PROCESS DESCRIPTION
FOR
MICRONIZED COAL RE-BURNING PROJECT
FOR
NYSEG/KODAK
NEW YORK, U.S.A.

BY

FULLER MINERAL PROCESSING, INC.
BETHLEHEM, PENNSYLVANIA

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CERTIFIED FOR CONSTRUCTION
SIGNATURE James J. Lupo
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REVISION NUMBER	DESCRIPTION	PREPARED BY	APPROVED BY	DATE
0	INITIAL ISSUE	J.R.	B.J.Z./L.S.	05/10/96
1	GENERAL REVISIONS	J.R.	B.J.Z./L.S.	05/31/96
2	Added Bearing Housing Water Jacket System	L.S.	B.J.Z./D.F.	07/29/96
3	Added Safety procedures for shutdown	L.S.	B.J.Z.	08/14/96

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A. GENERAL INFORMATION

The Coal Grinding System will be used to process bituminous coal for the MCRP (Micronized Coal Re-burn Project).

B. SYSTEM DESCRIPTION

The Coal Milling System consists of two coal grinding mill circuits each containing the following equipment:

200HP Fuller-Microfuel 3018 Micromills [PM-CH-15B001E, PM-CH-15B001W] complete with lubrication and labyrinth seal systems [LU-CH-15B001E, LU-CH-15B001W] and each with a bearing housing cooling water jacket.

Plant air solenoid valve [SV-1A-15B040E, SV-1A-15B040W] for the Lubrication and labyrinth seal systems

Bearing Housing Water Jacket solenoid valve [SV-CW-15B003E, SV-CW-15B003W], manual isolation valve [HV-CW-15B001E, HV-CW-15B001W], flow switch [FS-CW-15B001E, FS-CW-15B001W], and throttle valve [HV-CW-15B002E, HV-CW-15B002W] arrangement (all by others).

Micromill classifiers [CL-CH-15B001E, CL-CH-15B001W]

Classifier rotary feeders [RV-CH-15B002E, RV-CH-15B002W]

Mill Flue-Gas inlet control dampers [CZ-TG-15B002E, CZ-TG-15B002W]

Mill inlet air flow meters [FT-TG-15B026E, FT-TG-15B026W]

Mill inlet rotary feeders [RV-CH-15B001E, RV-CH-15B001W]

In general all equipment may be operated in individual manual mode to permit maintenance testing of the equipment. If any equipment is operated in this manner, automatic operation of the group to which the piece of equipment belongs will not be permitted. Similarly, once an equipment group is selected for automatic group mode of operation, an individual piece of equipment cannot be operated in individual manual mode of operation.

When a piece of equipment is operated in its individual manual operating mode, only protection and personnel safety interlocks are operable.

The following sections in this document describe the operation of each of the micro mills in the following situations:

Normal Startup

Normal Operation

Normal Shutdowns

Abnormal Shutdowns

Emergency Shutdowns

For clarification of the process description, refer to the following Fuller drawings which show the process flow information for the system:

1.724705, Rev. 0
1.724706, Rev. 0
1.724707, Rev. 1
1.724708, Rev. 1
1.725164, Rev. 0

C. Normal Startup of The Coal Milling System

Since both the Micromill circuits operate in the same manner, the operation described herein is for the Mill No. 1 circuit only. The operation of the second mill is identical.

NOTE: For normal startup of the mill to proceed, it is necessary that the plant's compressed air supply (for the Mill seal air and lube mist system) and instrument air supply (for the control valve air) be fully available at the required pressure and volume. The plant cooling water supply (for the Mill Bearing Housing Water Jacket) should also be fully available at the required temperature and flow. In addition, the boiler must be in its normal operating state and ready to accept Micronized coal through the new burners. Finally, the Mill Tramp iron gate must be closed as sensed by limit switch [ZSC-CH-15B012E].

The Micromill startup proceeds in the sequence described in the following paragraphs:

When the boiler is ready to accept Micronized coal through the new burners and the Transport Gas Fan is running, an alarm bell (by others) will ring for seven (7) seconds to notify anyone near the system of the pending start of the Coal Milling System.

First the Mill Air Supply Solenoid Valve [SV-1A-15B040E] is energized, establishing the Mill Labyrinth Air Seal System, starting the Mill Mist Lubrication System, and simultaneously starting the Mill Lube Mist Demister Unit [TK-CH-15B001]. At the same time that the Mill Air Supply Solenoid Valve [SV-1A-15B040E] is energized, the Mill Bearing Housing Water Jacket solenoid [SV-CW-15B003E, by others] is energized, initiating the closed loop water cooling system for the bearing housing.

After the Labyrinth Seal and Lube System compressed air pressure is above the minimum required pressure (44 psi) as sensed by pressure switch [PS-1A-15B003E], the Tramp Iron Gate is closed as sensed by its position switch [ZSC-CH-15B012E], and the Mill Bearing Housing Water Jacket water circulation is above 3 gpm as sensed

by the flow switch [FS-CW-15B001E, by others] being not low, the Mill Inlet Damper [CZ-TG-15B002E] is moved to the fully open position.

After the Mill Inlet Damper [CZ-TG-15B002E] is in its fully open position as sensed by position switch [ZSO-TG-15B002E], the Mill Mist Lube System oil level [LS-CH-15B001E] is not low, the Mill Mist Lube System air pressure [PS-1A-15B003E] is not low, the Mill upper/lower bearing temperatures [TE-CH-15B048E/TE-CH-15B049E] are not HI-HI, and the Mill vibration [VT-CH-15B001E] is not HI-HI (there is a thirty (30) second bypass of vibration monitor during the mill start-up), and three (3) minutes have elapsed since the Mill air supply Solenoid Valve [SV-1A-15B040E] was energized, the Mill [PM-CH-15B001E] motor is started.

Seventy-five (75) seconds (to allow the mill to ramp up to speed) after starting the Mill [PM-CH-15B001E] motor, as sensed by motion switch [SS-CH-15B004E] not indicating zero speed, the Mill Classifier Rotary Feeder [RV-CH-15B002E] is started.

After the Mill Classifier Rotary Feeder [RV-CH-15B002E] is started, as sensed by motion switch [SS-CH-15B002E] not indicating zero speed, the automatic airflow control portion of the circuit is placed in its normal operating configuration.

Once the Classifier Outlet Temperature [TE-CH-15B050E] (by others) reaches 150°F, at least one hundred twenty five (125) seconds have elapsed since the starting of the Classifier Rotary Feeder [RV-CH-15B002E] as sensed by the motion switch [SS-CH-15B002E] not indicating zero speed, and the oxygen content of the transport gas as sensed by the customer's oxygen analyzer is below eight percent, the Mill Inlet Rotary Feeder [RV-CH-15B001E] is started.

After the Mill Inlet Rotary Feeder [RV-CH-15B001E] is started, as sensed by motion switch [SS-CH-15B003E] not indicating zero speed, the Coal Feed Screw Conveyor (by others) can be started to introduce material flow to the Coal Milling System.

Note: the coal feed screw conveyor (by others) should start at a maximum set point of roughly 50% mill maximum capacity.

D. Normal Operation of the Coal Milling System

Once the System has been started in the manner described in section C, normal operation consists of controlling the following:

The air flow rate into the Mill

The material feed rate into the Mill circuit (by others)

The air flow rate into the mill is controlled by the operation of the Mill Air Inlet Damper [CZ-TG-15B002E]. The control loop consists of a flow indicating controller that permits the operator to set a mill inlet air flow rate set point.

In normal operation, the flow rate at full load is set at 3460 ACFM; however, this value will be verified and adjusted during startup testing of the mill, and a table of mill inlet air flow rates will be prepared for use by the operators.

The feed rate of material into the mill circuit is manually adjusted by the operator.

Note: during startup the maximum mill capacity will be determined, and a table of mill operating points will be established by Fuller.

E. Normal Shutdown of The Coal Milling System

A normal shutdown of the Coal Milling System is a sequenced shutdown of the System, and is either initiated by the system operator, or automatically initiated by one of the following conditions:

Mill Mist Lube System oil level low, as sensed by level switch [LS-CH-15B001E], persisting for a period of 10 minutes or longer

High Mill vibration [VT-CH-15B001E] (in excess of 0.4 in./sec.) which persists for 10 minutes or longer

When normal shutdown is initiated, the shutdown proceeds as described below:

The Coal Feed Screw Conveyor (by others) is stopped to cut-off material flow to the Coal Milling System

Ten seconds after The Coal Feed Screw Conveyor (by others) is stopped, the mill inlet rotary feeder [RV-CH-15B001E], as sensed by motion switch [SS-CH-15B001E] indicating zero speed, is stopped

Once the mill inlet rotary feeder [RV-CH-15B001E] is stopped, as sensed by motion switch [SS-CH-15B001E] indicating zero speed, and after a 10 minute time delay to purge the system, the Classifier Rotary Feeder [RV-CH-15B002E] is stopped

Ten seconds after the Classifier Rotary Feeder [RV-CH-15B002E] is stopped, as sensed by motion switch [SS-CH-15B002E] indicating zero speed, the Mill [PM-CH-15B001E] is stopped

Ten seconds after the mill [PM-CH-15B001E] stop is initiated, the Mill Inlet Damper [CZ-TG-15B002E] is closed

After the Mill Inlet Damper [CZ-TG-15B002E] is closed, as sensed by its position switch [ZSC-TG-15B002E], and the mill [PM-CH-15B001E] is stopped, as sensed by motion switch [SS-CH-15B004E] indicating zero speed, the Mill Compressed Air System Valve (to the Mill Mist Lube System) is closed by de-energizing Solenoid Valve [SV-1A-15B040E], the Mill Bearing Housing Water Jacket solenoid [SV-CW-15B003E, by others] is de-energized, and the Mill Lube Mist Demister [TK-CH-15B001] is stopped. **Note: If Mill No. 2 circuit is running, the Mill Lube Mist Demister is left running.**

The de-energizing of Solenoid Valves [SV-1A-15B040E] and [SV-CW-15B003E] completes the normal shutdown of the Coal Milling System.

Note: The Transport Gas Fan, supplying air to the mill systems, may only be stopped during a shutdown of the boiler. When a coal milling system is shutdown and the boiler is operating, the transport gas will by-pass the mill system to provide cooling air to the burners.

F. Abnormal Shutdowns Of The Coal Milling System

Abnormal shutdowns are those unplanned shutdowns of the system caused by either isolated process or equipment abnormalities, activation of individual equipment safety devices, or automatic activation of personnel safety systems.

Abnormal shutdowns caused by isolated process or equipment abnormalities or activation of individual safety devices will cause the immediate stopping of the affected piece of equipment and will stop all upstream equipment in a cascade fashion. Equipment downstream of the faulted piece of equipment or point at which the abnormality occurs will continue in normal operation.

3 In an abnormal shutdown, the mill circuit MUST cool down for a period of one hour prior to the opening of any equipment or ductwork ports, flanges, or (tramp iron) cleanout gates by maintenance personnel. This will prevent injury from high temperatures and reduce the danger of introducing excess oxygen into the system, which could feasibly lead to fires or explosions.

If, during normal operation of the Coal Milling System, any of the following systems or equipment is activated, all equipment in the System will be stopped without any intentional time delays to allow for equipment clean out and deceleration:

If at any time the boiler becomes unable to continue to receive Micronized coal through the new burners

Transport Gas Fan not running (by others)

Mill air supply system Low (< 44 psi), as sensed by pressure switch [PS-1A-15B003E]

Tramp iron gate not closed, as sensed by limit switch [ZSC-CH-15B012E].

Mill vibration [VT-CH-15B001E] high-high (0.75 in./sec)

Mill upper bearing temperature HI-HI, as sensed by temperature element [TE-CH-15B048E]

Mill lower bearing temperature HI-HI, as sensed by temperature element [TE-CH-15B049E]

During normal operation of the Coal Milling System, if the Mill [PM-CH-15B001E] Motor stalls, as sensed by motion switch [SS-CH-15B004E] indicating zero speed, the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others).

Mill Inlet Rotary Feeder [RV-CH-15B001E]

Classifier Rotary Airlock [RV-CH-15B002E]

During normal operation of the Coal Milling System, if the Classifier Rotary Feeder [RV-CH-15B002E] stalls, as sensed by motion switch [SS-CH-15B002E] indicating zero speed, the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others)

Mill Inlet Rotary Feeder [RV-CH-15B001E]

During normal operation of the Coal Milling System, if the Mill Inlet Rotary Feeder [RV-CH-15B001E] stalls, as sensed by motion switch [SS-CH-15B001E] indicating zero speed, the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others)

During normal operation of the Coal Milling System, if the Mill Inlet Air flow falls below 2425 ACFM or the oxygen content of the transport gas exceeds eight percent (as sensed by the customer's oxygen analyzer), the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others)

Mill Inlet Rotary Feeder [RV-CH-15B001E]

Note: After an abnormal shutdown as detailed in the above case, the mill circuit can be restarted once the airflow returns to its normal operating point and the oxygen content in the Mill falls below 7.5 percent. The coal feed screw conveyor should start at its minimum set point, and the circuit brought back to maximum capacity.

During normal operation of the Coal Milling System, if the Mill Bearing Housing Water Jacket water circulation is less than 3 gpm as sensed by the flow switch [FS-CW-15B001E, by others]:

"ALARM ONLY"

During normal operation of the Coal Milling System, if the classifier outlet temperature (by others) falls below 140°F:

"ALARM ONLY"

Note: if the alarm persists, it is recommended that the operator use his discretion whether to "cut-back" or "cut-off" the coal feed.

G. Emergency Shutdowns Of The Coal Milling System

Emergency shutdowns will cause the immediate and simultaneous shutdown of the entire Coal Milling System.

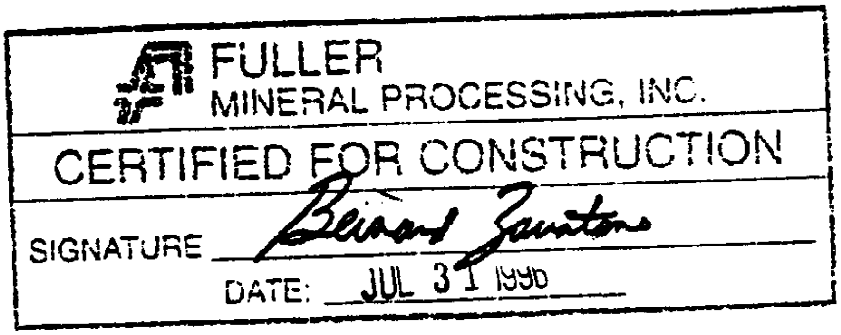
Any emergency shutdowns of the entire Coal Milling System shall be at the discretion of the customer.

3 In an emergency shutdown, the mill circuit MUST cool down for a period of one hour prior to the opening of any equipment or ductwork ports, flanges, or (tramp iron) cleanout gates by maintenance personnel. This will prevent injury from high temperatures and reduce the danger of introducing excess oxygen into the system, which could feasibly lead to fires or explosions.

Installation, Operation & Maintenance

Manual

MF-3018 MicroMill



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REFERENCE DOCUMENTS:

A) Micromill Assembly Parts List 5.702628
B) Micromill Instrumentation, Lubemist, and Air Piping Assembly Parts List 5.701743
C) Classifier Drawing 429-93-4-2003.
D) Vendor Manuals

1. PRINCIPLES OF OPERATION AND SPECIFICATIONS

1.1 GENERAL DESCRIPTION

The MicroFuel 30" MicroMill micronizes fuels and products over a wide range of grindabilities and moisture contents. The MicroMill design produces sustained product fineness over long periods of time with minimum power consumptions, good availability, ease of maintenance with minimum expense, and quiet and vibrationless operation. The housing of the MicroMill is constructed entirely of steel. The replaceable blades and sections of the machine subject to extreme abrasion are made of high chrome wear-resistant white iron, ceramics, or wear-resistant alloys. These wearing parts are so designed that replacement, when required, can be conveniently made with a minimum of labor and outage time. The MicroMill has been designed to operate for long periods of time with only minimum attention such as routine inspection of bearings and lubrication systems. The MicroMill does not require any adjustment while in operation.

1.1.1 Construction

The MicroMill housing and major components are fabricated with welded steel and connected by bolted flange connections. The major components are shown on assembly drawings 1.716957 and 1.713916 and listed in Parts List No. 5.702628. The cone and Rotational Impact Zone are connected to the mill housing and equipped with a pivot pin system to allow the cone and Rotational Impact Zone sections to swing out of the way to allow access to the impeller and replaceable blades. Replacement of the blade sections and the complete impeller assembly can be accomplished without removal of the cone and Rotational Impact Zone sections. The steel MicroMill housing, classifier and major wear parts are protected with ceramic wear-resistant material.

1.1.2 Fuel/Product Micronization

The fuel/product is fed into the MicroMill by a feed screw conveyor and is controlled by an input signal from the customer's control center. There is no fuel/product level in the MicroMill, hence there is no fuel/product level control. The feed screw conveyor,

mounted near the MicroMill feed inlet piping, drops the fuel/product into the primary air stream with recycled fuel/product. The fuel/product and primary air enter the MicroMill cone where surface moisture is evaporated. As they enter the cone section, they begin to swirl in a cyclonic motion caused by the rotation of the impeller. The fuel/product is held to the edge of the cone by centrifugal force. As the air and fuel/product proceed up in the cone, the area increases and the upward velocity decreases until the particles form bands of comparable mass. The smaller, higher-velocity particles passing through these bands collide with larger particles, breaking them up. Thus, particle-to-particle attrition.

This action continues until the particle is small enough to be drawn from the cone/Rotational Impact Zone through the impeller and discharged to the classifier. Here the oversized particles are rejected and returned to the MicroMill feed system upstream of the raw fuel/product feed through an airlock. The fine fuel/product is discharged directly to the burner system or collection device. The hot primary air, recycle fuel/product, and raw fuel/product are violently mixed and attrited in the cone section promoting additional drying of the fuel/product. The primary air temperature is increased as the fuel/product moisture increases to remove additional moisture from the fuel/product.

1.2 PRINCIPLES OF OPERATION

The MicroMill System is a patented centrifugal-pneumatic pulverizer which reduces the particle size by particle-to-particle attrition. The heart of the MicroMill System is shown on drawing 1.716957. The major components are:

- Inlet cone (Part No. 01.01.01.19)
- Rotational Impact Zone (Part No. 01.01.01.11)
- Impeller with replaceable blades (Part No. 01.01.01.03)
- Ceramic-line scroll (Part No. 01.01.01.07)

The MicroMill is an air-swept mill and the fuel/product to be micronized is conveyed pneumatically into the transition section just below the cone inlet flange. There is only one moving part, the rotating impeller, in the primary micronizing area. This rotating impeller creates air waves in a tornado-like column of air inside the cone and MicroMill Rotational

Impact Zone. As the fuel/product particles are fed into the lower portion of the cone, centrifugal force pushes them to the outside of the cone and they are picked up in the swirling air flow. As the fuel/product particles move up in the cone, the velocity decreases as the cone area increases and eventually the particles reach a point where their mass will not allow them to move further up in the cone. They form bands of like material in the cone. Smaller, higher-velocity particles traveling up through the cone pass through those bands and impact with the larger, slower-moving particles. These impacts cause fracturing and micronizing of the particles.

As the fuel/product moves up the cone into the Rotational Impact Zone (RIZ) area, the bands of particles become more dense and finer. When the particles are small enough to be pulled out of the centrifugal bands by the air motion, they are passed through the impeller and replaceable blades and are discharged to the horizontal centrifugal classifier.

The function of the classifier is to separate oversize particles and return them to the mill feed system where they are recycles for re-micronization. The particles that are acceptable pass through the outlet orifices of the classifier and are discharged either directly to the burner process or a collection system.

The major wear areas in the MicroMill System are the upper cone, the RIZ, the replaceable-blade sections, and the mill housing scroll area. These wear areas are designed to minimize wear and utilize the materials as detailed in the Micromill Assembly Parts List No. 5.702628.

Conveying air for the MicroMill System is provided by a primary air fan. Depending on the application, it may be necessary to preheat the air to get drying of the fuel/product. The primary air fan can be designed with the preheated air before the fan or if it is a stand-alone installation, with the preheater after the fan.

The main mill drive system for the MF-3018 is provided by an electric motor driving the MicroMill impeller through a belt and sheave arrangement. The electric motor drive system is controlled during start-up by the control center (PLC).

If provided by Fuller Mineral Processing Inc., the controls and electrical equipment for the MicroMill System are incorporated in a pre-wired stand-alone control cabinet. The electric power requirements for the MF-3018 MicroMill would normally be 480 volts, 3 phase, 60 cycles. The mill can be

designed to accommodate 380 or 660 Volt, 3 Phase, 50 cycle power. The control of the MicroMill System, when provided by Fuller Mineral Processing Inc., is accomplished by the use of a programmable controller. The programmable controller monitors all critical mill operating parameters and permissive requirements and also interfaces with the customer's control system. The programmable controller is capable of being modified to accommodate various control systems or changes in control systems, should the operating mode change after the unit is placed in service.

The impeller, the only major rotating component in the MicroMill, is supported by a bearing system which consists of a bearing housing and three anti-friction bearings. Lubrication for these bearings is provided by an oil mist system which is considered to be the best bearing lubrication system for anti-friction bearings. The bearing housing is also equipped with a vibration detector which is monitored by the programmable controller control system and shuts the unit down automatically should be the vibration exceed the allowable limits. Please refer to Parts List No. 5.701684 for the bearing housing assembly.

The entire MicroMill System is mounted in a modular box steel frame which contains the MicroMill and feed system components. The MicroMill System support frame transfers its load to the structure it is mounted on through a series of base plates. The foundation requirements for the MicroMill System are minimal and normally require only a 6" to 10" (150mm to 250mm) concrete slab for mounting.

Maintenance is accomplished on the MicroMill System by removing the expansion joint below the cone section and the bolts which attach the Rotational Impact Zone (RIZ) to the scroll. The RIZ/Cone section can then be lowered, and swung out of the way, by loosening the large nut on the pivot point. This will allow access to the mill's internal components.

