpose of that hearing was to receive testimony and evidence concerning whether the location and operation of the proposed facility would produce adverse effects on human health, environment, the ecology of the land and its wildlife, and the ecology of State waters and their aquatic life;

would assure the citizens of Florida that operational safeguards are technically sufficient for their welfare and protection; and would effect a reasonable balance between the need for the facility and the environmental impact resulting from construction and operation of the facility; as well as providing abundant, low-cost electrical energy. The hearing included an examination of the following:

VOID

The necessity for expanded electrical generation;

The expected environmental impact from construction and operation of the resource recovery facility;

Operational safeguards of the facility;

The availability of abundant, low-cost electrical energy;

Other public interests and issues relevant to certification of the proposed site.

In addition, evidence relating to best available control technology and the prevention of significant deterioration of ambient air quality was presented.

The following parties entered appearances at or participated in this proceeding:

1. The Applicant, Pinellas County.
2. Florida Department of Environmental Regulation.
3. Florida Department of Community Affairs.

Having considered all testimony and evidence properly admitted, having heard arguments of Counsel, and being otherwise fully apprised herein, the following Findings of Fact, Conclusions of Law, and Recommended Order are entered:

FINDINGS OF FACT

1. A revised Application for power plant site certification was filed by Pinellas County on September 6, 1983. The Applicant proposes to expand its resource recovery facility, within the existing certified site, at which municipal solid wastes are burned to produce steam-generated electrical energy by the addition of a third boiler, additional turbine-generator, expanded cooling tower, a second stack, and related structures. The residue from the burning of these wastes is processed for recovery of metals and other valuable materials. The facility includes a large landfill which is used for disposal of those portions of the residue not amenable to recovery. Existing transmission facilities connecting the facility to Florida Power Corporation's Gandy Substation will continue to be utilized.

VOID

2. The resource recovery facility buildings are located on approximately 20 acres within Pinellas County's existing certified site. Areas of the plant site not previously disturbed by landfilling or construction activities are occupied largely either by pine flatwoods or wet weather ponds.

3. The existing resource recovery facility, certified in July 1979, consists of a 50 megawatt steam-electric generating turbine, two 1050 tons-per-day solid waste fired boilers; truck weighing scales; a refuse collection and storage pit, refuse stoking equipment; magnetic and serrofluid separators; conveyors; a four cell mechanical draft cooling tower utilizing treated sewage effluent; effluent intake and outfall piping and connections; a 161 foot flue gas stack; electro-static precipitators; stormwater retention and treatment ponds; stormwater spray irrigation fields; a sanitary landfill; and control ditching. A 230 kilovolt transmission line and associated structures runs East, South, and then East of the site for approximately 1 and 1/4 miles. The proposed expansion of electrical generation capacity is approximately 29 MW for a total capacity not exceeding 79.9 MW.

4. The primary purpose for the facility is to dispose of the county's refuse and trash. There is a clear need for recovery facilities such as that proposed by the Applicant.

The Florida Public Service Commission has found that the proposed facility expansion will increase electrical system reliability and integrity and will maintain the supply of adequate electricity at a reasonable cost while reducing dependence on fossil fuel. The Department of Environmental Regulation has found that construction of the resource recovery facility permitted the closing of current landfills and reduced the need for future landfill areas and in fact serves a recognized need.

5. Impacts from site modification are minimal in that all new additions are adjacent to existing structures on previously cleared land. No rare or endangered species have been observed on the site.

VOID

6. Since 1978, refuse generation rates in Pinellas County have risen faster than was anticipated. To meet the added demand on the processing capacity of the plant, expansion of the facility is proposed. The reduction of landfill areas is environmentally desirable and area residents, concerned about the presence of landfills near their home, should find the proposed site modification and visual barriers more attractive than landfills.

7. Extensive measures have been incorporated into the proposal and the conditions of certification so as to minimize the environmental impacts from construction and operation.

8. Due to the isolated nature of the proposed site there is very little opportunity for public access during construction and operation. In addition, traffic into the site will be limited and controlled by fencing. The applicant has proposed adequate measures to comply with both State and Federal health and safety requirements.

9. The resource recovery facility is expected to produce the following average volumes of water during normal daily operations:

1. Cooling tower blowdown 279gpm.
2. Boiler blowdown 32gpm.
3. Cooling tower evaporation and drift 1311gpm.
4. Boiler demineralization backflush water 45 gpm.
5. Sanitary wastes 50gpm.

The plant effluents will be discharged to Pinellas County's South Cross Bayou Sewage Treatment Plant. Any surface water impacts would largely arise from stormwater runoff. Perimeter ditches, a central holding pond, and associated treatment facilities are used to collect, contain, and treat runoff originating on the site. This collection and treatment system is of sufficient size to prevent any stormwater discharge from the site except during periods of extremely heavy rainfall.