Additional detail and specific operating and maintenance instructions are contained in the body of this manual and should be consulted with installing, operating, or maintaining the unit. The material in this manual is meant to give the operator general operating instructions and is not intended to override the purchaser's own operating and safety procedures.

Safe operation of the MicroMill System is the responsibility of the operator and the MicroMill should never be operated for any purpose other than the purpose for which it was designed; and the MicroMill should never process any material other than the material for which it was designed.

1.3 SPECIFICATIONS FORM SHEET

SYSTEM SPECIFICATIONS

July 25, 1996

Customer:	Eastman Kodak
Contract No.:	96-11028-745
Location:	Rochester, NY
Model No.:	MF-3018-1P
Material Processed:	3/4 by 0 Coal
MicroMill Data:	Size 30" - 18 blades
RPM:	2860
Drive:	Belt
Replaceable Blade:	Radial
Drive Motor:	200 HP, 480 V/3 phase/60 Hz
Bearing Data Type:	Anti-friction ball
Lubrication:	Oil mist
Shaft Seal:	Labyrinth pressurized air
Vibration Detector:	Balmac mounted on bearing housing
Bearing Temperature detectors:	Top and bottom bearings PT100 RTD's
Wear Parts, Replaceable Blades:	Radial with hardfacing
Wear Parts, Cone Liners:	High chrome white iron
Wear Parts, RIZ Liners:	High chrome white iron, 18" opening
Classifier:	Per Drawing 429-93-4-2003 Sht 1 and 2
Air Preheater:	N/A
Feed Piping:	10" Sch 40 with flanged connections
Air Piping:	N/A
Controls:	N/A

2. INSTALLATION AND COMMISSIONING

2.1 SHIPMENT INSPECTION AND VERIFICATION

Upon receipt of shipment of a MicroFuel MF-3018 MicroMill, a visual inspection of the components should be made. The carrier should be notified of any parts that were damaged. During this inspection, the equipment shipped should be verified against the assembly parts list (5.702628). Any discrepancies should be brought to the attention of Fuller Mineral Processing Inc. immediately.

NOTE: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW PROPER SAFETY PROCEDURES FOR ALL LIFTING AND MOVING OF EQUIPMENT DURING INSTALLATION!

2.2 INSTALLATION OF EQUIPMENT (PHASE 1)

2.2.1 Frame Erection and Installation (See Dwg. 1.713916)

The frame should be bolted to an appropriate footing which is level to one-eighth inch in ten feet (1/8"/10' = 3.2mm/3048mm). The anchor bolts for the frame are M16 Hilti HVA adhesive anchors w/ 125 mm embedment or approved equal. After placing the base frame/mid frame. (01.01.02.21 on dwg. 1.713916) on the footing, check the frame to insure it is level and square.

The mid frames, which are already installed on the base frame using hardware supplied by Fuller Mineral Processing Inc. (5/8" diameter hex bolts), must be squared on the foot pads and should be checked. Check the tightness of the bolts against the torque value listed in Table I.

2.2.2 Installation of Mill Housing Frame, Vibration Isolators and Mill Discharge Transition (See Dwg. 1.713916)

Install the mill discharge transition (01.01.02.18) and gasket (01.01.02.19) with the hardware on the drawing listed above. Torque the bolts to the value indicated in Table I.

Using the lifting eyes on the mill housing frame, by suitable means lift it and the upper mill frame and

TABLE I: TORQUES TO PRODUCE RECOMMENDED LOADS
CAP SCREWS

SIZE INCH	BASIC DIAMETER	STRESS AREA	TENSILE STRENGTH (T) MIN. PROOF STRESS (P) P.S.L. SAE GRADE			S.A.E. GRADE 2		
			2 T/P	5 T/P	8 T/P	CLAMP LOAD (LBS.)	ASSEMBLY TORQUE DRY R=.200	ASSEMBLY TORQUE LUB. R=.150
	.1120	.00604	69M/55M	120M/85M	150M/120M	240	5	4
	.1120	.00661	–	–	–	280	6	5
	.1250	.00776	–	–	–	330	8	6
	.1250	.00820	–	–	–	342	9	7
	.1380	.00909	–	–	–	380	10	8
	.1380	.01015	–	–	–	420	12	9
	.1640	.01400	–	–	–	580	19	14
	.1640	.01474	–	–	–	600	20	15
	.1900	.01750	–	–	–	720	27	21
	.1900	.02000	–	–	–	820	31	23
1/4 –20	.2500	.0318	–	–	–	1320	66	49
1/4 –28	.2500	.0364	–	–	–	1500	76	56
5/16 –18	.3125	.0524	–	–	–	2160	11	8
5/16 –24	.3125	.0580	–	–	–	2400	12	9
3/8 –16	.3750	.0775	–	–	–	3200	20	15
3/8 –24	.3750	.0878	–	–	–	3620	23	17
7/16 –14	.4375	.1063	–	–	–	4380	30	24
7/16 –20	.4375	.1187	–	–	–	4900	35	25
1/2 –13	.5000	.1419	–	–	–	5840	50	35
1/2 –20	.5000	.1599	–	–	–	6600	55	40
9/16 –12	.5625	.1820	64M/52M	–	–	7100	65	50
9/16 –18	.5625	.2030	–	–	–	7900	75	55
5/8 –11	.6250	.2260	–	–	–	8800	90	70
5/8 –18	.6250	.2560	–	–	–	10000	100	80
3/4 –10	.7500	.3340	–	–	–	13000	160	120
3/4 –16	.7500	.3730	–	–	–	14550	180	140
7/8 –9	.8750	.4620	55M/28M	115M/78M	–	9700	140	110
7/8 –14	.8750	.5090	–	–	–	10700	155	120
1–8	1.0000	.6060	–	–	–	12700	220	160
1–12	1.0000	.6630	–	–	–	13900	240	170
1–1/8 – 7	1.1250	.7630	–	105M/74M	–	16000	300	220
1–1/8– 12	1.1250	.8560	–	–	–	18000	340	260
1–1/4– 7	1.2500	.9690	–	–	–	20350	420	320
1–1/4– 12	1.2500	1.0730	–	–	–	22550	460	360
1–3/8– 6	1.3750	1.1550	–	–	–	24300	560	420
1–3/8– 12	1.3750	1.3150	–	–	–	27500	640	460
1–1/2– 5	1.5000	1.4050	–	–	–	29800	740	560
1–1/2– 12	1.5000	1.5800	–	–	–	33200	840	620

NOTE: 1 INCH = 25.4 mm
1 FT–LBS = 1.356 N–m
1 in–LBS = .113 N–m

place it over the mill mid frames. Using the hardware indicated on drawing 1.713916, bolt the upper mill frame to the mid frames, making sure the holes in the frame pads line up. Torque these bolts to the value indicated in Table I. The mill housing frame is bolted to the upper frame with shipping bolts; remove these bolts and discard them. Lift the mill housing frame off the upper mill frame and position the vibration isolators (01.01.04.23 on dwg. 1.713916) onto the mill frame and bolt in place with the hardware indicated by the drawing, but do not tighten the bolts.

Lift and reposition the mill housing frame and align the holes in the frame with the holes in the vibration isolators. Using the hardware indicated in the drawing, bolt the mill housing frame to the isolators. Verify that the mill housing frame is installed correctly on the isolators and tighten all the hardware.
BE CAREFUL NOT TO OVERTIGHTEN THIS HARDWARE.

2.2.3 Installation of Feed System (See Dwg. 1.713916 and 1.725690)

Install the feed piping according to the drawings listed above. After the pipe support (01.01.04.01) is installed, make sure the assembly is level and square.

Bolt the tramp iron valve (01.01.05.21) and 8" (200 mm) weld neck (01.01.05.20) to the feed pipe system noting the orientation of the tramp iron valve. Torque all hardware to the values listed in Table I.

2.2.4 Installation of Lube Mist Assembly (See Parts List 5.701743)

Locate on the left side of the mill frame (as viewed from the front or side opposite the motor) four 3/8" diameter tapped holes. Using the bolts, flat and lock washers noted in drawing 3.704581, mount the lube mist assembly (01.01.01.09) to the frame.

2.2.5 Lube Mist Piping Installation and Lube Mist Set-Up

Locate in the shipping container the various piping segments and notice that each one has a label making reference to its description. Refer to Drawing 3.704581 and note the position and orientation of each pipe segment. All piping has been manufactured so that each segment is in its appropriate location on the mill

frame according to Drawing 3.704580 and 3.704581.

When testing for leaks, in the unlikely event that a leak is found, break the connection in question and use Teflon tape to wrap the male threaded end and reconnect.

Insure that the piping is secured to the supports that are located in various areas on the mill frame. When installing the lube mist piping, the horizontal run of ½" pipe MUST slope down towards the lube mist assembly to prevent oil from accumulating in the pipe (See Lubemist manual for specific instructions). Locate and install the two (2) hydraulic hoses (item 01.01.02.07 in Parts List 5.701743) from the tee to the bearing housing.

Refer to the Lube Mist manual and fill the lube mist assembly with the oil provided (01.01.02.20 on Parts List 5.701743) and replace the fill cap on the lube mist unit.

2.2.6 Labyrinth Seal Installation and Labyrinth Seal Set-Up

The labyrinth seal (01.01.02.05 on dwg 1.716957) consists of two parts: the stationary member and the rotating member. The rotating member consists of a steel sleeve with six (6) Allen set screws. Using a light oil (10W) lightly coat the bearing shaft, verify the O-ring is installed properly into the bore of the sleeve and slide it onto the shaft with the set screws located to the top. Slide the sleeve up the shaft until the sleeve top is approximately 1/8" (3 mm) below the oilseal in the bottom of the bearing housing. Lightly tighten the first Allen set screw, then tighten the Allen set screw that is directly opposite of the first one. Move sixty (60) degrees clockwise and do the same as above; then tighten the last pair. Go around the six (6) set screws and "SNUG" them down (approximately 1/8 turn from contact to shaft). **DO NOT OVER TIGHTEN!**

The stationary member comes with six 1/4-20 Allen bolts and is installed with the flat face-down position, making sure the O-ring is seated in its groove. Slide the stationary member onto the shaft; and when the bronze ring inside the diameter comes near the sleeve, make sure the stationary member is parallel to the bored hole and the bronze ring is centered on the sleeve. Push the stationary member up until it is

seated in the counter bored hole. DO NOT FORCE THE STATIONARY MEMBER ONTO THE SLEEVE!

If it starts hard, re-position and it will slide on easily. Tighten the Allen bolts as was done for the sleeve, but do **NOT** overtighten.

2.2.7 Installation and Set-Up of Vibration Transmitter, RTD's, Pressure Switch, and Lube Mist/Labyrinth Seal Solenoids.

2.2.7.1 Vibration Transmitter

The vibration transmitter (01.01.02.14 on Parts List 5.701743) is installed on a ½" National Pipe Thread (NPT) coupling welded to the bearing housing and located near the bottom of the housing. Screw the monitor in hand tight and then ½ turn more (See drawing 3.704581). This transmitter should be attached to a 30 Volts Direct Current (VDC) Maximum (MAX) linear regulated or unregulated power supply and MUST be wired as shown in the diagram (drawing 3.704581).

2.2.7.2 PT100 RTD's

Two PT100 RTD's mount on the bearing housing to monitor the bearing temperatures. On drawing 2.708145 and 3.704580, locate the two 1/8" National Pipe Thread (NPT) female-tapped holes on the bearing housing. The RTD's are inserted into these holes. When the tip of the RTD bottoms out on the bearing, thread the male fitting into the bearing housing and tighten being careful **NOT** to over tighten it. Do the same for the other RTD, then tighten the nuts down onto the adapters. These nuts do not need to be excessively tight, but just tight enough to hold the RTD in place.

2.2.7.3 Pressure Switch

The pressure switch has been factory set and does not need to be adjusted.

2.2.7.4 Limit Switches, Tramp Iron Butterfly Gate

These switches have been set at the factory and should not need further adjustment.

2.2.7.5 Labyrinth Seal/Lube Mist Solenoids

These solenoids are installed at the factory and no further work is needed in this area. The coils for the solenoids are 120 VAC.

2.2.7.6 Speed Switch

The mill is equipped with a speed switch mounted on the mill shaft. This switch will indicate that the mill shaft is rotating. If for some reason there is a failure in the mill drive system the operator will be notified that there is a problem. Please refer to item 01.01.02.18 on Parts List 5.701743.

2.2.8 Low-Level Alarm for Lube Mist

The lube mist assembly has a low level alarm to indicate when the reservoir needs to be refilled. If the operator does not shut the system down within ten minutes after the alarm, an automatic sequenced stop will occur. At the sound of the alarm, approximately two (2) hours of lubricant remains. The wiring diagram is shown in the Lube Mist System manual and must be wired into the circuit to indicate a warning to the operator. The addition of oil to the lube mist system can be done when the MicroMill System is operating. Please use the hand pump detail in the Lube Mist manual.

2.2.9 Regulator Settings and Purge

Turn on the system air and energize the solenoid(s). Check the pressure on the plant air source supplying air to the Lube Mist and verify there is at least 80 pounds per square inch gauge (psig) (550 kPag). Check the rest of the piping for any air leaks and correct all problems as necessary. The following is a component check-out procedure:

2.2.9.1 Labyrinth Seal Pressure Setting

Refer to item 01.01.01.16 on Parts List 5.701743 and adjust the pressure regulator until the gauge reads 7 psig (50 kPag). Using

the locknut, tighten it so the setting of 7 psig (50 kPag) cannot be changed.

2.2.9.2 Lube Mist Assembly

With a pressure gauge that reads 0-30 inches of water (minimum) (7.5 kPag), remove the plug and attach the gauge as shown in drawing 3.704581. Adjust the lube mist pressure regulator to achieve a pressure reading on the gauge of 20 inches of water (5 kPag).

Remove the pressure gauge and replace the plug that was removed earlier. Using the locking ring on the regulator, push in and "snap" it into the locked position. If there is a cloudy discharge, the lube mist unit is working properly. If not, refer to the "MAINTENANCE" section of this manual under "LUBE MIST SYSTEM".

2.2.9.3 Bearing Housing Cooling Jacket (if supplied)

Located at the base of the bearing housing are two ½" NPT couplings, which are for a water line to remove excess heat from the bearing housing (see dwg 2.708145). One coupling is marked "IN" and the other "OUT". The cooling jacket should be piped to a suitable source of clean, cool (85 °F) water with a means to remove excess heat from the water (i.e., heat exchanger) if the water is to be re-used.

On the discharge ("OUT") of the bearing housing water jacket, the following equipment should be installed in the order specified; a) flow switch, b) manual throttling valve, c) on/off solenoid valve (refer to P&ID for additional information). The flow switch will indicate that cooling water is indeed flowing through the cooling jacket. The throttling valve will be used to regulate the flow through the housing. The on/off valve will be utilized to start water flow during the mill start-up procedure. On the inlet ("IN"), a manual shut-off valve should be installed.

The water requirements for the cooling jacket are as follows; 10 GPM @ 85 °F with a maximum allowable pressure of 20 PSIG.

Operation: The bearing housing cooling jacket is equipped with two (2) bleed air fittings. First, turn the water source on with the on/off valve and throttling valve closed. Open the bleed air fittings to allow air to escape from the cooling jacket. When water begins to exit from both bleed air fittings, close them. Next open the on/off valve. Now establish cooling water flow by opening the throttling valve. The mill bearing temperatures should be, under normal operating conditions, between 170°F-190°F. The throttling valve should be manually adjusted, during commissioning, to keep the bearing temperatures in this range under normal operating conditions. After the throttling valve location is set, normal operation of the water jacket consists of opening and closing the on/off valve during mill start-up and shutdown. Water will always be inside the cooling jacket to prevent rust.

2.2.10 Installation of Motor, Driver/Driven Pulleys, Drive Belts and Belt Guard

WARNING: MAKE SURE THE POWER HAS BEEN DISCONNECTED BEFORE PROCEEDING! THE MOTOR MUST BE WIRED TO ALL APPLICABLE CODES!

Remove the belt guard (01.01.03.11 and 01.01.03.12 on drawing 1.713916) from the supports on top of the mill housing frame. Make sure that the motor mount plate is moved to the left-most position as viewed from the mill housing frame looking at the motor mount. If it is not, turn the adjusting bolts evenly clockwise. Lift the motor into place in the mill housing frame; and using the hardware provided on the motor mount, bolt the motor in place with the shaft up. Lightly tighten the motor hold-down bolts to insure that it is positioned snugly against the mounting plate; BUT before snugging down the bolts, make certain the motor shaft is parallel to the bearing housing shaft.

Install the lower belt guard (01.01.03.11). Then locate the driver sheave/bushing (approximately diameter 15", 381mm) and square stock key and install this on the motor, but do NOT tighten the bolts. Locate and install the driven sheave/pulley/keystock (approximate diameter 8", 203mm) on the bearing housing, but once again, do NOT tighten the bolts. Position the driven sheave so that there is approximately 3/8" (9.5mm) gap between the bottom of the sheave and the top of the bearing housing cap and tighten the bolts. Using a level, lay it across the top of the sheaves and move the driver sheave

until they are level. Make sure that the shafts protrude slightly above the bore of the sheaves and torque the bolts on both the driver/driven sheaves to the values listed in the sheave section of the manual.

Slightly loosen the motor hold-down bolts and install the drive belt(s) onto the sheaves. Turn the adjuster bolts counterclockwise to tighten the belts making sure they are evenly adjusted. Using the adjuster bolts, tighten the belts so that they deflect approximately 1/4" (6.4mm) while being pushed in hard by hand at the mid-point of the span. Measure the top and bottom distance between motor foot and mounting plate edge and make sure this distance is equal. With a level, verify that the sheave alignment with the motor is still parallel to the bearing housing. Tighten the motor hold-down bolts to the recommended value in Table I. Reinstall the top belt guard.

Wire the motor to the manufacturer's information and according to all applicable codes.

2.3 SYSTEM CHECK-OUT PRIOR TO INSTALLATION OF BACKPLATE ASSEMBLY

Before installation of the backplate, the bearing housing should be run to insure that the MF-3018 MicroMill is in the proper operating condition. If the motor has not been wired at this time, do so. Go through the following checklist before running the bearing housing:

1) Is the motor rotating clockwise looking at the drive sheave?
2) Is the air supply on? Does the supply air pressure gauge indicate a minimum of 80 psig (560 kPag)?
3) Is the lube mist assembly full of oil? Do all the pressure gauges indicate the correct pressures?
4) Is the vibration transmitter operating?
5) Are the bearing RTD's reading the ambient temperature?
6) Are the drive belts tight? Is the belt guard cover bolted down tightly?
7) Is the speed switch working?
8) Is the water cooling jacket fully operational?
9) Walk around the equipment and visually inspect the entire mill, does everything look satisfactory? If there is any question about starting the mill, get an answer first. Turn the mill on and run it for fifteen (15) minutes. During this time monitor the bearing temperature and vibration. If the temperature climbs more than 20°F (11°C) above the starting temperatures or the vibration exceeds 20% of the full scale, there is a problem that needs to be fixed before proceeding.

2.4 INSTALLATION OF EQUIPMENT (PHASE 2)

2.4.1 Backplate Assembly, Rotational Impact Zone (RIZ), Cone and Expansion Bellows

WARNING: MAKE SURE THE POWER DISCONNECT IS LOCKED OUT FOR THE MILL MOTOR BEFORE PROCEEDING!!!

The installation of the backplate assembly is very critical in that it can be detrimental to mill operation if this procedure is not adhered to. The necessary equipment to install the backplate is:

1) Torque wrench, 0-150 ft-lb (0-202 N-m)
2) Dial indicator with magnetic base, +/- .100" and .001 increments (+/-2.5mm @ .025mm increments).
3) 10 mm Allen socket.
4) Impeller supports with hardware, quantity 3, supplied by Fuller Power Corporation.
5) Vernier calipers.
6) Adjusting Shims (Dwg. 4.701942)
7) Other "usual" tools.

Remove the twelve (12) ½" bolts on the top, RIZ flange (01.01.02.01 on dwg 1.716957) and loosen the 2" hex nut on the pivot pin. As you loosen this hex nut, the RIZ will lower; and when it clears the mill casing, swing it counterclockwise (viewed from top) until it almost strikes the mill motor. On top of the mill housing locate the two square access openings. Remove the covers and put them aside. These two openings will be used to hoist the impeller assembly into and out of position with the aid of the overhead crane. Two Eye-Bolts will be screwed into the back of the mill backplate. Cables can then pass through the access openings on the mill housing and attach to the impeller assembly. The entire assembly can then be lifted into position. In addition, the spacer shims (dwg. 4.701942) supplied by Fuller Mineral Processing Inc., will be positioned through these openings.

Locate the impeller assembly (01.01.01.03 on dwg 1.716957), Ringfeder (01.01.02.09) and impeller supports. With a clean rag dipped in solvent, wipe off the shaft and make sure there is no oil or dirt on it. **Make sure when the backplate assembly is being positioned for installation (with blades facing down), that blocks of wood are placed between the blades and carrying device to prevent damage to the blades.** NOTE: The replaceable blade sections, RIZ liners and upper cone liners are made of high chrome, white iron, wear-resistant material. This material

is brittle and subject to mechanical failure should the sections be dropped or impacted with heavy objects. Carefully raise the impeller up into the mill housing, centering the shaft in the bored hole of the impeller. As the impeller is lifted into the mill casing, two things must be done. First, place the spacer shims (dwg 4.701942) through the access openings on top of the mill housing. Second, locate the shims between the backplate and the underside of the mill housing. The shims will ensure that a 0.25" (6.35mm) gap exists.

Continue raising the impeller until the top side of the impeller makes contact with the shims. Install the impeller supports with the included hardware and place blocks of wood between the impeller and supports in the unlikely event that the impeller would slip off the shaft. The Ringfeder should be wiped clean with a clean rag with solvent, and the surfaces indicated on Figure 1 should be lightly oiled (10W). Make sure the Ringfeder is assembled properly (Figure 1) and the Allen bolts (only) are lightly coated with anti-seize compound (moly-coat). Verify the Allen bolts are in the correct holes (non-threaded holes) for tightening the Ringfeder to shaft. The Allen bolts should have their threads just started and two (2) opposing bolts removed from the tightening holes (threaded holes) and put into loosening holes and screwed completely in. This will cause the Ringfeder to expand and ease installation of it. Slide the Ringfeder onto the shaft and into the counter-bored hole on the backplate. If the Ringfeder will not start into the counter-bored hole, remove it and re-center the impeller. The Ringfeder is in the correct position when it bottoms out against the impeller assembly. While holding the Ringfeder up and bottomed out (tap lightly to make sure), start tightening the Allen bolts in cross pattern until all the bolts are tight. Remove the two (2) bolts that were in the loosen holes and put them back in the non-threaded hole and tighten. **DO NOT OVER TIGHTEN THESE BOLTS, MAKE SURE THEY ARE TIGHT ENOUGH SO THE IMPELLER WILL STAY IN PLACE (≈75 FT-LBS=100N-m).**

Remove the shims and disconnect the cables used in raising the impeller. Remove the Eye-bolts.

Using the access openings on the top of the mill set up the dial indicator. The indicator tip should be positioned as close to the outside edge of impeller as possible. Adjust the indicator so it is set at the midpoint of its range and "zero" the pointer. Slowly rotate the impeller clockwise, as viewed from the top, and watch for the maximum and minimum movement of the indicator. The backplate MUST be level to within .002" (.05mm) TIR (Total Indicator Readout). Rotate the backplate until the indicator reads its **MAXIMUM, HIGHEST** reading. **TIGHTEN** three or four Allen bolts closest to the position of the dial indicator.

Re-zero the indicator, and spin the impeller again. Pick the "high" again and do as stated above. If the bolt torque is approaching 120 ft-lb (90N-m), you must rotate the impeller so the indicator reads the **MAXIMUM, LOWEST** reading.

Closest to the dial indicator, loosen two Allen bolts and remove one and thread it into the hole next to the one you just removed the bolt from. Slowly tighten the bolt while watching the indicator and when the indicator has moved half the previous amount shown on the dial indicator, STOP. Remove the bolt from the "loosen" hole and put it back into its original position. Tighten these moderately so that the backplate cannot move from this position. Re-zero the indicator and spin the impeller. When the total indicator movement is not more than .055" (.13mm) TIR, re-zero and pick the high indicator reading. Begin with the Allen bolts nearest the dial indicator and torque them to 120 ft-lb (90N-m). Torque the next pair of Allen bolts to 120 ft-lb (90N-m) that are closest to the previous pair. Continue using this torquing sequence until you finish the last pair of Allen bolts that are directly opposite the dial indicator. Re-zero the indicator and check to make sure that the TIR is .002" (.05mm) MAX> When this has been verified, install the cover cap (01.01.02.11) making sure the o-ring (01.01.02.12) is seated in its groove. Put two drops of Loc-tite 242 (or comparable product) on this bolt and torque it to 30 ft-lb (22N-m). Remove the impeller supports and reinstall the access openings and gaskets.

2.4.2 INSTALLATION OF RIZ (ROTATIONAL IMPACT ZONE), CONE AND EXPANSION JOINT W/LINER

Verify the installation of the O-ring (01.01.01.12) into the groove, which is on top of the RIZ flange, and wipe a light coat of grease on the mating flange to insure that the O-ring seals effectively. Rotate the RIZ on the pivot pin until the RIZ is aligned and concentric with the opening in the mill casing. Slowly tighten the 2" hex nut which will raise the RIZ, and keeping the RIZ liner centered in the mill casing until the flanges come close to meeting. Reinstall the bolt hardware for the RIZ and tighten to the torque values in Table I.

Rotate the impeller by hand and verify there are no interference problems. If there is interference, it must be corrected. Install the RIZ/cone O-ring (01.01.01.12) into the groove located at the top of the cone flange and lightly grease its mating flange. Lift the cone into place. Align the flanges to each other and align the bolt holes and install the hardware as listed in drawing 1.716957 and torque per the values listed in Table I.

Installation of the expansion joint w/liner is to be done according to Drawing 1.713916 with the hardware noted and locating the three (3) 10" (254mm) flange gaskets (Detail "H" dwg 1.716957) as shown. Tighten the bolts to the torque specified in Table I. If the flanges are not parallel, adjust the upper pipe support adjusting bolt to help align the flanges.

2.5 COMPLETE SYSTEM CHECK-OUT

After successful completion of the checklist on page 13, items 1 through 9, turn the MicroMill on manually and allow ambient air to flow through the system. Make sure any flow control valves are open to allow air flow. During the ramp-up to full speed, closely monitor the vibration so that if the MicroMill exceeds 40% of full scale of the vibration transmitter, the MicroMill can be shut down. If a problem is detected, it must be fixed. If no problems are encountered during start-up, run the MicroMill for one (1) hour and monitor the vibration, bearing temperature and motor amps. The vibration should not fluctuate more than 10% and the bearing temperature should rise slowly. During this time, the motor amps should be stable and energy consumption should be approximately 40 kilowatts. By the end of an hour, the bearing temperature should not exceed 170°F (75°C) and vibration should be no more than 30% of full scale of the vibration transmitter.

3. OPERATION

3.1 INSPECTION OF EQUIPMENT

3.1.1 General

Initial inspection of the MicroMill should be made by the purchaser's operating and maintenance people together with a Fuller Mineral Processing Inc. representative before placing the equipment into service. This inspection and the accompanying illustrations and descriptions will be of assistance in understanding the construction, operation and maintenance of the MicroMill.

3.1.2 Feed System

All access doors and panels should be removed from the feed screw and inspected for foreign material, if this has not been done already. The inspection openings and clean-out doors should be reinstalled and made secure. All flange connections to the MicroMill Feed System and the customer's bunker or hopper should be checked to insure that they are secure and gasketed. The drive unit should be checked to insure that there is proper lubrication and that the drive guard cover is in place. The screw feed should then be jogged to insure that it is wired properly and rotating in the proper direction. Once this is established, it should be operated for several minutes to insure that the screw is free and functioning properly. At this time, verify the feed screw speed switch is operating correctly and the screw calibrated for the proper feed rate.

The bunker of driven end of the main feed screw should be inspected to insure that it is connected to the customer's bunker or hopper properly and that there are no forces being introduced to the feed screw system from the customer's bunker hopper, or other material handling equipment.

3.1.3 MicroMill

The MicroMill should be inspected to insure that it is assembled properly and ALL fasteners are secure and in place. The drive motor/sheave should also be inspected to insure that it is secured properly and lined up

properly with the sheave on the MicroMill bearing housing. The drive belt(s) should be checked for alignment and tightness (See Section 2.2.10). With the belt guard in place, check the operation of speed switch for the motor/bearing housing system. The system should be checked to insure that the seal air piping, the lube oil system air piping, the lube mist system piping, and cooling water jacket piping are piped and operable. The bearing housing should also be inspected to insure that the vibration detector and bearing RTD's are installed properly and operate correctly. Once this inspection is complete, the Rotational Impact Zone (RIZ) and cone section should be unbolted at the mill casing and swung out of the way to inspect the impeller and mill housing internals.

CAUTION: **Do not work on the MicroMill until the drive motor power circuit has been disconnected and tagged out.**

DO NOT WORK UNDER THE IMPELLER SECTION UNTIL IT IS SAFETY BLOCKED BY ATTACHING THE IMPELLER SUPPORTS TO THE RIZ BOLT HOLES TO CONTAIN THE IMPELLER, SHOULD IT SLIP DOWN.

DO NOT RUN THE MICROMILL WITH THE RIZ AND CONE SECTION REMOVED.

Inspect the mill housing internals to insure that all ceramics are secure and in place and that the impeller and replaceable blades rotate freely by hand. Check to insure that the impeller backplate is aligned properly. (See Section 2.4.1)

Turn on the air to the labyrinth seal system to verify that air is flowing freely and the pressure regulator indicates 7 psig (48.3 kPag). Once the alignments and internal checks are complete, verify the RIZ liners are secured, then the RIZ/cone assembly should be swung back in place, the O-ring installed, and the RIZ bolted securely to the mill housing. The cone should then be dropped by removing the bolts that attach it to the RIZ section and the flange inspected to insure that the O-ring is in place. Also inspect the cone liners and attaching bolts to insure they are not loose or missing. The cone should then be reinstalled and secured. The flexible expansion joint between the feed pipe outlet and the cone inlet should be inspected to insure that all shipping brackets are free and the joint is attached and gasketed properly.

Next, open the access doors on the classifier and inspect

the classifier and airlock to insure that they are free of debris and construction material. Once this is assured, the gaskets should be checked and in place and the doors tightened securely. The classifier discharge airlock should be inspected to insure the drive and drive system is connected properly and adequately lubricated. Once this is accomplished, the airlock should be jogged manually to see that it rotates freely and is rotating in the proper direction. Once this is established, the airlock should be operated manually for several minutes to insure that it is going to function properly. At this time, verify the airlock speed switch is operating correctly.

3.1.4 Bearing Inspection

Great care is exercised in handling and assembling the MicroMill bearings and bearing system at the Fuller Mineral Processing Inc. plant. All MicroMill bearing systems are preassembled before field shipment. They are at this time lubricated with a residual oil to prevent internal rusting and damage of the bearings during shipment and erection. There should be no need to disassemble the bearing housing and inspect the bearings unless there has been damage to the bearing system during erection such as dropping, storing in an unprotected area, flooding, and so forth. The installation of the oil lubrication mist system should be inspected to insure that it is installed properly. that sufficient air is connected to the system, and that the lube system is properly connected to the bearing housing.

CAUTION: The bearings should never be rotated at full speed until the oil lube mist system is checked out and has been in operation for at least 5 minutes.

Next, check the foundations and foundation bolts to insure that the MicroMill is securely bolted and grouted to the foundation.

3.1.5 Auxiliaries and Ducting

The hot primary air duct attaching to the MicroMill feed system should be inspected and has been designed to allow sufficient expansion and not put undue stresses on the MicroMill System. Make sure that the ducting is free of all debris and construction materials that could possible cause damage during initial operation of the MicroMill System.

Dampers and control valves, if applicable, should be inspected to insure that there is sufficient clearance within the ducting and system to allow smooth operation at normal operating temperatures. All automatically operated control valves and dampers should be operated to insure that they are connected properly and responding to the proper input signals.

3.1.6 Turbo Blower

If provided, the turbo blower should be inspected to insure that there is no debris or foreign material in it and that it is installed in accordance with its manufacturer's recommendations. The unit should then be bumped electrically to insure that it is rotating in the proper direction and that the bearing system is functioning properly. Once this has been established, the turbo blower should be operated for several minutes to insure that it is functioning properly. All discharge valves must be in the closed position.

3.2 START-UP AND INITIAL OPERATION

3.2.1 MicroMill

When the MicroMill is initially started, a person should be stationed nearby to immediately shut it down if unexplained sounds are heard or vibration exceeds 40% of full scale (.4in/sec of velocity). The MicroMill should be started the first time in manual. There may be a squealing or belt noise when the last torque on the motor occurs; this is normal and can be minimized by insuring that the belts are tensioned properly. At full speed the MicroMill should make no more noise that a turbine or such device of its size would make. If there are any unusual noises such as clicking, rubbing, squeaking, et cetera, the unit should be shut down immediately, the cause of the noise determined and eliminated. The vibration on the unit should be watched closely during start-up and if for any reason it appears it is excessive (greater than 40% of the scale provided), the unit should be shut down immediately and the cause of the vibration determined and eliminated. If the MicroMill is operating normally with all parameters such as vibration level, drive motor amperage, bearing temperatures and so forth within normal ranges, the MicroMill should be operated empty for a period of one to two hours before actual processing of coal/raw material. During this initial operation, the unit should be checked continually for such things as vibration, noises, bearing temperatures,

and other parameters impacting its operation.

3.2.2 Motor

During this initial operation, the motor should be checked to insure that the bearing temperatures are running within acceptable limits and that the motor cooling system inlet and outlet are free of all foreign material. While running without raw feed, the motor should not consume more than 40 kilowatts of power. If it consumes more than 40 kilowatts of power, determine the reason and correct the problem.

NOTICE: Inspection of the motor and bearing area should not be made with the mill in service unless the belt guard is in place and secure.

3.2.3 Valves and Auxiliaries

Once the MicroMill is up and running and you are satisfied that all operating conditions are within normal bounds, the balance of the system should be brought on line which would include the turbo blower, the airlock under the classifier, and the feed screw conveyor. These components should be operated for 30 minutes to one hour to insure that they will operate for extended periods without malfunctioning.

3.3 PREREQUISITES FOR GOOD OPERATIONS

3.3.1 Feed Screw Conveyor

It is required that the material provided to the feed screw conveyor be no greater than 2" x 0 to avoid undue wear, material stoppage and unnecessary jamming of the feeder. If a drive sheave is connected to the screw feed conveyer with a shear pin, a small supply of shear pins should be available. If the drive unit is not provided with shear pins and is protected by thermal overloads on the drive motor, the starter should be inspected to insure that the proper size heaters are installed.

The feed screw conveyor is equipped with clean-out and inspection doors for quick access should the screw conveyor become jammed. If the feed screw conveyor should become jammed or locked with either large lumps of coal or foreign material, the power to the feed screw conveyor drive should be disconnected prior to removing any of the access doors and freeing the foreign material. Once the foreign material is removed, the access and clean-out door should be securely attached prior to

restarting the feed screw conveyor. Keep the feed screw conveyor and its drive clean and frequently inspect it for proper operation and lubrication. Good housekeeping and preventative maintenance can save future operating troubles.

3.3.2 MicroMill

The MicroFuel MF-3018 MicroMill takes material that is sized 2" x 0 or less as fed to it by the feed screw conveyor, micronizes it and discharges it with the primary air to the burner or collection device. The rate of raw material feed is entirely controlled by the rotating speed of the feed screw conveyor. In order to obtain proper mill performance, the MicroMill should be operated at its designed speed. For the MF-3018 system, the impeller rotating speed is 2860 revolutions per minute.

3.4 OPERATION OF THE MICROMILL WHEN GRINDING COAL/RAW MATERIAL

Before the MicroMill is placed in service, calibration of the screw feed conveyor should be checked to verify that the feed rate is within tolerance. All ancillary equipment (turbo blower, airlocks, automatic valves, etc.) should be checked out and working properly. When the MicroMill has been run at least two (2)hours without any abnormalities and the rest of the "total" system has been checked out, a cursory walk-around of the equipment should be made and inspected according to the checklist in Section 2.3. If everything is acceptable, start the equipment in "auto". While the MicroMill is running, keep monitoring the vibration, bearing temperatures and motor amp load. The vibration should be steady and not fluctuate over 10% over the "nominal" running percentage and the motor amps should not fluctuate +/- 8 amps from its running load. Bearing temperature should rise and stabilize after one hour. If for any reason erratic behavior in these areas should occur, the system must be shut down and the condition corrected.

The mill operating sequence in the automatic condition should be as follows:

1) Fan starts with valves closed.
2) Mill runs up to speed.
3) When Fan reaches full speed, valves open to position to establish air flow(s).
4) Preheat for air (if installed) starts, valves reposition for flow.
5) Preheat reaches setpoint, material feed starts.

When the raw feed starts, the MicroMill should be monitored to insure all parameters are at their running conditions for the first hour and then on a time basis as determined by experience.

Before starting the MicroMill, the following should be checked to insure that no problems are encountered during extended operations:

1) Lube mist oil reservoir checked and topped off.
2) Lube mist filter/receiver manual drain opened to remove condensate.
3) Supply air pressure is at least 80 psig (560 kPag).
4) Verify the labyrinth seal pressure regulator is set at 7 psig (49 kPag).
5) The lube mist system is operating correctly.
6) The tramp iron gate has been opened to remove any foreign material from previous operations.
7) Drive belts tensioned properly and checked for cracking and fraying.
8) No "unusual" oil leaks or stains.
9) No "unusual" complaints during previous operations.
10) ALL sensors are operating correctly.
11) Cooling water jacket is operating correctly.

4. MAINTENANCE AND REPAIRS

4.1 GENERAL

The parts needing most frequent replacement in the MicroMill System are: the replaceable blade sections, the Rotational Impact Zone (RIZ) and cone liners. The design of the MicroMill is such that the replaceable blades can be retrofitted without removal of the RIZ or cone; however, to replace the RIZ liners and the upper cone liners, it is easier to remove these assemblies from the mill casing and work on them not attached to the mill.

The other wear parts needing replacement are the ceramics; however, these parts require replacement less frequently than other parts. To expedite maintenance work, it is advisable to have a forklift available for removal of the cone and RIZ sections.

Parts replacement are necessary when indicated by individual visual inspection. Initial inspection should take place at 300-500 tons throughput after commissioning. Subsequent inspections should take place at every 1000 tons of throughput, or longer, as indicated by appearance and inspections.

The replacement of the wear parts and blade sections is dependent on the throughput and the constituents in the raw feed. The blade life will vary and experience will determine the inspection and replacement cycles.

4.2 REPLACEABLE-BLADE SECTIONS

The replaceable-blade sections can be accessed by removing the RIZ bolts and dropping the RIZ/cone assembly from the mill casing. Once these parts are removed and swung out of the way, the maintenance crew has access to the replaceable blades and impeller.

NOTE: Always install the impeller supports provided to the RIZ flange tapped holes to insure that the impeller will not drop down and injure those working on it.

NOTE: The replaceable-blade sections, RIZ liners and upper cone liners are made of high chrome, white iron, wear-resistant material. This material is brittle and subject to mechanical failure should the sections be dropped or impacted with heavy objects.

The blade sections can then be removed and replaced by removing the center cap, and then remove the 12 Allen bolts from the retainer ring (01.01.01.07 dwg 2.707751). Remove the inspection plate to gain access to the locknuts located on the back side of the impeller backplate. With a 3/4" (approximately 19mm) combination wrench or socket, hold the hex bolt in place while using a 3/4" (approximately 19mm) socket with extension to remove the hex nut. Once this is accomplished, the blade section can be removed by loosening the 9 hex bolts.

NOTE: Care must be taken that the impeller blade does not fall on workers.

Replaceable blades are sold balanced. Once the blade has been removed from the backplate, the backplate should be inspected and cleaned prior to reinstalling a new blade. The blade is installed in reverse sequence (refer to drawing 2.707750). Each new installation, lightly coat the blade locking bolt with anti-seize compound and with a new blade washer (01.01.01.15 dwg 2.707750), tighten to the specific level on drawing 2.707750. Install and torque the retainer bolt locking nut while holding the hex bolt so it does not change position. See drawing 2.707750 for the torque value.

The retainer ring should be reinstalled and the Allen bolt threads coated lightly with anti-seize compound and torqued in accordance with drawing 2.707750 in an opposing fashion. The backplate should be checked for alignment per Section 2.4.1 in the Installation Section. If the backplate is within tolerances as specified, the cover cap can be installed. The cover cap O-ring should be inspected and replaced, if needed. The bolt should have two drops of Loc-tite 242 or comparable product applied to the threads, installed and torqued to 30 ft-lb (40.7 N-m).

It is recommended that on alternating blade replacements the backplate be removed and the labyrinth seal and shaft area be inspected. With the backplate removed, it is recommended that the replacement blade should be placed on the backplate of the MicroMill. The backplate and new blade section should be balanced as a component to insure that the system is within balancing tolerances if the replacement blade set was not balanced by Fuller Mineral Processing Inc. Contact Fuller Mineral Processing Inc. for information regarding balancing of blades and backplate. Once this is complete, the backplate can be installed by following the installation procedures in the installation section of this manual (Section 2.4.1).

4.3 ROTATIONAL IMPACT ZONE (RIZ) AND MILL CONE LINERS

The Rotational Impact Zone (RIZ) and mill cone liners do not require replacement frequently and should be inspected each time the replacement blades are changed. When it is apparent during the current blade change that these liners will need to be replaced (RIZ 01.01.01.13, Cone 01.01.01.21 on dwg. 1.716957), they should be ordered along with compressible washers (Item 01.01.06.01) and placed in stock.

Replacement of these liners is accomplished by removing the cone and RIZ sections from the MicroMill. With the RIZ and cone sections out, remove the retaining bolts and compression washers. Remove the worn casting and clean the old sealant off the outside of the RIZ and cone. New compression washers and sealant (clear silicone or equal) are required around the retainer bolts to insure no leakage of material or air through the clearance holes for the mounting bolts. Once they are in place, reinstall the RIZ and rotate the impeller by hand to insure there are no interference problems with RIZ-to-mill housing connection. This is critical because if the sections extend above the recommended clearances, contact with the rotating replaceable blades is possible. Once this is complete, the cone, expansion joint and the rest of the MicroMill can be assembled and started up using the initial operational start-up procedures.

4.4 INSTALLATION OF NEW BEARINGS

The bearings are designed to give extended life under normal operation and should not be changed unless they are suspected of excessive wear or damage. To install the bearings, it is necessary to remove the bearing housing. If the replacement of the bearings becomes necessary, it is recommended that a Fuller Mineral Processing Inc. service technician be employed to assist in this work. Too much emphasis cannot be placed on cleanliness and the handling of these bearings, the shaft and the bearing housing assembly. It is necessary to use clean rags (not waste) and have clean hands. Great care should be taken in cleaning the bearing housing and shaft. Grit and rust are the natural enemies of polished bearing surfaces and must be avoided. New bearings should never be removed from their carton or wrapper until they are ready to be mounted on the MicroMill shaft. It is recommended that the top and bottom oil seals, gaskets, bearing locknuts and washers be replaced at the same time that new bearings are installed.

<u>Caution:</u> Prior to removing the impeller assembly, the impeller supports provided should be in place and should be blocked properly so that if the impeller should drop inadvertently, it

would not cause damage or injury to anyone.

To remove the bearing housing, it is necessary to first remove the impeller section. Unbolt and remove the expansion/liner joint, as described in Section 4.2, and swing the RIZ/cone assembly out of the way. Install the impeller supports. Blocks of wood **MUST** be placed on top of the impeller supports high enough so that no more than a 1/4" (6mm) gap is between the block of wood and the lowest point of the blades. This is necessary because when the Ringfeder is released, the impeller will drop. Remove the cover cap. On the Ringfeder locate the four "loosen" holes (See Figure 1) and remove the Allen bolts adjacent to them and thread the Allen bolts into the "loosen" hole. Remove the remaining Allen bolts. In an alternating fashion tighten the four "loosen" bolts until the impeller is released from the shaft. A forklift is recommended to take the impeller down at this point; however, an overhead crane or chain hoist can be used if a forklift is not available.