Groundwater in the vicinity is Class G-II (as defined by Section 17-3.401, Florida Administrative Code). Movement of the shallow aquifer groundwater in the area is generally

Northeasterly at a rate of 1 to 10 feet per year. The area of the site is underlain by a clay/marl zone which would tend to slow the vertical migration of leachates. There has previously been an impact on the shallow aquifer groundwater quality in the vicinity of the site due to adjacent landfilling operations and saltwater intrusions. Leaching of the decomposition materials from putrescible wastes has already altered the natural state and quality of the shallow aquifer. Since landfill materials from the resource recovery facility should primarily be boiler residue and non-putrescible wastes it is likely that any groundwater impacts from these new landfill materials will be much less than from previously landfilled putrescible materials.

VOID

10. Leachates and drainage are minimized by allowing water to run off the fill rather than being allowed to percolate through the filled material. Leachate which does form by percolation through an active fill is accumulated at the low point of the active cell. This accumulation is pumped directly to the aeration pond and is contained on site. At no time will raw refuse be deposited in standing water.

Wastewater leaves the aeration lagoon and enters two water treatment ponds which have been designed to remove nutrients and heavy metals from the runoff waters. Upon leaving the ponds, wastewater is chlorinated for bacteria and virus control and pumped to the land on the Southern portion of the site.

11. Construction activities are expected to produce air pollutants from vehicular and heavy equipment exhaust emissions and fugitive dust. During operation, expected stack emissions will include particulate, sulfur dioxide, fluorides, lead, carbon monoxide, hydrocarbons, mercury, beryllium, chlorides, and oxides of nitrogen. Odor is not expected to be a problem and control measures have been included in the proposal. An electro-static precipitator has been included for the control of particulate matter. There are no sulfur dioxide emission limitations for incinerators; however, if a sufficient volume of refuse is incinerated, prevention of significant deterioration criteria may

VOID

be applicable. The Department has conducted a Best Available Control Technology analysis for the resource recovery facility and has proposed emission limitation rates for the facility.

12. During operation, refuse will be sorted for large items or non-combustibles, the remaining refuse will be incinerated. Following combustion, the residue will pass through a resource recovery system designed to extract ferrous and non-ferrous metals. The residue, approximately 2.1 percent by weight of the original raw waste, will be landfilled on site. In the event of a facility shutdown, storage facilities at the processing plant will be sufficient for storage of three to four days of incoming waste. If the plant should remain out of operation beyond three to four days, incoming raw wastes would be landfilled at the site. The facility does not intend to accept hazardous wastes.

13. During and at the conclusion of the site certification hearing, the public was given the opportunity to comment upon the application for site certification. No one not a party provided any verbal or written testimony, reports, or other evidence.

14. The Department of Environmental Regulation and the Applicant have agreed that no land use hearing was required because the proposed expansion is within the previously certified site.

15. The Applicant has accepted the proposed conditions of certification (Exhibit 1) and has agreed to comply therewith if certification is granted subject to a reservation of its right to exercise the Modification of Conditions procedure referenced in Exhibit 1 and a further reservation of its rights to object, if deemed necessary, to the application of any revised emission limitation rates contained in Exhibit 1 to its existing facilities. No objection to said reservations was entered by any party to this hearing.

16. The Florida Department of Environmental Regulation, the Public Service Commission, the Division of State Planning and Southwest Florida Water Management District, have all recommended certification of the proposed resource recovery facility subject to conditions. The stipulated conditions are attached hereto as Exhibit 1.

CONCLUSIONS OF LAW

VOID

1. This proceeding was held pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes, and Chapter. 17-17, Florida Administrative Code, to consider the subject application for site certification.

2. Notice in accordance with Chapter 403 and Chapter 120, Florida Statutes, and Chapter 17-17, Florida Administrative Code, has been given to all persons and parties entitled thereto, as well as to the general public. The defect in the required time period for publication of the notice in the Florida Administrative Weekly is deemed inconsequential and not prejudicial and is therefore waived.

3. The purpose of the site certification hearing was to receive testimony and evidence concerning whether the location and operation of the proposed facility will produce minimal adverse effects on human health, the environment, the ecology of the land and its wildlife, the ecology of State waters and their aquatic life, and to fully balance the increasing demand for electrical power plant location and operation with the broad interest of the public as provided in Chapter 403, Florida Statutes.

4. The record of this hearing consists of all pleadings and papers filed herein, including the site certification application, as amended, the transcripts of all hearings, all orders entered by the Hearing Officer, as well as all evidence and exhibits properly admitted.

5. Section 403.507(1)(a), Florida Statutes, provides that the Department of Community Affairs shall present a report as to the compatibility of the proposed electrical power plant with the State comprehensive plan. The Department of Community Affairs has made a report on the resource recovery facility and its report and recommendation have been submitted and introduced into evidence. The Department recommends certification subject to the conditions in Exhibit 1.

6. Section 403.507(1)(b), Florida Statutes, requires that the Florida Public Service Commission prepare a report and recommendation as to the present and future needs for electrical generating capacity in the area to be served by the proposed facility. Such a report and recommendation have been submitted and introduced into evidence. The Public Service Commission states that there will be some benefits derived from the generating capacity addition of the resource recovery facility and resulting reduction in oil consumption. The recommendation of the Public Service Commission is that the Pinellas County Waste Resource Recovery Facility be certified subject to the conditions in Exhibit 1.