After the impeller is removed, all electrical, air and lubrication connections should be removed from the bearing housing. Remove the size 1/4-20 Allen bolts that hold the stationary member of the labyrinth seal and carefully slide it down from the rotating sleeve. Open the cover to the belt guard, loosen the motor mounting bolts. Using the motor adjusting bolts, move the motor to disconnect the drive belt(s). Refer to the sheave section of this manual and remove the driven sheave from the bearing housing. Unbolt and remove the belt guard. Remove the eight 5/8" (approximately 16mm) diameter bolts. By tightening the two 1/2" (approximately 13mm) jack bolts, the bearing housing will be released. Using the 5/8-11 UNC tapped hole in the end of the shaft, the bearing housing can be lifted out. Loosen the six #10 Allen bolts that hold the rotating sleeve to the shaft and carefully slide the sleeve off.

Disassemble the bearing housing by reversing the instructions detailed on drawing 2.708145. Please note that the preheating of the lower bearing must be skipped during disassembly.

Inspect the shaft and housing for any signs of scoring, wear, pits or other indications that the shaft or housing needs replacement or refurbishment. If there are no indications of problems, clean the shaft and housing with solvent and wipe clean with uncontaminated, dirt-free rags.

4.5 REASSEMBLY OF THE BEARING HOUSING

Extreme care must be taken when reassembling the bearing housing. All surfaces and the work area must be clean. The procedure detailed on drawing 2.708145 must be followed for the

appropriate results. The following are recommendations to be followed during installation:

-During assembly replace the oil seals (01.01.01.17) in the upper and lower bearing housing caps. Lightly coat the cap bored hole with oil to help ease the installation of the seal. Make sure that when installing the seals, that they are not "cocked" or crooked when being pressed in.
-Place the shaft in a vise being careful not to scratch, dent or damage the shaft surface. This will aid in placing the bearings.

4.6 OIL FOR LUBRICATING BEARINGS AND THE LUBEMIST SYSTEM

The lubricating oil for the lube mist system should be a synthetic based SAE 20W, the MicroFuel part number is 01.01.02.20 on parts list 5.701743. This oil is a Mobil synthetic, their part number SHC 626 and has an ISO viscosity grade of 68. This oil is superior to all mineral oils and outperforms them in many aspects, and should be used in this application. Any oil that matches the Mobil SHC 626 specifications is adequate.

Oil consumption for the LubeMist System is approximately 0.4 fluid ounces per hour (.0296 1/HR) with air consumption at 1.2 SCFM (.472 liter/sec). The reservoir contains 1 U.S. gallon (3.79 liter) of oil, and will last about 240 hours before it needs to be refilled.

The LubeMist System is a very low maintenance unit, and the following items should be checked on a semi-annual basis.

1) Replace air filter element.
2) Inspect and clean the reservoir.
3) Inspect and clean the oil suction tube screen.

4.7 MAINTENANCE OF FEED SYSTEM AND AUXILIARIES

Regular checks of the system components will help prevent equipment failures. Routine checks of the feed system, classifier, air supply system and other equipment should be done for routine wear and adjustment. These procedures are intended only for routine maintenance and adjustments, with more in-depth information contained in Parts Lists 5.702628, 5.702629, 5.702406, 5.701743, and Classifier drawing 429-93-4-2003 sheets 1 and 2.

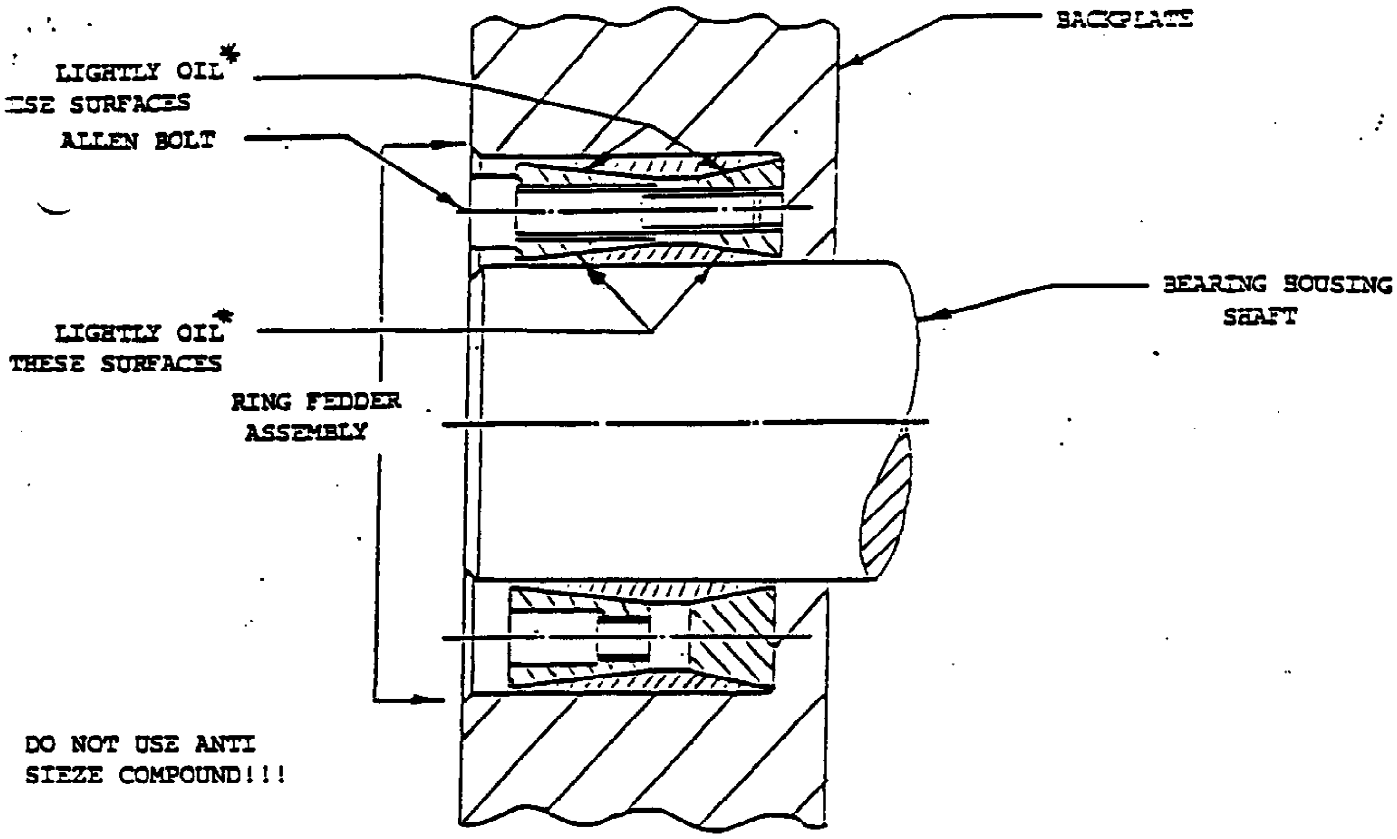
4.8 MICROMILL, CLASSIFIER AND AIRLOCK

The doors of the classifier should be opened, a visual inspection made and the following items should be checked:

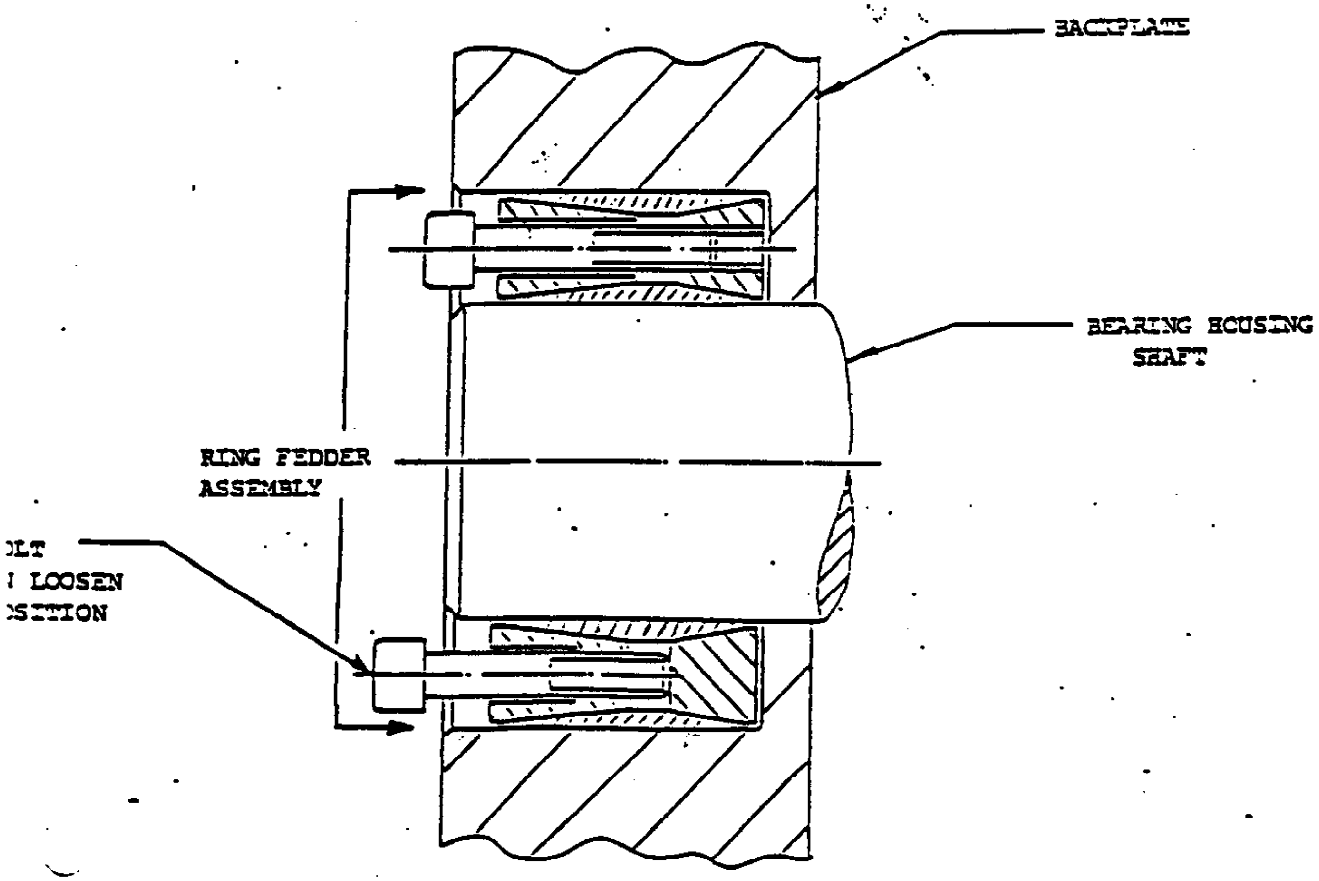
1) Door gaskets.
2) Classifier internals. Check for worn parts or broken welds.
3) Check expansion joint from mill discharge to classifier inlet.
4) Check the exterior for leaks in weld seams.
5) Check airlock drive chain for tightness.
6) Check gear box lube level on airlock.
7) Check driver/driven gears on airlock for wear or broken teeth.
8) Check for loose hardware on the frame and mill system.
9) Check for leaks at all joints such as the cone/RIZ connection, RIZ/mill casings connection and all piping.
10) Check for oil leaks at the bearing housing and all associated piping for the lubrication system.

4.9 ROUTINE MAINTENANCE FOR SCREW FEEDER, MOTOR, AND OTHER ANCILLARY EQUIPMENT

Routine maintenance for the auxiliary equipment for a MicroFuel System requires only basic checks of gearbox oil levels, and routine greasing of bearings. This should be done at a minimum of semi-annually, more often depending on how long the system is on-line.



"TIGHTEN" POSITION



"LOOSEN" OR "REMOVE" POSITION

FIGURE 1

ENGINEERING DATA SHEET

JLSON technologies
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SHEET NO. S 50324 1Q02
PAGE 1 OF 3 DATE 12/29/80

Installation, Operation & Maintenance Instructions - Butterfly Valves Type 15-25# AW, CW, AL, CL

GENERAL

All valves are bi-directional valves, and as such, can be installed regardless of the direction of flow. Although the valves are designed to operate in any position, a horizontal shaft orientation is recommended.

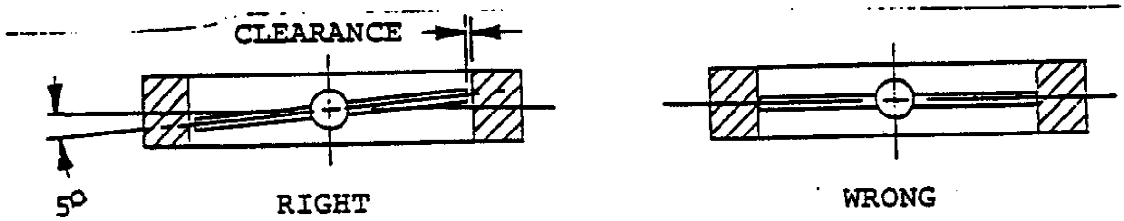
Positioning lugs, drilled holes and tapped holes are incorporated into the body design of valves to assure correct positioning in the line.

These valves are machined with a specific clearance between the valve disc and the valve body. This clearance is based on the intended service temperature.

Note: If the valve is not received as a valve/operator assembly, care must be taken in the field to insure that the proper clearances are maintained since the limiting benefit of any operator is lost.

To check the clearance of any AL/CL or AW/CW valve, establish the total clearance between the disc and body at both hubs. One-half of this dimension is the proper radial clearance between the disc and body.

Before installing an AL/AW valve in the line, be sure that the edge of the closed disc at the extreme limit of its travel is not against the valve body. To maintain the designed clearance, the disc of this type of valve is machined with a 5° bevel on the seating edge and is intended to seat at a 5° angle to the plane of the valve. Failure to observe the above may result in the valve binding up elevated temperatures.



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Disc-Body interference normally is not a problem in CL/CW valves, because these valves employ a swing-thru design.

Gasket material should be checked to assure compatability with the flowing medium and service requirements.

INSTALLATION

Installation is accomplished by closing the valve and positioning it with proper gasketing between the flanges of the pipeline.

Sealing surfaces of both the valve and the companion flanges should be cleaned with a suitable solvent and the valve body alligned with the corresponding bolt holes of the pipeline flanges. Insert two bolts at the bottom of the flange to aid in supporting and alligning the valve. Insert the remaining bolts around the flange connection and tighten lightly. Final tightening of all bolts should be done evenly by tightening those bolts opposite each other in alternate sequence.

OPERATION

After the valve has been installed in the line, all foreign matter that could interfere with proper seating s should be removed from the system. The valve should be manually cycled to determine whether the blade is operating freely.

Note: The normal direction of rotation to close a valve is clockwise. This is based on the rotation of the shaft at the operator end of the valve valve while sighting along the shaft toward the valve.

Check the source of supply of any necessary pneumatic or electrical connections for compatibility with the valve operator requirements.

Note: A groove appears on the top of all valve shafts. This groove is parallel to the disc and may be used to indicate its position.

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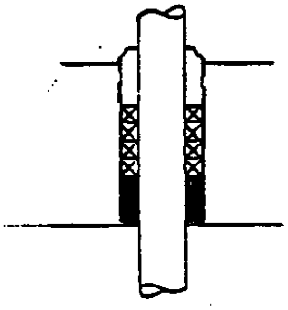
After connection of the operator power supply and adjustment of any limiting devices, cycle the valve a few times to determine whether the operator connections are correct and that the valve is operating properly.

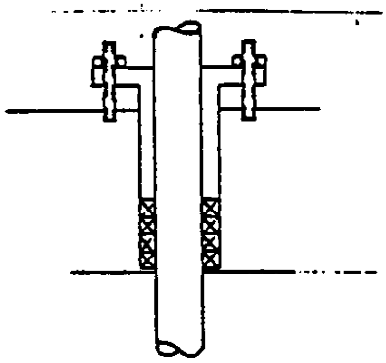
MAINTENANCE

Routine maintenance of valves is normally confined to addition and/or replacement of the packing rings; however, it should be noted that total replacement of the packing rings may cause leakage during the operation and isolation of the line may be necessary.

Valves are furnished with adjustable packing glands or gland nuts which may be inspected periodically and adjusted as required.



GLAND NUT



PACKING GLAND

If additional packing is needed, or complete replacement is required, be sure that the additional or replacement packing material is compatible with the flowing medium and service requirements. For best results the joints of the packing rings should be staggered.

Replacement of non-consumable parts such as bearings, glands, taper pins, etc., is considered as an overhaul procedure, since the valve must be removed from the pipeline and disassembled. A special spare parts kit containing packing, bearings, gland or gland nut, and taper pin is available. When ordering spare parts, please include the following information: 1) valve size, 2) valve type, 3) figure number, and 4) order number.

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SuperNova S-Series

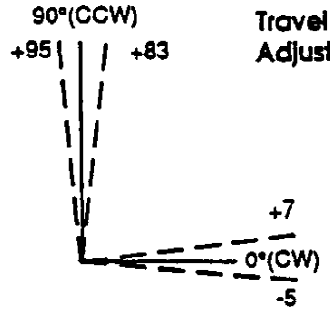
Installation, Operating & Maintenance Instructions

All actuators are factory lubricated for life, but still should be protected from the elements and stored indoors until ready for use. The ports of the actuator are plugged as supplied from the factory. If actuators are stored for a long period of time prior to installation, the units should be stroked periodically to prevent the seals from taking a set.

Prior to assembly, check the mounting surfaces, the stem adaptor and the bracket to assure proper fit. Manually open and close the valve to insure freeness of operation. Be sure the valve and Automax actuator rotate in the same direction and are in the same position (i.e. valve open, actuator open). Secure the valve with the stem vertical. Bolt the bracket to the valve and place the stem adaptor on the valve stem. Position the actuator over the valve and lower to engage the stem adaptor to the actuator shaft. Continue to lower until the actuator seats on the bracket mounting surface. In order to align the bolt holes, it may be necessary to turn or stroke the actuator a few degrees and/or adjust the actuators travel stops. Bolt the actuator to the bracket.

After consulting the valve manufacturer's recommendations, adjust the travel stop bolts of the actuator for the proper open and closed valve positions. Pneumatically stroke the actuator several times to assure proper operation with no binding of the stem adaptor. If the actuator is equipped with an UltraSwitch or other accessories, adjust them at this time.

To prolong actuator life use only clean, dry plant air. Lubricated air is not required, however it is recommended particularly for high cycle applications. Do not use lubricated air with positioners.



Travel Stop Adjustments

Actuator	Endcap Screw Socket Size	Adjustment Bolt Socket Size	Spring Color Code
S50	4mm	1/8 inch	white
S63	5mm	5/32 inch	lt. green
S85	6mm	3/16 inch	blue
S100	6mm	7/32 inch	red
S115	6mm	7/32 inch	yellow
S125	8mm	1/4 inch	grey

Travel Stop Adjustments (Patent #4,949,936)

Both Directions 5° Overtravel 12° Adjustment Each End

The *SuperNova* Series actuators have unique, patented travel stop adjustments in both the clockwise and counterclockwise directions. The 10° total overtravel provides adjustments from -5° to +7° at the 0° clockwise position and from +83° to +95° at the 90° counterclockwise position.

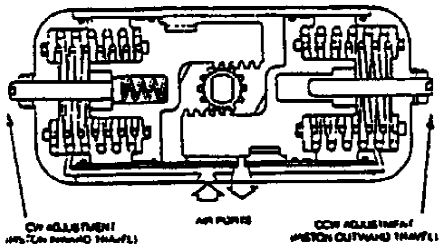
All actuated valves require accurate travel-stop adjustments at both ends of the stroke to obtain optimum performance and valve seat life. The accumulation of tolerances in the adaption of actuators to valves is such that there must be a range of adjustment for both ends of the stroke to achieve the expected performance.

Ball and Plug Valves require precise adjustment at the open (CCW) position to protect the seat from the flow media and the closed (CW) position to assure absolute shut-off.

Butterfly Valves require precise adjustment at the closed position to assure full shut-off, to prevent disc overtravel and damage to the seat at the closed position and to assure maximum flow in the open position.

Tandem Valves, where two valves are operated in tandem through a single solenoid valve (eg. a 3-Way configuration), absolutely require precise adjustment at both ends of the stroke to assure the seating of both valves.

Stop Adjustments and Locations
View the actuator with the Air Ports facing you.



Adjustment Bolt Location

Actuator Type	Fail Position	Clockwise (CW)	Counterclockwise (CCW)
Double Acting		Left End Cap	Right End Cap
Spring Return	CW	Left End Cap	Right End Cap

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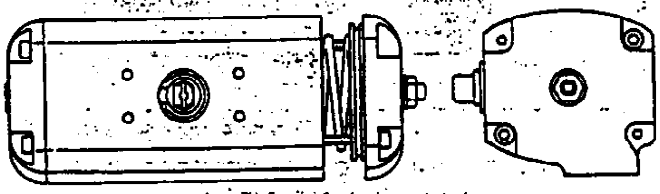
SuperNova S-Series

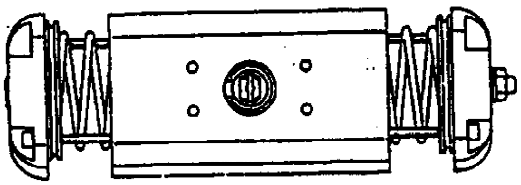
Maintenance Instructions

Disassembly Procedures

1. Disconnect all air and electrical supplies from actuator.
2. Remove all accessories from actuator and dismount actuator from valve.
3. Position actuator with air supply ports facing you. Apply air pressure to Port 2 to release spring pressure from the Stop Bolt (9).
4. Remove the Stop Bolt Retaining Nut (14), Washer (15), and O-ring (16) on the Left Endcap (19) and turn the Stop Bolt (9) clockwise into the Body (1) until it is flush with the Endcap (19).
5. Exhaust air from Port 2,the Stop Bolt (9) should now turn freely. Continue turning Stop Bolt (9) clockwise until it is disengaged from the Endcap.
6. SR Actuator:
   CAUTION: Follow step 4 to relieve force on inward travel stop before proceeding.
   To remove SR Endcap, first completely remove two diagonal Endcap Screws (21) from one Endcap. The two remaining Endcap Screws should be removed evenly. As the Screws are removed, the springs will push the Endcap out. Repeat for opposite side. **The springs will be totally unloaded before the screws are completely unthreaded.** Remove the springs (23,24,25.)



Actuator with springs partially disarmed (right side)



Actuator with springs totally disarmed

DA Actuator: Remove the 8 Endcap Screws (21). Step 7 will push the Endcaps (18,19) from the Body (1).

7. Rotate Pinion (3) counterclockwise (DA & SR-FCW) or clockwise (DR & SR-FCCW) to drive the Pistons (2) off the end of the rack. Pull the Left Piston (2) from the body (1) by pulling on the Stop Bolt (9).
8. Remove the Right Piston (2) by pushing out

Reassembly Procedures

1. Inspect all parts for wear and replace any worn parts as needed. Replace all O-rings.
2. Clean all components and lightly grease cylinder bore, pinion and seals with a multi-purpose "polymer" fortified grease such as DuBois Chemicals MPG-2. Lubricate endcap screw (21) threads with similar grease
3. Reverse the disassembly procedures to reassemble.
4. The standard Pinion (3) orientation is with the drive pocket parallel with the Body (1) in the CW position.
5. When fitting the Pistons (2) ensure the teeth engage the Pinion (3) at the same time by measuring in from the edge of the body (1) the same distance from each end. Note: the orientation of the pistons will determine the operation of the actuator. Refer to the diagrams under "Operation" for correct piston position.
6. Test the actuator for smooth operation and air leakage at service pressure before reinstalling.

Changing Number of Springs

1. Follow the Disassembly Procedures through step 6.
2. Determine nested spring combination of inner, middle and outer springs. Consult catalog torque charts, distributor or factory. Insert appropriate springs into cylinder. Springs must be properly seated against piston and endcap to assure that springs do not bind.
3. Re-assemble the actuator.

Spring chart S63-S200

Spring Group	Spring Combination ①		
	#1 Spring (inner)	#2 Spring (middle)	#3 Spring (outer)
4		2	
5		1②	1②
6			2
7	1		2
8	2		2
9	1②	1②	2
10		2	2
11	1	2	2
12	2	2	2

Spring chart S50③

Spring Group	Spring Combination ①		
	#1 Spring (inner)	#2 Spring (low rate outer)	#3 Spring (high rate outer)
4	1②	1②	
5		2	
6	2	1	
7	1	2	
8	2	2	
9	2		2

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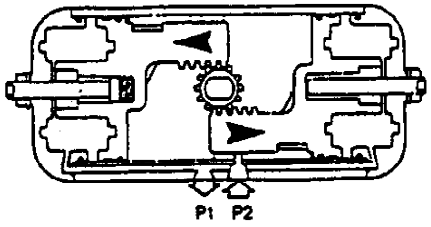
Operation

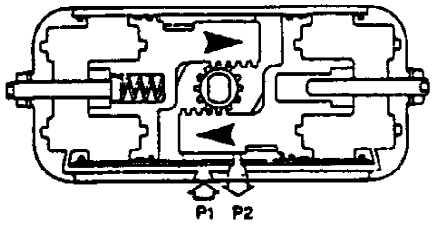
(as viewed from top of actuator)

Double Acting

Applying air pressure to Port 2 drives the pistons outward, which turns the pinion counterclockwise as the air volume on the outside of the pistons exhausts through Port 1.

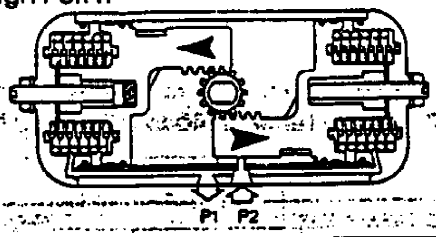


Applying air pressure to Port 1 drives the pistons inward, which turns the pinion clockwise as the air volume on the inside of the pistons exhausts through Port 2.

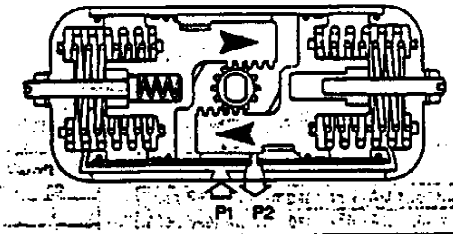


Spring Return (Fail CW)

Applying air pressure to Port 2 drives the pistons outward, which compresses the springs and turns the pinion counterclockwise as the air volume on the outside of the pistons exhausts through Port 1.

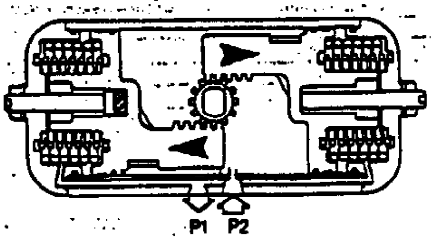


Exhausting the air pressure from Port 2 allows stored energy of the springs to drive pistons inward, turning the pinion clockwise. Air volume on outside of pistons vents through Port 1.

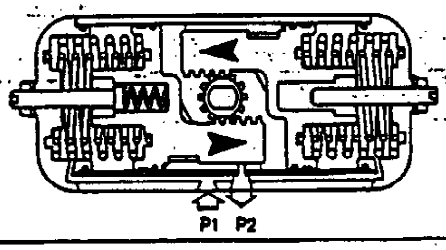


Spring Return (Fail CCW)

Applying air pressure to Port 2 drives the pistons outward, which compresses the springs and turns the pinion clockwise as the air volume on the outside of the pistons exhausts through Port 1.



Exhausting the air pressure from Port 2 allows stored energy of the springs to drive pistons inward, turning the pinion counterclockwise. Air volume on outside of pistons vents through Port 1.



Changing Pinion Orientation

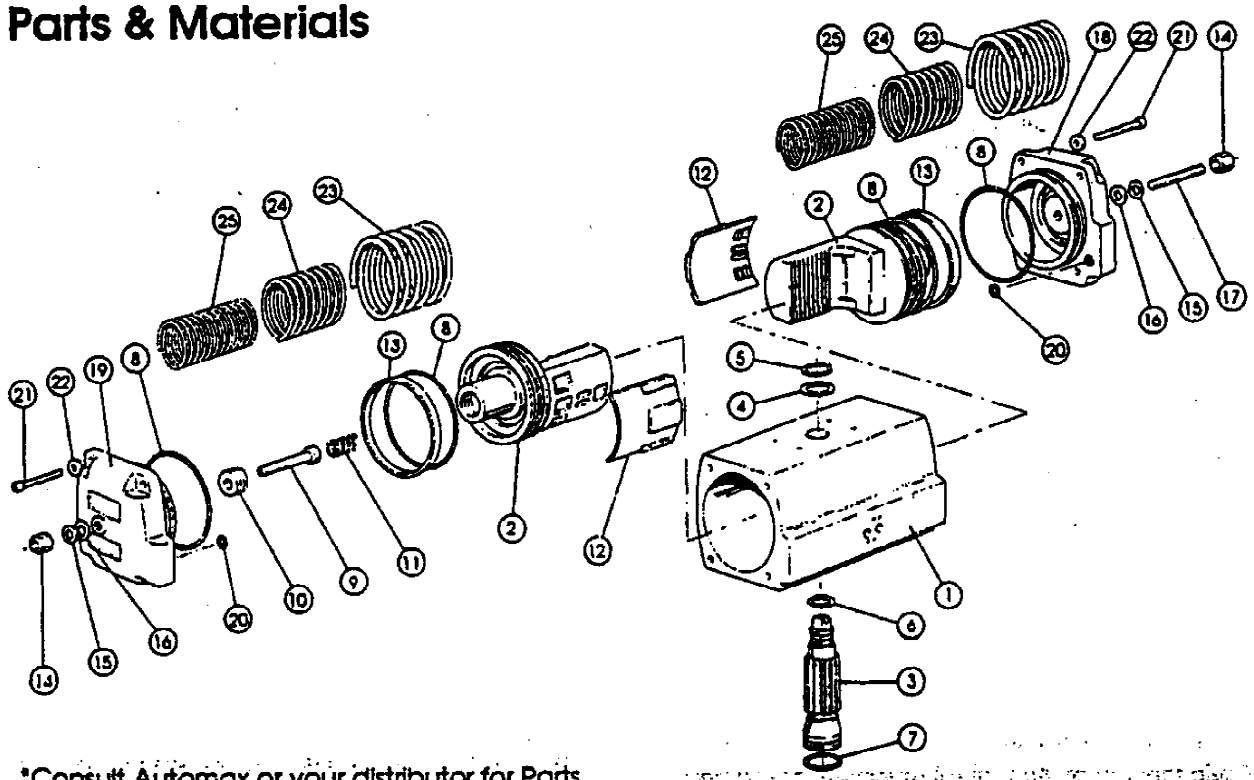
Note: Steps 4 & 8 are not required for DA actuator.

1. Disconnect all air and electrical supplies from actuator.
2. Remove all accessories from actuator and dismount actuator from valve.
3. Position actuator with air supply ports facing you.
4. Follow step 6 under disassembly procedure to un-
6. Tap Pinion (3) lightly with plastic mallet to remove.
   CAUTION: Failure to follow step 4 will result in permanent damage to SR actuator.
7. Reverse Steps 5 & 6 with new Pinion (3) orientation.
8. Assemble right endcap (18) in reverse order of dis-

Automax INC
11444 Deerfield Rd.
Cincinnati, Ohio 45242
(513) 489 - 7800
FAX (513) 489-5243

SuperNova S-Series

Parts & Materials



*Consult Automax or your distributor for Parts and Materials for other series of Actuators.

Item No.	Part Description	Materials	Quantity DA	Quantity SR
1	Body	Hard Anodized Aluminum	1	1
2	Pistons	Die Cast Aluminum	2	2
3	Pinion	Nickel Plated Steel	1	1
4	Pinion Washer ⊛	Nylon	1	1
5	Pinion Snap Ring ⊛	Steel/Plated	1	1
6	Upper Pinion O Ring ⊛	Nitrile Rubber	1	1
7	Lower Pinion O Ring ⊛	Nitrile Rubber	1	1
8	Piston and End Cap O Ring ⊛	Nitrile Rubber	4	4
9	Inward Travel Stop Bolt	Steel/Plated	1	1
10	Inward Travel Retaining Nut	Steel/Plated	1	1
11	Inward Travel Spring	Steel/Plated	1	1
12	Piston Guide	Nylon and Molybdenum Disulfide	2	2
13	Piston Guide Band	Nylon and Molybdenum Disulfide	2	2
14	Stop Bolt Retaining Nut	Stainless Steel	2	2
15	Stop Bolt Washer	Stainless Steel	2	2
16	Stop Bolt O Ring ⊛	Nitrile Rubber	2	2
17	Stop Bolt	Steel/Plated	1	1
18	Right End Cap	Die Cast Aluminum/Electrostatic Poly	1	1
19	Left End Cap	Die Cast Aluminum/Electrostatic Poly	1	1
20	End Cap Supply O Ring ⊛	Nitrile Rubber	2	2
21	End Cap Screw	Stainless Steel	8	8
22	End Cap Screw Washer	Stainless Steel	8	8
23	Outer Spring	Spring Steel Coated	0	2 max.⊛
24	Middle Spring	Spring Steel Coated	0	2 max.⊛
25	Inner Spring	Spring Steel Coated	0	2 max.⊛

Seal Kits

Buna Seal Kit Number	SN (Actuator Model No.) SKB
Viton Seal Kit Number	SN (Actuator Model No.) SKV

SN kits consist of all sealing parts, snap ring and washer.

Pressure Rating

150 psig maximum

Temperature Ratings

Standard	Nitrile	-20°F to +175°F
High Temp	Viton	0°F to +300°F
Low Temp	Silicon-based	-55°F to +175°F

Note: ⊛ Parts included in a Seal Kit.
⊛ See Spring chart for required spring combination

Automax INC

11444 Deerfield Road
Cincinnati, Ohio 45242

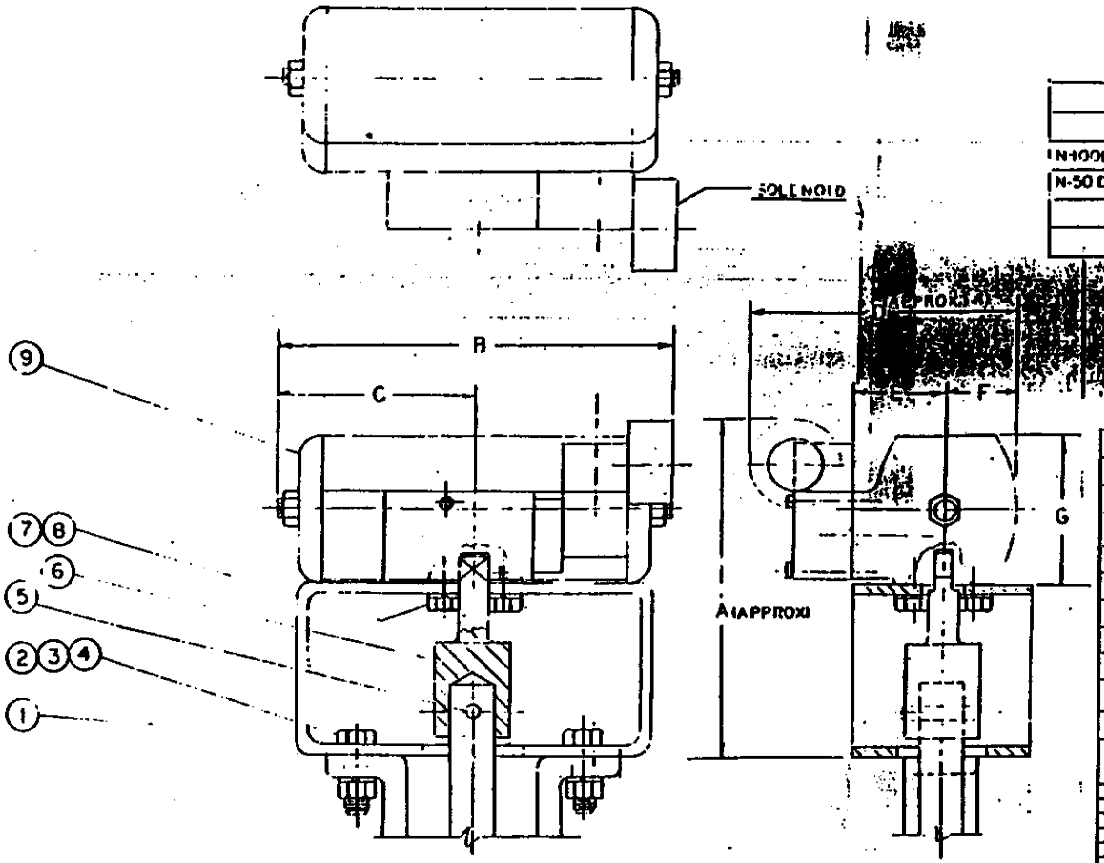
Service Center
4214 Bluebonnet Drive

Service Center
7445 Whitecine Road

Automax Controls, Inc.
3375 Laird Road, Unit 4

P-2044-25

NOTE:
FOR VALVE ASSEMBLY SEE
DRAWING P-1014-105



DIMENSIONS								
	A	B	C	D	E	F	G	
N-100DA	7.19	11.65	5.83	7.03	2.48	2.17	4.37	
N-50 DA	5.81	9.63	3.35	4.60	1.58	1.14	2.56	

NO.	PART NAME	MATERIAL	QTY.
9	ACTUATOR	AUTOMAX	1
8	LOCKWASHER	STEEL	4
7	HEX.HD.CAP SCR.	STEEL	4
6	COUPLING	STEEL	1
5	PIN-DR.LOK.	S.S.	1
4	HEX.NUT	STEEL	1
3	LOCKWASHER	STEEL	2
2	HEX.HD.CAP SCR.	STEEL	2
1	BRACKET	STEEL	1

BILL OF MATERIALS

[redacted]

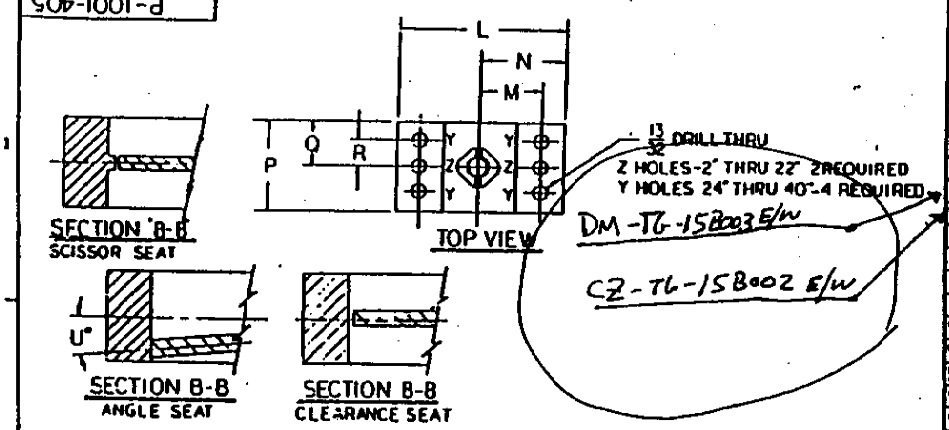
DRN	WE	6-92
CHK	[illegible]	6-92
ENG	[illegible]	6-92

N-50DA,N-100DA W/S[illegible] N.[illegible]
S20N3AA ASSEMBLY

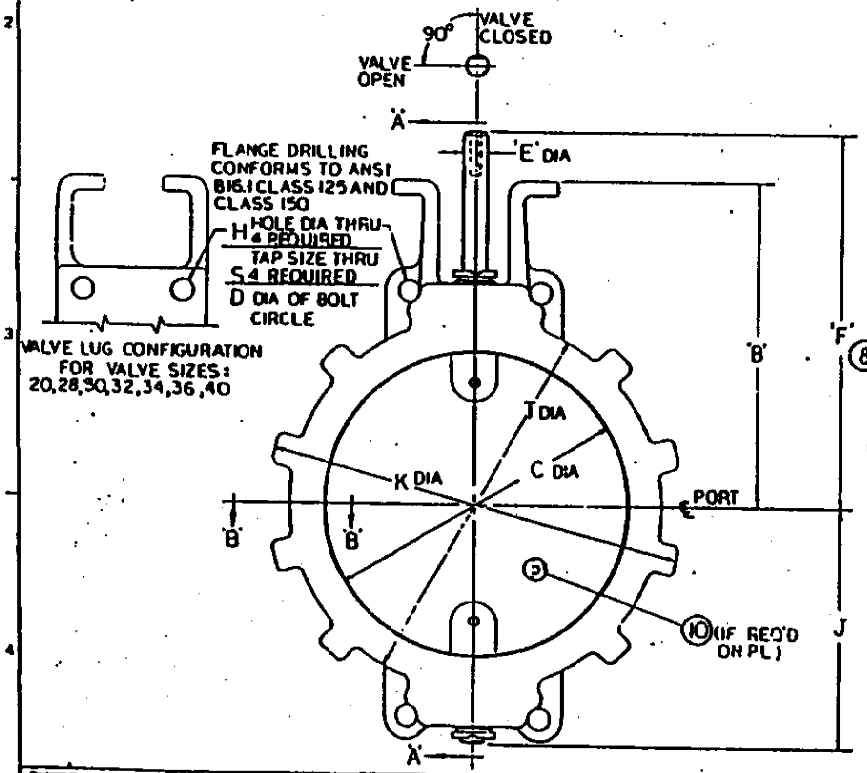
P-2044-25

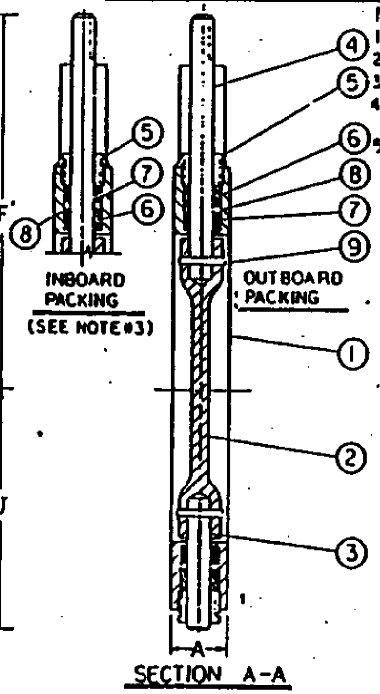
ORIGINAL	A	5824	[illegible]
DESCR	REV	[illegible]	[illegible]