7. Section 403.507(1)(c), Florida Statutes, requires the Water Management District in whose jurisdiction the resource recovery facility will be located to prepare a report as to matters within its jurisdiction. On September 22, 1983, the Southwest Florida Water Management District stated it did not object to the proposed expansion and encouraged the continued use of reclaimed water for such industrial non-potable needs.

8. Section 403.507(2), Florida Statutes, requires that the Department of Environmental Regulation conduct or contract for studies of the proposed electrical power plant including but not limited to:

a. Cooling system requirements
b. Construction and operational safeguards
c. Proximity to transportation systems
d. Soil and foundation conditions
e. Impact on suitable present and projected water supplies for this and other competing uses
f. Impact on surrounding land uses
g. Accessibility to transmission corridors
h. Environmental Impacts.

Such a report and recommendations have been submitted and introduced into evidence. The Department of Environmental Regulation recommends certification of the proposed facility subject to the conditions of certification which are attached as Exhibit 1.

VOID

9. The Applicant has accepted the proposed conditions of certification (Exhibit 1) and has agreed to comply therewith if certification is granted subject to a reservation of its right to exercise the Modification of Conditions procedure referenced in Exhibit 1 and a further reservation of its rights to object, if deemed necessary, to the application of any revised emission limitation rates contained in Exhibit 1 to its existing facilities. No objection to said reservations was entered by any party to this hearing.

10. The location and operation of the proposed facility, as described by the evidence in the record, if made subject to the conditions of certification attached, are expected to produce minimal adverse effects on human health, the environment, the ecology of the land and its wildlife, and the ecology of state waters and their aquatic life. Section 403.502, Florida Statutes.

11. The operational safeguards for the proposed facility are technically sufficient for the welfare and protection of the citizens of Florida. Section 403.502(1), Florida Statutes.

12. The certification of the proposed facility is consistent with the provision of abundant low-cost electrical energy. Section 403.502(3), Florida Statutes.

13. The proposed air pollution control equipment should prevent the operation of the facility from causing significant deterioration of ambient air quality in the vicinity.

14. Construction and operation of the facility satisfy the prevention of significant deterioration criteria and the application of the Best Available Control Technology standards.

15. No land use hearing was required in this case because the proposed expansion is within the previously certified site and responsible zoning or planning authorities are precluded from changing land use plans or zoning ordinances so as to affect the site by Section 403.508(2), Florida Statutes.

16. The parties to this certification hearing have stipulated to this Recommended Order.

RECOMMENDED ORDER

VOID

Having reviewed the record of this proceeding, and based upon the Findings of Fact and Conclusions of Law set forth herein, it is hereby recommended that certification, pursuant to Chapter 403, Part II, Florida Statutes, be granted to Pinellas County for the construction and operation of its resource recovery facility expansion and associated facilities, as proposed in the amended application and described in the record of this proceeding. It is further recommended that this certification be made subject to the conditions of certification attached hereto as Exhibit 1.

However, pursuant to the stipulation of the parties to this certification hearing, to the extent of any conflict between previously imposed Conditions of Certification and the proposed Conditions of Certification contained in Exhibit 1 herein pertaining to air quality, the revised Conditions of Exhibit 1 shall not apply to the existing facilities until the proposed expansion which is the subject of this proceeding is operational, at which time the Conditions of Certification (Exhibit 1 herein) shall apply and the previous Conditions of Certification shall be deemed rescinded.

DONE AND ORDERED this 8th day of MARCH 1984 in Tallahassee, Florida.

WILLIAM E. WILLIAMS
Hearing Officer
Division of Administrative Hearings
The Oakland Building
2009 Apalachee Parkway
Tallahassee, Florida 32301

FILED with the Division of Administrative Hearings this 8th day of March, 1984.

Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   Mr. Pick Talley, Director of Utilities, Pinellas County

2. Owner/Authorized Representative or Responsible Official Mailing Address:

   Organization/Firm: **Pinellas County Utilities Administration**
   Street Address: **14 South Fort Harrison Avenue, 5th Floor**
   City: **Clearwater** State: **Florida** Zip Code: **33756**

3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: (727) **464-3438** Fax: (727) **464-3944**

4. Owner/Authorized Representative or Responsible Official Statement:

   I, the undersigned, am the owner or authorized representative(check here [ ], if so) or the responsible official (check here [X], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

Pick Talley
Signature

9-7-99
Date

* Attach letter of authorization if not currently on file.

1. Professional Engineer Name: **R. Peter Stasis**
   Registration Number: **0046220**

2. Professional Engineer Mailing Address:
   Organization/Firm: **Pinellas County Utilities Administration**
   Street Address: **14 South Fort Harrison Avenue, 5th Floor**
   City: **Clearwater** State: **Florida** Zip Code: **33756**

3. Professional Engineer Telephone Numbers:
   Telephone: (727) **464-3519** Fax: (727) **464-3595**

4. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

If the purpose of this application is to obtain a Title V source air operation permit (check here [X], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.

If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [ ], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [X], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

R P Stasis — 9/3/99

Signature Date

(seal)

* Attach any exception to certification statement.