P-1001-405



STD/BOLT PATTERN			DIMENSIONS																			
W	DP	LG	A	B	C	D	E	F	H	J	K	L	M	N	P	Q	R	S	T	U
2	1/64	1/8	2	4.06	6.00	2.00	—	.38	7.50	—	2.50	4.00	3.00	2.00	2.50	.69	.44	—	—	3.00	7
2 1/2	3/64	1/8	2 1/2	4.06	6.50	2.50	—	.38	8.00	—	2.75	4.75	3.00	2.00	2.50	.88	.44	—	—	3.62	7
3	1/64	1/8	3	4.06	6.75	3.00	—	.38	8.25	—	3.00	5.25	3.00	2.00	2.50	.88	.44	—	—	4.25	7
4	1/16	1/8	4	6.25	7.50	4.00	—	.50	9.00	—	3.75	5.75	3.00	2.00	2.50	1.00	.50	—	—	5.50	7
5	1/16	1/8	5	6.31	8.00	5.00	—	.56	9.50	—	4.25	7.62	3.00	2.00	2.50	1.12	.56	—	—	6.62	7
6	1/16	1/8	6	6.31	8.50	6.00	—	.56	10.00	—	4.62	8.62	3.00	2.00	2.50	1.22	.66	—	—	7.50	7
8	1/16	1/8	8	6.31	9.75	6.00	—	.56	11.25	—	5.62	10.88	3.00	2.00	2.50	1.22	.66	—	—	9.50	7
10	1/16	1/8	10	6.31	11.00	10.00	—	.56	12.50	—	6.62	13.12	3.00	2.00	2.50	1.22	.66	—	—	11.50	6
12	1/32	1/8	12	8.50	12.50	12.00	—	.75	14.00	—	8.00	16.00	3.00	2.00	2.50	1.38	.75	—	—	13.62	5
14	1/32	1/8	14	8.50	13.50	13.25	—	.75	15.00	—	8.62	17.62	3.00	2.00	2.50	1.38	.69	—	—	15.00	5
16	1/32	1/8	16	8.62	14.75	15.25	—	.75	16.25	—	9.12	20.12	3.00	2.00	2.50	1.38	.69	—	—	17.25	5
18	1/32	1/8	18	8.88	15.50	17.25	—	1.00	17.25	—	11.50	21.50	3.00	2.00	2.50	1.62	.81	—	—	19.00	5
20	1/32	1/8	20	2.00	16.88	19.25	—	1.00	18.62	—	12.75	23.75	5.38	2.00	2.94	1.76	.88	—	—	21.25	5
22	1/32	1/8	22	2.25	17.75	21.25	27.25	1.00	19.50	1 1/2	14.59	25.12	3.00	2.00	2.50	2.00	1.00	—	—	23.36	5
24	1/32	1/8	24	2.50	19.00	23.25	29.50	1.25	21.00	1 3/4	15.88	27.00	5.00	2.00	2.50	2.00	1.00	.50	—	25.50	5
25	1/16	1/16	25	2.75	20.50	25.25	31.75	1.25	22.50	1 7/8	17.12	29.00	5.00	2.00	2.50	2.50	1.25	.50	—	27.50	5
28	1/8	1/16	28	2.88	21.25	27.25	34.00	1.25	23.25	2 1/8	18.00	30.88	6.25	2.00	3.12	2.50	1.25	.50	—	29.50	5
30	1/8	1/8	30	3.00	22.38	29.00	36.00	1.25	24.38	2 1/4	18.00	32.94	7.25	2.00	3.62	2.75	1.38	.50	—	31.25	5
32	1/16	1/8	32	3.50	24.00	31.00	38.50	1.50	26.25	—	20.50	34.88	7.00	2.00	3.50	3.25	1.62	.50	1/2-6	33.36	5
34	1/16	1/8	34	3.50	23.88	33.00	40.50	1.50	26.12	—	21.50	36.50	7.00	2.00	3.50	3.38	1.69	.50	1/2-6	36.50	5
36	1/16	1/8	36	3.50	26.00	35.00	42.75	1.50	28.25	—	22.62	38.94	5.75	2.00	2.88	3.25	1.62	.50	1/2-6	37.56	5
40	1/16	1/8	40	4.00	28.38	39.00	47.25	1.75	30.22	—	24.50	42.88	6.88	2.00	3.44	3.25	1.62	.50	1/2-6	41.75	5





NOTES:
1 MAX OPERATING TEMP 325°F FOR STD MATERIALS
2 2"-24" A-536 BODY & BLADE, 25"-40" A-125 CL-B BODY A-536 DISC
3 FOR DIRTY SERVICE SPECIFY INBOARD PACKING
4 FOR HIGH TEMP SERVICE TO 800°F SUBSTITUTE THE FOLLOWING:
MEEHANITE H.S. BODY, DISC & CARBON BEARING & VG 1 PACKING
5 PRESSURE RATINGS:
2"-12" 25 PSI
14"-40" 15 PSI

ITEM	DESCRIPTION	MATERIAL
10	PIPE PLUG	A-126 CL-B (IF REQ'D)
9	TAPER PIN	STAINLESS STEEL
8	SPACER	CARBON STL (IF REQ'D)
7	BEARING	SAE 660 (BRONZE)
6	PACKING	TFE/ASB
5	PACKING NUT	BRASS
4	TOP SHAFT	A-564 XM 25 (450 SS)
3	BOTTOM SHAFT	A 564 XM 25 (450 SS)
2	BLADE	SEE NOTE 2
1	BODY	SEE NOTE 2

BILL OF MATERIAL

ARL — NONE

2"-40" 15/25 AW/CW ANSI DRILLING

P-1001-405

MECHANICAL INSTALLATION DESCRIPTION

KODAK
*96-11028-745

KODK-DV-38-0-
000-000-0026--0-
00009-

DATE: June 6, 1996

96-11028-745--6/6/96

The following description details how the mill circuit will be shipped to site and provides a suggested method of how to install the system. Use this description in conjunction with the Installation, Operation & Maintenance Manual (IO&M) for the 3018 Micromill. The balance of plant contractor may adapt the procedure as deemed fit by the contractor. Fuller Mineral is not responsible for any damage and/or injury incurred during installation.

Notes:

A) The description below does not detail what hardware to use in a specific situation. The contractor should refer to Fuller GA 1.725690 and Micromill parts list 5.702437 for this information. Hardware will be shipped loose.
B) The description below does not detail the field welds required. Refer to Fuller GA 1.725690 for this information.
C) This description is for information only. During packaging it may be necessary to modify how the system will be shipped. Fuller reserves the right to make any changes that are necessary.
D) Do **NOT** grout until after all equipment is installed and aligned properly.

1) Mill Lower Frame:
The mill lower frame (shown in green) should be located according to the customer's general arrangement drawings, and anchored using the recommendation detailed on Fuller drawing 1.725689 and IO&M.
2) The mill inlet pipe (shown in yellow) and inlet pipe support legs (shown in pink) should be placed within the mill lower frame, but **NOT** anchored.
3) Mill Upper Frame:
The mill upper frame (shown in yellow) should be set in place on top of the lower frame. Bolts should be tightened to ensure that the upper frame will not move during the remainder of construction (refer to IO&M).
4) The Classifier Frame:
The classifier frame (shown in green) should be located according to the customer's general arrangement drawing, and

anchored using recommendation detailed on Fuller drawing 1.725689 and IO&M.

5) Classifier:
The classifier (shown in blue) should be set into place on top of the frame. The bolts tightened (refer to IO&M).

6) The Classifier Rotary Feeder (16 x 16):
The classifier rotary feeder (shown in pink under the classifier) should be bolted to the bottom flange of the classifier in the orientation shown on Fuller GA 1.725690.

Note: At this moment the contractor should check the alignment of the mill outlet and classifier inlet to verify they are in line. If not the contractor my need to adjust the height of the classifier frame and/or Micromill frame.

7) The Intake Tee:
The intake tee below the classifier rotary feeder (shown in yellow) should be brought into position under the rotary feeder. The contractor should set the elevation of the tee by bolting it to the rotary feeder. The tee's legs are shipped loose and must be welded on in the field. Once the tee elevation is set the contractor should tack weld the legs into place, then remove the tee and complete welding. The tee should then be brought in position and bolted to the rotary feeder with two bolts. The tee should **NOT** be anchored yet because the flange leading into the mill pipe must still be aligned and welded.

8) Mill Piping:
The mill piping elbow (shown in blue) and mill inlet pipe (shown in yellow) should be aligned with the mill cone inlet and intake tee. The first step is to align the inlet pipe with the mill cone inlet (Note that there should be 12" or less space left between the cone and the top flange of the inlet pipe for the expansion joint). Once the inlet pipe is aligned, anchor the inlet pipe support legs using the recommendations on drawing 1.725689. Next, bolt the elbow onto the intake tee and align the elbow with the mill inlet pipe (the inlet pipe should rotate because the clamp on top of the inlet pipe support should be loose). The contractor may have to break the tack welds on the flanges to align them. Once everything is aligned, the flanges should be welded on and the inlet pipe support clamp tightened. The intake tee may need to be removed again to weld its flange on. After that is complete re-installed the tee and fasten the legs and flanges (refer to drawing 1.725689).

9) The Mill Outlet and Expansion Joint:
The mill outlet (shown in pink) and expansion joint (shown in green) can then be installed (refer to parts list for hardware).

10) Mill Inlet Rotary Feeder and Transition:
The mill inlet rotary feeder (shown in pink) and transition (shown in blue) should be aligned so the feeder flange is oriented correctly and installed (Note the flange on the inlet pipe must be welded into position).

11) Motor and Soleplate:
The mill motor (shown in green) and soleplate (shown in green) must be installed. Refer to Micromill parts list for hardware. The motor must be lowered into position from above. **NOTE: BE CAREFUL NOT TO DAMAGE MOTOR DURING INSTALLATION.**

12) The Mill impeller and back plate should be installed according to directions detailed in IO&M manual. **CONSULT FULLER IF YOU HAVE ANY QUESTIONS. THE IMPELLER ALIGNMENT AND BALANCE IS KEY TO SOUND MILL OPERATION.**

13) The mill inlet expansion joint (shown in blue) should be installed.

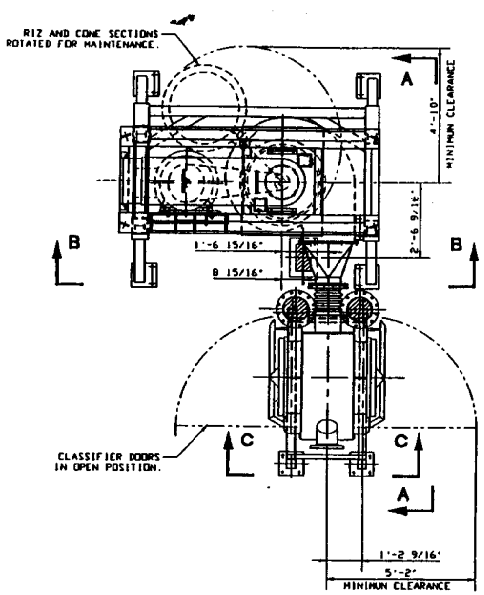
14) After the motor is in place the v-belt guard (shown in yellow) must be installed (refer to parts list).

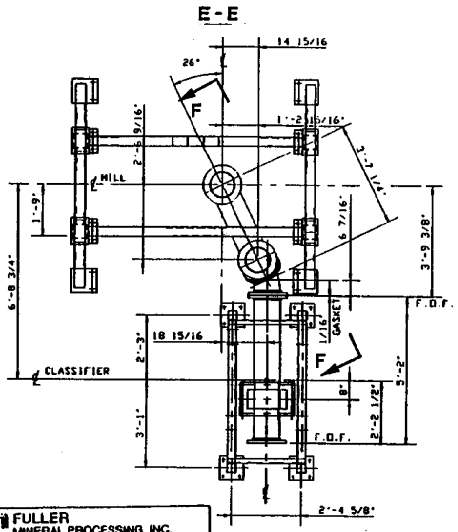
15) The motor sheave, mill sheave, and V-belt assembly should be installed, aligned and tightened. The cover for the guard installed.

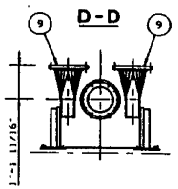
16) Lubemist system piping checked and tightened.

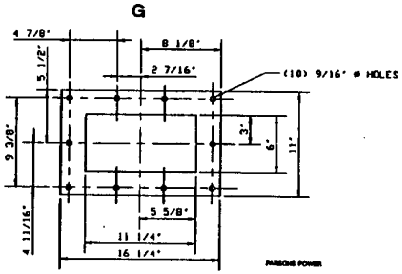
REFERENCE DOCUMENTS:

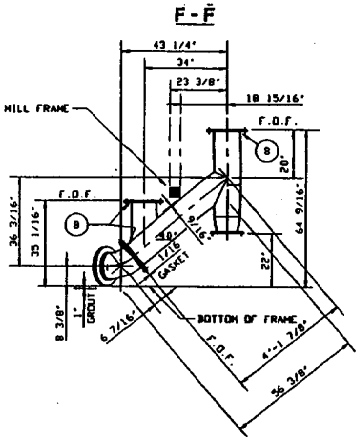
A) FULLER DRAWINGS; 1.725690, 1.725689
B) IO&M MANUAL
C) FULLER PARTS LIST (ASSEMBLY DRAWINGS REFERENCED OFF PARTS LIST); 5.702437
D) FULLER GA 1.725690 WITH MARKINGS INDICATING SHIPPING QUANTITIES.



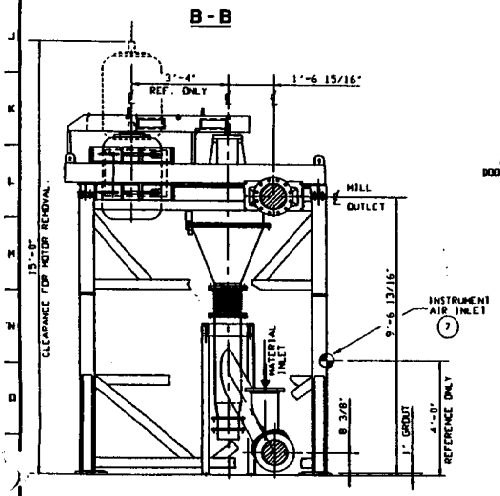


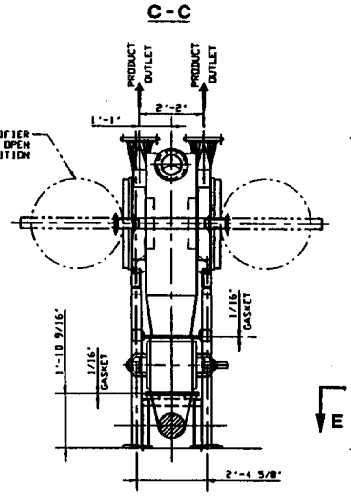


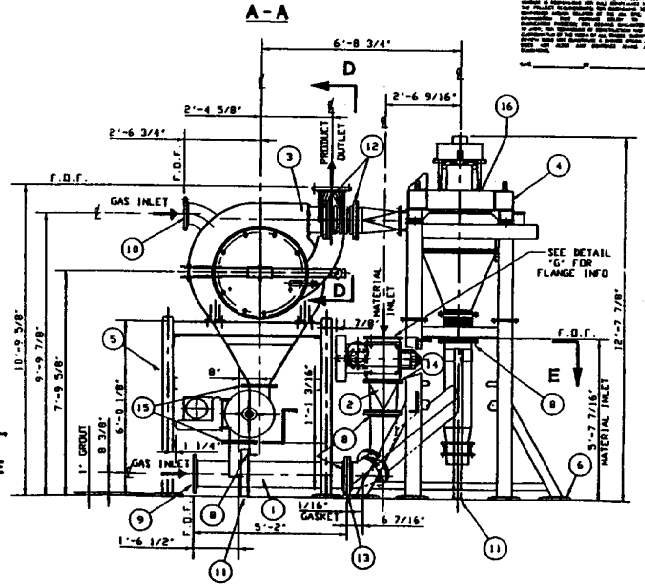




FULLER MINERAL PROCESSING, INC.
CERTIFIED FOR CONSTRUCTION
SIGNATURE
DATE: JUL 26 96







(16) BEARING HOUSING IS EQUIPPED WITH WATER JACKET REQUIRING 10 G.P.M. @ 85°F SEE BEARING HOUSING DWG. 1.727121 FOR CONNECTION DETAILS.

(15) - (2) GASKET PER DWG # 3.706398
- (24) 7/16"-14 UNC-2A X 2" LONG BOLTS, ASTM A307
- (24) 7/16"-14 UNC-2B HEX NUTS, ASTM A307
- (24) 7/16" STD. WASHERS, STL.

(14) - (1) GASKET PER DWG # 3.706397
- (10) 7/16"-14 UNC-2A X 2" LONG BOLTS, ASTM A307
- (10) 7/16"-14 UNC-2B HEX NUTS, ASTM A307
- (10) 7/16" STD. WASHERS, STL.

(13) - (1) GASKET PER DWG # 2.705732
- (12) 7/8"-9 UNC-2A X 3 3/4" LONG BOLTS, ASTM A307
- (12) 7/8"-9 UNC-2B HEX NUTS, ASTM A307
- (12) 7/8" STD. WASHERS, STL.

(12) - (4) GASKETS, 1/8" THICK FIBER, STD. 10" 150# SLIP-ON FLG. - GROUP 1 ANSI
- (24) 7/8"-9 UNC-2A X 3 3/4" LONG BOLTS, ASTM A307
- (24) 7/8"-9 UNC-2B HEX NUTS, ASTM A307
- (48) 7/8" STD. WASHERS, STL.

(11) FIELD LOCATE SUPPORT POINTS. ANCHOR WITH HILTI HVA ADHESIVE ANCHORS (50 MM EMBEDMENT OR APPROVED EQUAL.)

(10) 8" PIPE FLANGE, 8"-150# DRILLING, 13 1/2" O.D., 8 11/16" I.D., 11 3/4" B.B.C., (8) 7/8" DIA. HOLES EQUALLY SPACED ON CL'S.

(9) 10" PIPE FLANGE, 10"-150# DRILLING, 16" O.D., 10 12/16" I.D., 14 1/4" B.B.C., (12) 1" DIA. HOLES EQUALLY SPACED ON CL'S.

(8) FINAL ALIGNMENT AND WELDING TO BE DONE IN FIELD. (FOR INTAKE SEE DWG. 2.707883 FOR MORE DETAILS)

(7) 40 SCFM AT 80 PSI REQUIRED FOR INSTRUMENT AIR.

(6) SEE DRAWING 1.725689 FOR LOADING AND ANCHOR BOLT INFORMATION.

(5) SEE DRAWING 429-93-4-2019 FOR CLASSIFIER FRAME.

(4) SEE PART'S LIST. 5.702437 FOR MILL.

(3) SEE DRAWING 429-93-4-2003 FOR CLASSIFIER.

(2) SEE DRAWING 3.706395 FOR TRANSITION.

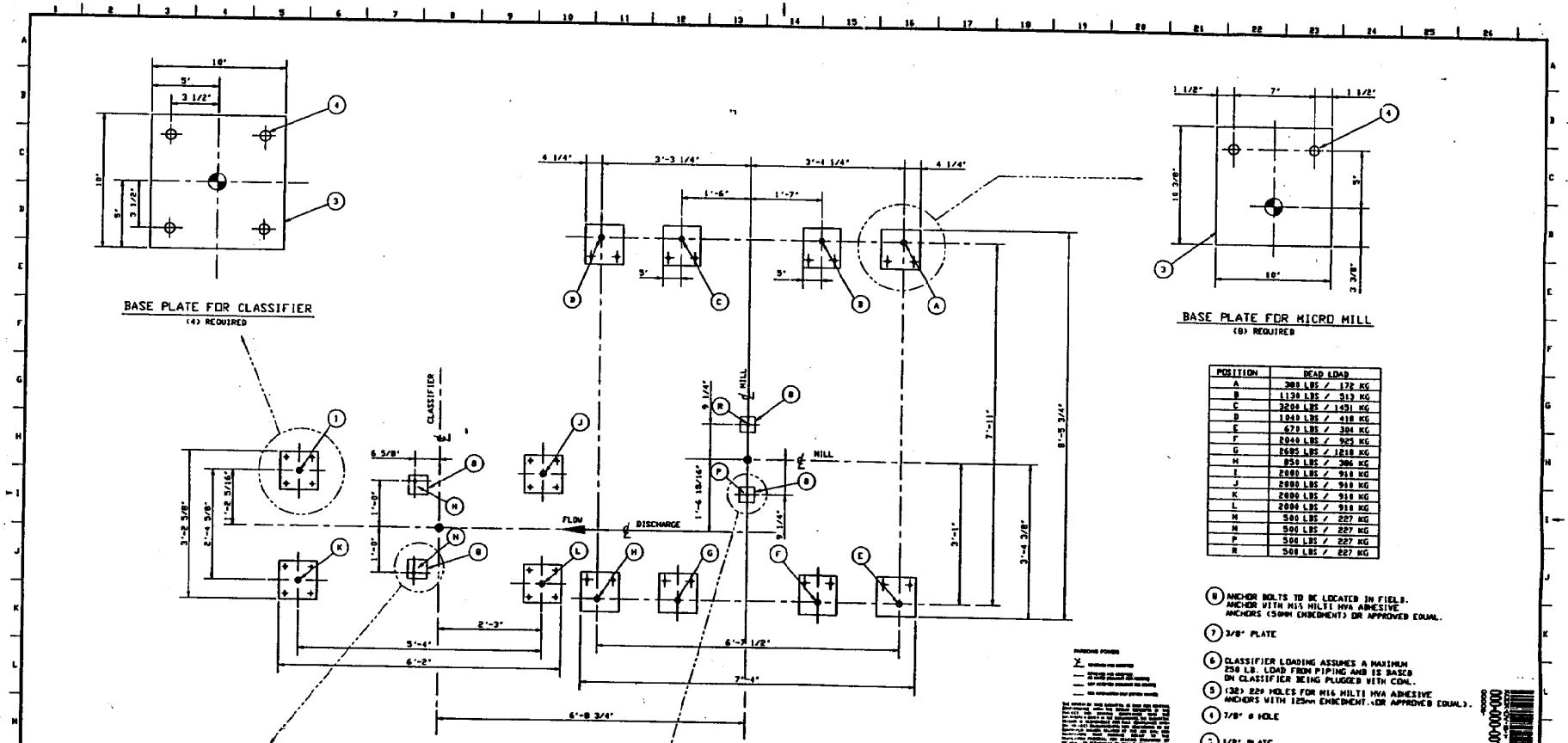
(1) SEE DRAWING 2.707883 FOR TEE.

Rev. 1	26JUL96	LLS	BJZ	BJZ	ADDED NOTE 16
Original	20MAY96	ACS	BJZ	BJZ	Revision in panel / Description
Scale: 1/2"=1"	Date	Sign.	Sign.	Sign.	Number with ○, see list No.
	Drawn		Chkd	Appr	PC-429

GENERAL ARRANGEMENT
MICRO MILL WITH CLASSIFIER
EASTMAN KODAK CO., ROCHESTER, NY.

FULLER MINERAL PROCESSING INC.

Drawing Number 1.725690 Rev. 1



POSITION	DEAD LOAD
A	380 LBS / 172 KG
B	1130 LBS / 513 KG
C	3200 LBS / 1451 KG
D	1040 LBS / 418 KG
E	670 LBS / 304 KG
F	2040 LBS / 925 KG
G	2685 LBS / 1218 KG
H	850 LBS / 386 KG
I	2000 LBS / 910 KG
J	2000 LBS / 910 KG
K	2000 LBS / 910 KG
L	2000 LBS / 910 KG
N	500 LBS / 227 KG
N	500 LBS / 227 KG
P	500 LBS / 227 KG
R	500 LBS / 227 KG

(8) ANCHOR BOLTS TO BE LOCATED IN FIELD. ANCHOR WITH HIS HILTI HVA ADHESIVE ANCHORS (50MM EMBEDMENT) OR APPROVED EQUAL.

(7) 3/8" PLATE

(6) CLASSIFIER LOADING ASSUMES A MAXIMUM 250 LB. LOAD FROM PIPING AND IS BASED ON CLASSIFIER BEING PLUGGED WITH CONC.

(5) (32) 22ø HOLES FOR HIS HILTI HVA ADHESIVE ANCHORS WITH 125mm EMBEDMENT.(OR APPROVED EQUAL).

(4) 7/8" ø HOLE

(3) 1/2" PLATE

(2) BASE PLATES TO BE SET ON 1" (25) GROUT.

(1) ALL DIMENSIONS ARE IN INCHES.

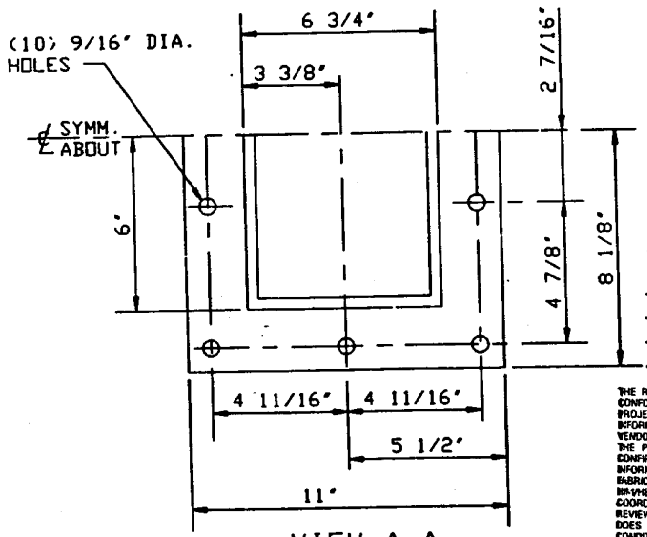
FULLER MINERAL PROCESSING INC.
RELEASED FOR CONSTRUCTION
JUN 04 1996

Original	28MAY96	ACS	BJZ	BJZ	Revision in zones / Description
Scale:	Date	Dsgn.	Dsgn.	Dsgn.	Number with ○, e.g. (1st No.
1"=1'	Drawn		Chkd	Appr	PC-429

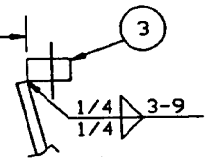
ANCHOR BOLT PLAN
MICRO MILL 3018 WITH CLASSIFIER
PROJECT NO. 96-11809-745
EASTMAN KODAK CO.

FULLER MINERAL PROCESSING INC.

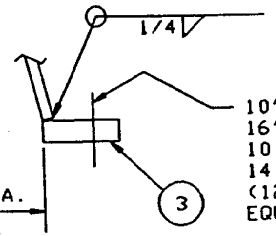
Drawing Number 1.725689 Rev.



VIEW A-A



DETAIL "B"



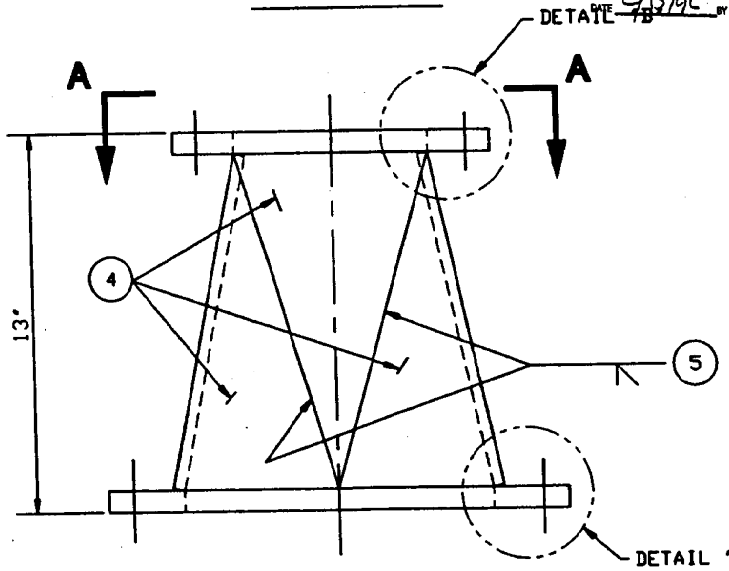
DETAIL "C"

PARSONS POWER

- X REVIEWED AND ACCEPTED
- REVIEWED AND ACCEPTED, AS NOTED (RESUBMIT FOR RECORD)
- NOT ACCEPTED (RESUBMIT FOR REVIEW)
- FOR INFORMATION ONLY (REVIEW WAIVED)

THE REVIEW OF THIS SUBMITTAL IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPTS OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE DOCUMENTS. THE SUBMITTAL VENDOR IS RESPONSIBLE FOR FULL COMPLIANCE WITH THE PROJECT REQUIREMENTS; FOR DIMENSIONS TO BE CONFIRMED AND/OR RELATED AT THE JOB SITE; FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESS; FOR DESIGNS ORIGINATED BY HIM/HER; FOR TECHNIQUES OF CONSTRUCTION AND FOR COORDINATION OF THE WORK OF ALL TRADES. SUBMITTAL REVIEW DOES NOT CONSTITUTE A CHANGE ORDER AND DOES NOT ALTER ANY CONTRACT TERMS AND CONDITIONS.

DATE 8/13/96 BY

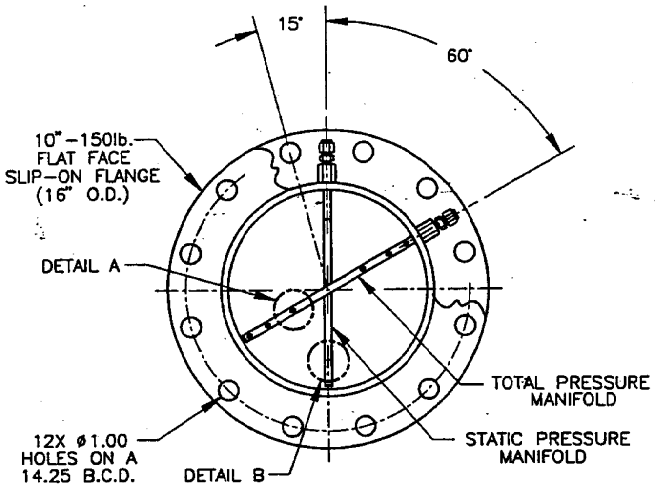


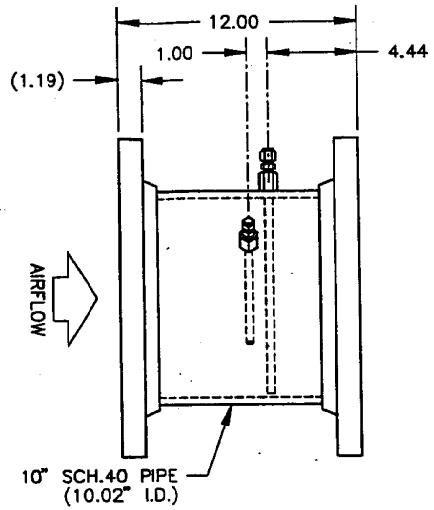
8. FABRICATION TOLERANCE ±1/8"
7. HOLE LOCATION TOLERANCE ±1/32"
6. ALL INTERNAL WELDS TO BE GROUND SMOOTH.
5. ALL WELDS TO HAVE FULL PENETRATION UNLESS NOTED.
4. 3/8" THICK PLATE.
3. 3/4" THICK PLATE.
2. ASTM A36 UNLESS NOTED.
1. ALL DIMENSIONS ARE IN INCHES.

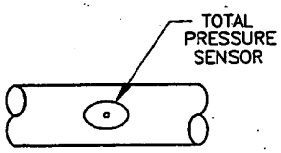
KODK-DV-21-O-
000-000-0015-0-
00005- 3.706395—

FULLER MINERAL PROCESSING INC.
CONSTRUCTION
JUN 04 1996

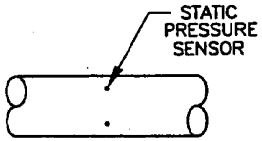
Original	30MAY96	JBV	BJZ	BJZ	Revision in zone: / Description:
Scale: 3"=1'	Date	Sign.	Sign.	Sign.	Mat.: (2) lbs: 80
	Drawn		Chkd	Appr	Welds: AWS ISO-E
MICRO MILL 3018					⊗ Pattern number, embossed/countersunk
MILL FEED TRANSITION					Where nothing else is stated, adhere to general instructions No. 520530.
DETAIL					PC: 745
FULLER MINERAL PROCESSING INC.					Drawing Number 3.706395 Rev.







DETAIL: A



DETAIL: B

MATERIALS:
MOUNTING FLANGES: 10"–150lb. CARBON STEEL
PIPE BODY: 10" SCH. 40 CARBON STEEL PIPE
SENSING MANIFOLDS: 316 STAINLESS STEEL
SIGNAL CONNECTION: 1/4" COMPRESSION FITTINGS, STAINLESS STEEL
APPROXIMATE WEIGHT: 165lbs.

PROJECT:
EASTMAN KODAK
ROCHESTER, N.Y.
P.O. #5–9611028–6–0120
AMC W.O. #28082

AIR MONITOR CORPORATION
P.O. BOX 6368 SANTA ROSA CA 95406
TELEPHONE (707) 544–2706

FLOW STATION

CAD PLOT		FORMAT	DWG NO.	REV
07/19/96	13:40:39	B	W28082AA	0
SCALE FACTOR:	6.00	SCALE:	1:6.00	DO NOT SCALE DRAWING

SOLID/LIQUID/GAS	UNITS	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	SB3
MASS FLOW - SOLID	LB/HR	6000.0	30001.1	30001.3	24000.0	24001.1	1.1	0.2	1.3	6001.3	30001.1	1.6
MASS FLOW -LIQUID	LB/HR	486.5			242.4							
FLOW - GAS	LB/HR		11854	13854		11429.8	11429.8	2000.0	13429.8	13854.0	11854	17035.4
FLOW - TOTAL	LB/HR	6486.5	41855.1	43855.3	24242.4	35430.1	11430.2	2000.2	13430.4	19855.3	41855.1	17037.0
LUME	ACFM		3021	3472		2828.8	3254.7	576.1	3799.8	3472	2947	4559.8
VOLUME	GAL/MIN											
TEMPERATURE	°F	70.0	182.4	191.8	170.0	228.4	350.0	350.0	350.0	191.0	182.4	350.0
STATIC PRESSURE	INWG		26.0	36.0		47.5	57.8	52.5	60.0	36.8	52.3	87.6
DENSITY	LB/ACF		0.0654	0.0688		0.0673	0.0585	0.0579	0.0589	0.0665	0.0694	0.0623
DENSITY	LB/GAL											
DUST LOAD	GR/ACF		1229.68	1060.72		989.86	0.84	0.84	0.84	212.18	1304.85	0.84
H_2O DEW POINT	°F		115.49	114.96		106.91	107.67	107.28	107.09	114.96	117.60	109.81
COMPOSITION H_2O	VOL % H_2O		12.82	12.08		7.48	7.18	7.18	7.18	12.08	12.82	7.18
COMPOSITION O_2	VOL % O_2		3.06	3.08		3.24	3.25	3.25	3.25	3.08	3.08	3.25

FULLER
MINERAL PROCESSING, INC.

CERTIFIED FOR CONSTRUCTION

SIGNATURE Clark L Ecton

DATE: 26 July 96

NOTES:

1) Gas composition of stream S8 is:
In vol%
69.28% N2
3.40% O2
0.35% SO2
22.75% CO2
4.22% H2O

2) 36"H2O pressure drop to burner given by client

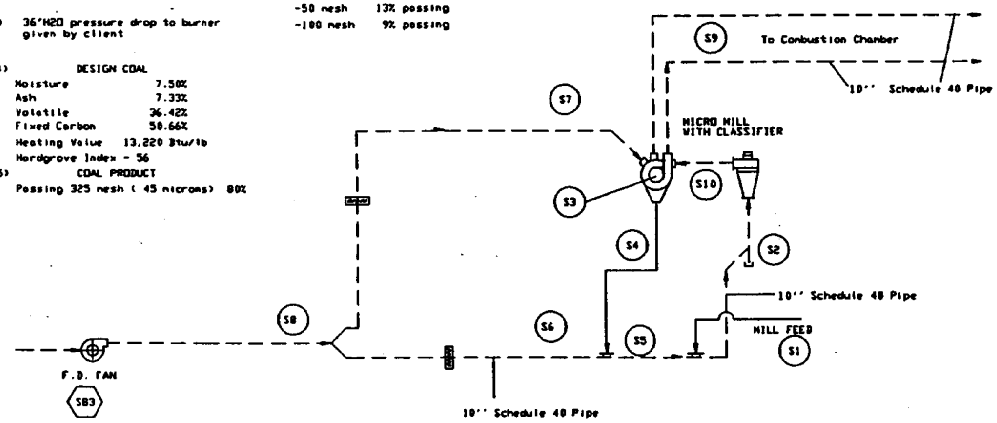
3) COAL FEED SIZE

-0.750"	100% passing
-0.250"	92% passing
-4 mesh	85% passing
-6 mesh	72% passing
-12 mesh	51% passing
-20 mesh	32% passing
-50 mesh	13% passing
-100 mesh	9% passing

4) DESIGN COAL

Moisture	7.50%
Ash	7.33%
Volatile	36.42%
Fixed Carbon	50.66%
Heating Value	13,220 Btu/lb
Hardgrove Index = 56	

5) COAL PRODUCT
Passing 325 mesh (45 microns) 80%



FR1081 - KODAK3

GAS FLOW
MATERIAL FLOW
ALTERNATE GAS FLOW
ALTERNATE MATERIAL FLOW

EXAMPLE:
S1 THEORETICAL FLOW RATES
S00 EQUIPMENT RATINGS

KODK-DV-70-0-00026-000-000-0050-0-
1.725164

PARSONS POWER

___ REVIEWED AND ACCEPTED
___ REVIEWED AND ACCEPTED, AS NOTED (RESUBMIT FOR RECORD)
___ NOT ACCEPTED (RESUBMIT FOR REVIEW)
___ FOR INFORMATION ONLY (REVIEW WAIVED)

THE REVIEW OF THIS SUBMITTAL IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPTS OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE DOCUMENTS. THE SUBMITTAL VENDOR IS RESPONSIBLE FOR FULL COMPLIANCE WITH THE PROJECT REQUIREMENTS; FOR DIMENSIONS TO BE CONFIRMED AND/OR RELATED AT THE JOB SITE; FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESS; FOR DESIGNS ORIGINATED BY MFR/VER; FOR TECHNIQUES OF CONSTRUCTION AND FOR COORDINATION OF THE WORK OF ALL TRADES. SUBMITTAL REVIEW DOES NOT CONSTITUTE A CHANGE ORDER AND DOES NOT ALTER ANY CONTRACT TERMS AND CONDITIONS.

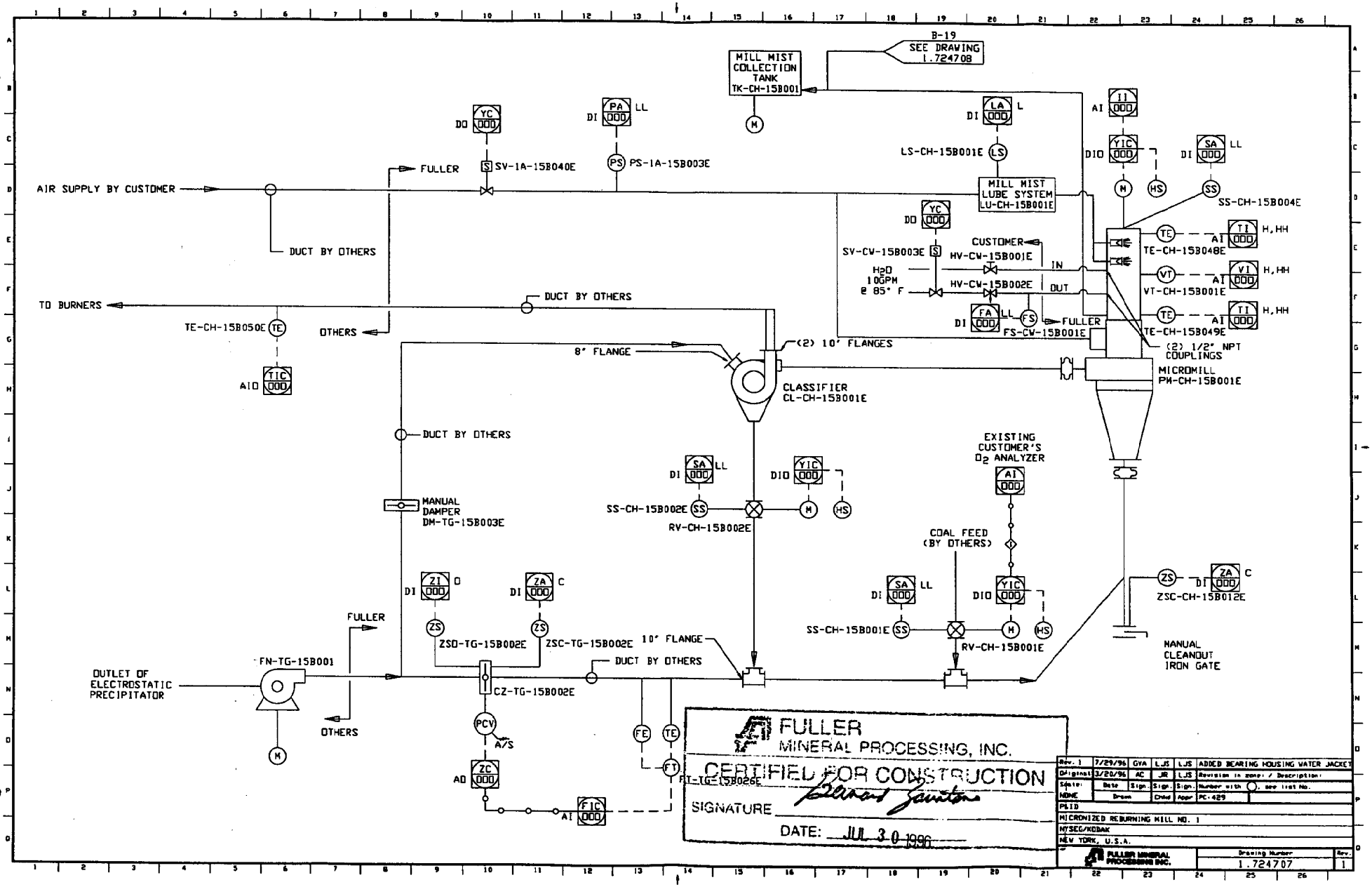
DATE _____ BY _____

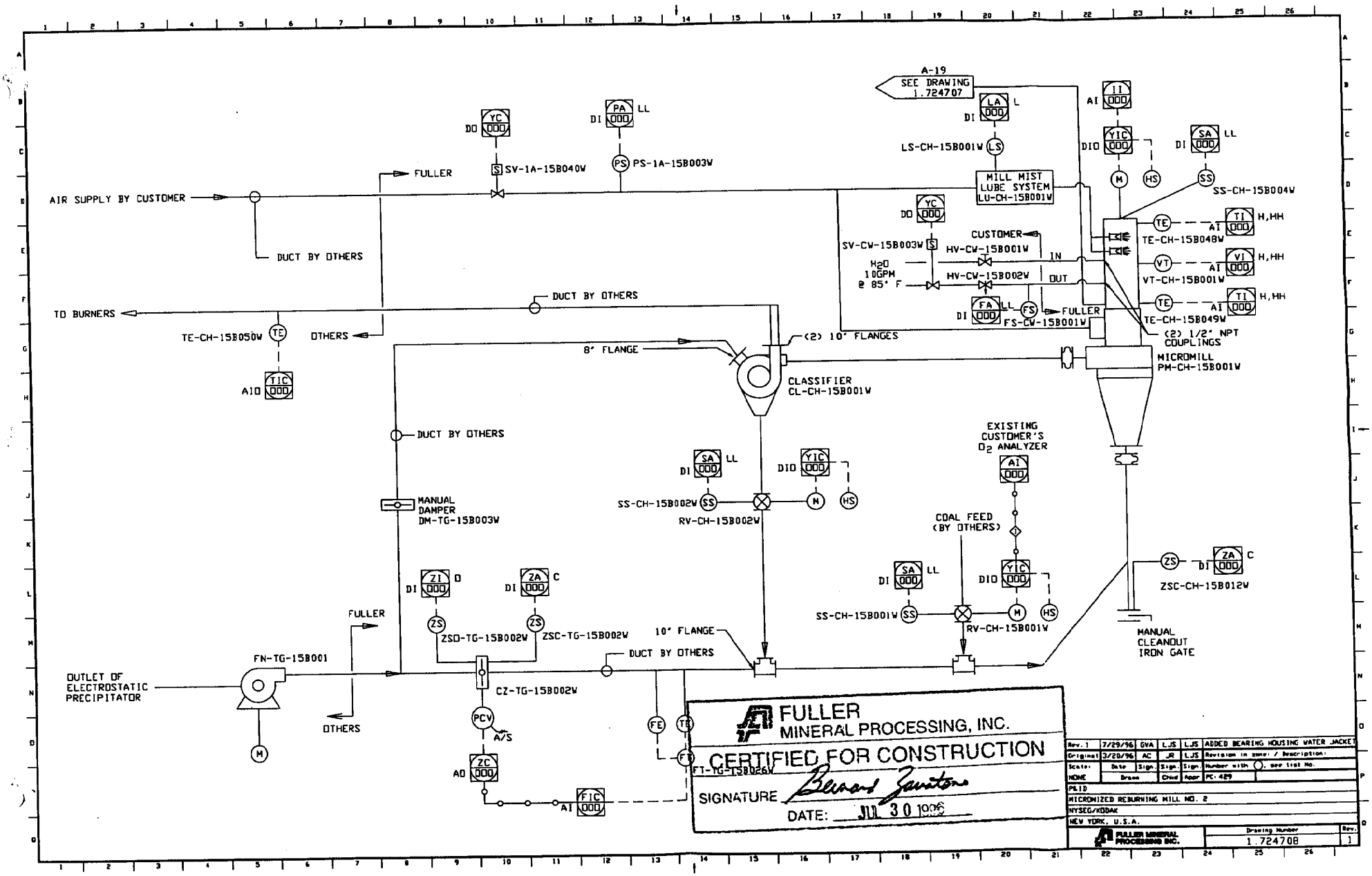
Rev.					
Original	15Jul96	DSF	DSF	CRC	Revision to zones / Description:
Scale:	Date	Sign.	Sign.	Sign.	Number with ○, see list No.
NONE	Drawn		Chkd	Appr	PC-136

CONTRACT PROCESS FLOW DIAGRAM
EASTMAN KODAK - ROCHESTER, NY
6000 LB/HR COAL MICRONILL
1 OF 2 IDENTICAL SYSTEMS

FULLER

Drawing Number 1.725164 Rev


B-19
SEE DRAWING
1.724708
MILL MIST COLLECTION TANK
TK-CH-15B001
M
YC
DO
PA
DI
LL
SV-1A-15B040E
PS-1A-15B003E
FULLER
AIR SUPPLY BY CUSTOMER
DUCT BY OTHERS
LA
DI
L
LS-CH-15B001E
LS
II
AI
YIC
DIO
HS
SA
DI
LL
SS
SS-CH-15B004E
MILL MIST LUBE SYSTEM
LU-CH-15B001E
YC
DO
SV-CW-15B003E
S
CUSTOMER
HV-CW-15B001E
IN
H2O
10GPM
@ 85° F
HV-CW-15B002E
OUT
FA
DI
LL
FS
FULLER
FS-CW-15B001E
TE
AI
TI
H, HH
TE-CH-15B048E
VT
AI
VI
H, HH
VT-CH-15B001E
TE
AI
TI
H, HH
TE-CH-15B049E
(2) 1/2" NPT COUPLINGS
TO BURNERS
DUCT BY OTHERS
TE-CH-15B050E
TE
OTHERS
AIO
TIC
8" FLANGE
(2) 10" FLANGES
CLASSIFIER
CL-CH-15B001E
MICROMILL
PM-CH-15B001E
DUCT BY OTHERS
MANUAL DAMPER
DM-TG-15B003E
SA
DI
LL
SS-CH-15B002E
SS
RV-CH-15B002E
YIC
DIO
M
HS
EXISTING CUSTOMER'S O2 ANALYZER
AI
COAL FEED (BY OTHERS)
ZI
DI
O
ZA
DI
C
ZS
ZSD-TG-15B002E
ZSC-TG-15B002E
FULLER
10" FLANGE
DUCT BY OTHERS
SA
DI
LL
YIC
DIO
SS-CH-15B001E
RV-CH-15B001E
ZS
DI
ZA
C
ZSC-CH-15B012E
MANUAL CLEANOUT IRON GATE
FN-TG-15B001
OUTLET OF ELECTROSTATIC PRECIPITATOR
M
OTHERS
CZ-TG-15B002E
PCV
A/S
ZC
AO
AI
FIC
FE
TE
FT
FT-TG-15B026E
FULLER
MINERAL PROCESSING, INC.
CERTIFIED FOR CONSTRUCTION
SIGNATURE
DATE: JUL 30 1996
Rev. 1 7/29/96 GVA LJS LJS ADDED BEARING HOUSING WATER JACKET
Original 3/20/96 AC JR LJS Revision in comp. / Description
Scale: NONE
Date Sign. Sign. Sign. Number with ○, see list No.
Drawn Chkd Appr PC-429
P&ID
MICRONIZED REBURNING MILL NO. 1
NYSEG/KODAK
NEW YORK, U.S.A.
FULLER MINERAL PROCESSING INC.
Drawing Number 1.724707
Rev. 1


A-19
SEE DRAWING
1.724707
LA
L
DI
LS-CH-15B001W
LS
AI
II
DIO
YIC
SA
LL
DI
M
HS
SS
SS-CH-15B004W
MILL MIST
LUBE SYSTEM
LU-CH-15B001W
YC
DO
PA
LL
DI
PS
PS-1A-15B003W
SV-1A-15B040W
FULLER
AIR SUPPLY BY CUSTOMER
DUCT BY OTHERS
SV-CW-15B003W
CUSTOMER
HV-CW-15B001W
IN
H2O
10GPM
@ 85° F
HV-CW-15B002W
OUT
FA
LL
FS
FS-CW-15B001W
FULLER
TE
AI
TI
H,HH
TE-CH-15B048W
VT
VI
TE-CH-15B001W
TE-CH-15B049W
(2) 1/2" NPT
COUPLINGS
MICROMILL
PM-CH-15B001W
TO BURNERS
DUCT BY OTHERS
TE-CH-15B050W
OTHERS
AIO
TIC
8" FLANGE
(2) 10" FLANGES
CLASSIFIER
CL-CH-15B001W
DUCT BY OTHERS
MANUAL
DAMPER
DM-TG-15B003W
SS-CH-15B002W
RV-CH-15B002W
EXISTING
CUSTOMER'S
O2 ANALYZER
COAL FEED
(BY OTHERS)
ZI
D
ZA
C
ZS
ZSD-TG-15B002W
ZSC-TG-15B002W
FULLER
10" FLANGE
DUCT BY OTHERS
SS-CH-15B001W
RV-CH-15B001W
ZSC-CH-15B012W
MANUAL
CLEANOUT
IRON GATE
FN-TG-15B001
OUTLET OF
ELECTROSTATIC
PRECIPITATOR
CZ-TG-15B002W
OTHERS
PCV
A/S
AO
ZC
FE
TE
FT-TG-15B026W
FIC
AI
FULLER
MINERAL PROCESSING, INC.
CERTIFIED FOR CONSTRUCTION
SIGNATURE
DATE: JUL 30 1996
Rev. 1 | 7/29/96 | GVA | LJS | LJS | ADDED BEARING HOUSING WATER JACKET
Original | 3/20/96 | AC | JR | LJS | Revision in zone / Description
Scale: NONE | Date | Sign. | Sign. | Sign. | Number with ○, see list No.
Drawn | Chkd | Appr | PC-489
P&ID
MICRONIZED REBURNING MILL NO. 2
NYSEG/KODAK
NEW YORK, U.S.A.
FULLER MINERAL PROCESSING INC.
Drawing Number 1.724708
Rev. 1

FULLER
A member of the FL Smidth-Fuller Engineering Group

LOAD LIST

NYSEG/KODAK MICRONIZED COAL REBURNING PROJECT
NEW YORK, U.S.A.

REVISION 4 - JULY 26, 1996
CONTRACT No. 96-11028-745
DOCUMENT No. 8.700863

PREPARED BY: JB
CHECKED BY: LJS
FULLER MINERAL PROCESSING, INC.
3235 SCHOENERSVILLE ROAD
BETHLEHEM, PA 18016-0810
TEL. 610-264-6900
FAX. 610-264-6347

FULLER
MINERAL PROCESSING, INC.
CERTIFIED FOR CONSTRUCTION
SIGNATURE Lawrence J. Supon
DATE: JUL 30 1996

LOAD LIST
NYSEG/KODAK MICRONIZED COAL REBURNING PROJECT
NEW YORK, U.S.A.
REVISION 4 - JULY 26, 1996
CONTRACT No. 96-11028-745
DOCUMENT No. 8.700863

MILL NO. 1

ITEM	EQUIPMENT NUMBER	KW	H.P.	RPM	VOLTAGE	DESCRIPTION	NOTES
1	PM-CH-15B001E	150	200	1800	480 VAC	MILL MOTOR	MARATHON, 1.15 SF
2	RV-CH-15B002E	1.5	2		480 VAC	CLASSIFIER ROTARY AIRLOCK	GEARMOTOR
3	RV-CH-15B001E	1.5	2		480 VAC	MILL INLET ROTARY AIRLOCK	GEARMOTOR
4	TK-CH-15B001	0.25	1/3		120 VAC	MILL MIST COLLECTION TANK DEMISTING MOTOR	LUBRICATION SYSTEMS, INC.
5	PM-CH-15B001E	0.06			120 VAC	MILL MOTOR SPACE HEATER	MARATHON
6	SV-1A-15B040E	0.2			120 VAC	MILL LUBE MIST SYSTEM SOLENOID VALVE	ASCO
7	SV-CW-15B003E	0.2			120 VAC	MILL BEARING HOUSING WATER JACKET SOLENOID VALVE	(BY CUSTOMER)
MILL NO. 2							
8	PM-CH-15B001W	150	200	1800	480 VAC	MILL MOTOR	MARATHON, 1.15 SF
9	RV-CH-15B002W	1.5	2		480 VAC	CLASSIFIER ROTARY AIRLOCK	GEARMOTOR
10	RV-CH-15B001W	1.5	2		480 VAC	MILL INLET ROTARY AIRLOCK	GEARMOTOR
11	PM-CH-15B001W	0.06			120 VAC	MILL MOTOR SPACE HEATER	MARATHON
12	SV-1A-015B040W	0.2			120 VAC	MILL LUBE MIST SYSTEM SOLENOID VALVE	ASCO
13	SV-CW-15B003W	0.2			120 VAC	MILL BEARING HOUSING WATER JACKET SOLENOID VALVE	(BY CUSTOMER)
	TOTAL	307.17					

REVISION NO. 1- MILL SPEED 1800 RPM, ADDED COAL FEED ROTARY AIRLOCKS, DELETED TRAMP IRON GATE SOLENIOD VALVES (050696)

REVISION NO. 2-DELETED CONTROL DAMPER ACTUATORS (050996)

REVISION NO. 3-ADDED EQUIPMENT NUMBERS; ADDED MILL MOTOR SPACE HEATERS

REVISION NO. 4-CHANGED MILL HP FROM 150 TO 200; ADDED MILL BEARING HOUSING WATER JACKET SOLENOID VALVE (BY OTHERS).

FULLER
A member of the F.L. Smidth-Fuller Engineering Group

INSTRUMENT-I/O LIST

NYSEG/KODAK MICRONIZED COAL REBURNING PROJECT
NEW YORK, U.S.A.

REVISION 4 - JULY 26, 1996
CONTRACT No. 96-11028-745
DOCUMENT No. 8.700864

PREPARED BY: JB
CHECKED BY: LJS
FULLER MINERAL PROCESSING, INC.
3235 SCHOENERSVILLE ROAD
BETHLEHEM, PA 18016-0810
TEL. 610-264-6900
FAX. 610-264-6347

FULLER
MINERAL PROCESSING, INC.
CERTIFIED FOR CONSTRUCTION
SIGNATURE Lawrence J. Lupon
DATE: JUL 30 1996

INSTRUMENT-I/O LIST
NYSEG/ KODAK MICRONIZED COAL REBURNING PROJECT
NEW YORK, U.S.A.
CONTRACT No. 96-11028-745
DOCUMENT No. 8.700864
REVISION 4 - JULY 26, 1996

ITEM	EQUIPMENT REF. NUMBER	I/O	DESCRIPTION	INSTRUMENT	STATUS	ENG. UNIT	MIN	MAX	ALARM		TRIP		MANUFACTURER	MODEL NO.
									HIGH	LOW	HI-HI	LO-LO		
COAL MILL NO. 1														
1	TE-CH-15B048E	AI	MILL UPPER BEARING TEMPERATURE	RTD	mV	DEG. F	0	400	170		200		THERMOCOUPLE TECHNOLOGY	100 Ω PT @ 0 DEG C, α = 0.00385 Ω/Ω/DEG C
2	TE-CH-15B049E	AI	MILL LOWER BEARING TEMPERATURE	RTD	mV	DEG. F	0	400	170		200		THERMOCOUPLE TECHNOLOGY	100 Ω PT @ 0 DEG C, α = 0.00385 Ω/Ω/DEG C
3	SS-CH-15B004E	DI	MILL MOTOR ZERO SPEED	PROXIMITY SWITCH	0							X	PEPPERL + FUCHS	NCN15-30GM60-ZO
4	VT-CH-15B001E	AI	MILL VIBRATION	VIBRATION TRANSMITTER	4-20mA	IN/ SEC	0	1	0.4 FOR 10 MIN.		0.75		BALMAC	191-1
5	PS-1A-15B003E	DI	MILL LUBE SYSTEM AIR PRESSURE LOW	PRESSURE SWITCH	0	PSIG	0	120				44	ASCO	TRANSDUCER TF10A21
6	LS-CH-15B001E	DI	MILL LUBE SYSTEM LEVEL LOW	LEVEL SWITCH	0					X		X -FOR 10 MIN.	LUBRICATION SYSTEMS	VM40XCXC
7	SS-CH-15B002E	DI	CLASSIFIER ROTARY AIRLOCK ZERO SPEED	MOTION SWITCH	0							X	DIVAC	
8	SS-CH-15B001E	DI	MILL INLET ROTARY AIRLOCK ZERO SPEED	MOTION SWITCH	0							X	DIVAC	
9	FT-TG-15B026E	AI	MILL INLET AIR FLOW	AIR MONITOR VOLU-PROBE W/ VELTRON DPT TRANSMITTER	4-20mA	ACFM	0	4700		2775		2425	AIR MONITOR	
10	ZSC-CH-15B012E	DI	TRAMP IRON GATE POSITION (CLOSED)	POSITION SWITCH	1								BRAY	SERIES 50

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									HIGH	LOW	HI-HI	LO-LO		
11	SV-1A-15B040E	DO	OPEN COMPRESSED AIR SOLENOID FOR MILL LUBE	SOLENOID	1								ASCO	8210G1
12	CZ-TG-15B002E	AO	MILL INLET AIR DAMPER SP	PNEUMATIC ACTUATOR	4-20 mA	%	0	100					AUTOMAX	
13	ZSC-TG-15B002E	DI	MILL INLET AIR DAMPER (CLOSED)	POSITION SWITCH	1								MICROSWITCH	TYPE 1 & 2
14	ZSO-TG-15B002E	DI	MILL INLET AIR DAMPER (OPEN)	POSITION SWITCH	1								MICROSWITCH	TYPE 1 & 2
15	SV-CW-15B003E	DO	START BEARING HOUSING WATER JACKET COOLING SYST.	SOLENOID	1								(BY CUSTOMER)	(BY CUSTOMER)
16	FS-CW-15B001E	DI	BEARING HOUSING WATER FLOW OK	FLOW SWITCH	1	GPM	0	10				3	(BY CUSTOMER)	(BY CUSTOMER)
COAL MILL NO. 2														
17	TE-CH-15B048W	AI	MILL UPPER BEARING TEMPERATURE	RTD	mV	DEG. F	0	400	170		200		THERMOCOUPLE TECHNOLOGY	100 Ω PT @ 0 DEG C, $\alpha = 0.00385$ Ω/Ω/DEG C
18	TE-CH-15B049W	AI	MILL LOWER BEARING TEMPERATURE	RTD	mV	DEG. F	0	400	170		200		THERMOCOUPLE TECHNOLOGY	100 Ω PT @ 0 DEG C, $\alpha = 0.00385$ Ω/Ω/DEG C
19	SS-CH-15B004W	DI	MILL MOTOR ZERO SPEED	PROXIMITY SWITCH	0							X	PEPPERL + FUCHS	NCN15-30GM60-ZO
20	VT-CH-15B001W	AI	MILL VIBRATION	VIBRATION TRANSMITTER	4-20mA	IN/SEC			0.4 FOR 10 MIN		0.75		BALMAC	191-1

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ITEM	EQUIPMENT REF. NUMBER	I/O	DESCRIPTION	INSTRUMENT	STATUS	ENG. UNIT	MIN	MAX	ALARM		TRIP		MANUFACTURER	MODEL NO.
									HIGH	LOW	HI-HI	LO-LO		
21	PS-1A-15B003W	DI	MILL LUBE SYSTEM AIR PRESSURE LOW	PRESSURE SWITCH	0	PSIG	0	120				44	ASCO	TRANSDUCER TF10A21
22	LS-CH-15B001W	DI	MILL LUBE SYSTEM LEVEL LOW	LEVEL SWITCH	0					X		X- FOR 10 MIN.	LUBRICATION SYSTEMS	VM40XCXC
23	SS-CH-15B002W	DI	CLASSIFIER ROTARY AIRLOCK ZERO SPEED	MOTION SWITCH	0							X	DIVAC	
24	SS-CH-15B001W	DI	MILL INLET ROTARY AIR LOCK ZERO SPEED	MOTION SWITCH	0							X	DIVAC	
25	FT-TG-15B026W	AI	MILL INLET AIR FLOW	AIR MONITOR VOLU-PROBE W/ VELTRON DPT TRANSMITTER	4-20mA	ACFM	0	4700		2775		2425	AIR MONITOR	
26	ZSC-CH-15B012W	DI	TRAMP IRON GATE POSITION (CLOSED)	POSITION SWITCH	1								BRAY	SERIES 50
27	SV-1A-15B040W	DO	OPEN COMPRESSED AIR SOLENOID FOR MILL LUBE	SOLENOID	1								ASCO	8210G1
28	CZ-TG-15B002W	AO	MILL INLET AIR DAMPER SP	PNEUMATIC ACTUATOR	4-20 mA	%	0	100					AUTOMAX	
29	ZSC-TG-15B002W	DI	MILL INLET AIR DAMPER (CLOSED)	POSITION SWITCH	1								MICROSWICH	TYPE 1 & 2
30	ZSO-TG-15B002W	DI	MILL INLET AIR DAMPER (OPEN)	POSITION SWITCH	1								MICROSWITCH	TYPE 1 & 2
31	SV-CW-15B003W	DO	START BEARING HOUSING WATER JACKET COOLING SYST.	SOLENOID	1								(BY CUSTOMER)	(BY CUSTOMER)

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									HIGH	LOW	HI-HI	LO-LO		
32	FS-CW-15B001W	DI	BEARING HOUSING WATER FLOW OK	FLOW SWITCH	1	GPM	0	10				3	(BY CUSTOMER)	(BY CUSTOMER)
Recommended Software Interlocks														
			PERMISSIVE TO START MILL CIRCUIT #1											
			PERMISSIVE TO START MILL CIRCUIT #2											
			REQUEST TO START F.D. FAN #1											
			REQUEST TO START F.D. FAN #2											
			F.D. FAN #1 RUNNING											
			F.D. FAN #2 RUNNING											
			BURNER SYSTEM OK											
			CLASSIFIER #1 EXIT TEMPERATURE		4-20 mA	DEG F	0	300						
			CLASSIFIER #2 EXIT TEMPERATURE		4-20 mA	DEG F	0	300						
			PERMISSIVE TO START COAL FEED SCREW #1											
			PERMISSIVE TO START COAL FEED SCREW #2											

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									HIGH	LOW	HI-HI	LO-LO		
Suggested Signals (by Customer)														
			MILL #1 AMPS		4-20 mA	% IFL	0	120						
			MILL #2 AMPS		4-20 mA	% IFL	0	120						

REVISION NO. 1- ADDED INSTRUMENT DETAILS, DELETED CLASSIFIER OUTLET TEMPERATURE ELEMENT, ADDED SPEED SWITCH FOR COAL FEED ROTARY AIRLOCK (050696)

REVISION NO. 2- ADDED AI/AO FOR DAMPER POSITION SETPOINT AND FEEDBACK, ADDED DO FOR COMPRESSED AIR MILL LUBE SOLENOID VALVE. ADDED RECOMMENDED INTERACE SIGNALS AND SUGGESTED SIGNALS.

REVISION NO. 3- ADDED EQUIPMENT REFERENCE NUMBERS AND INLET DAMPER POSITION SWITCH

REVISION NO. 4- ADDED MILL BEARING HOUSING WATER JACKET SOLENOID VALVE AND FLOW SWITCH (BOTH BY CUSTOMER)

FULLER I/O COUNT TOTALS:

AI	**8**
AO	**2**
DI	**18**
DO	**4**

NOTE: 1. NO MOTOR I/O IS INCLUDED.

In general all equipment may be operated in individual manual mode to permit maintenance testing of the equipment. If any equipment is operated in this manner, automatic operation of the group to which the piece of equipment belongs will not be permitted. Similarly, once an equipment group is selected for automatic group mode of operation, an individual piece of equipment cannot be operated in individual manual mode of operation.

When a piece of equipment is operated in its individual manual operating mode, only protection and personnel safety interlocks are operable.

The following sections in this document describe the operation of each of the micro mills in the following situations:

Normal Startup

Normal Operation

Normal Shutdowns

Abnormal Shutdowns

Emergency Shutdowns

For clarification of the process description, refer to the following Fuller drawings which show the process flow information for the system:

1.724705, Rev. 0
1.724706, Rev. 0
1.724707, Rev. 1
1.724708, Rev. 1
1.725164, Rev. 0

C. Normal Startup of The Coal Milling System

Since both the Micromill circuits operate in the same manner, the operation described herein is for the Mill No. 1 circuit only. The operation of the second mill is identical.

NOTE: For normal startup of the mill to proceed, it is necessary that the plant's compressed air supply (for the Mill seal air and lube mist system) and instrument air supply (for the control valve air) be fully available at the required pressure and volume. The plant cooling water supply (for the Mill Bearing Housing Water Jacket) should also be fully available at the required temperature and flow. In addition, the boiler must be in its normal operating state and ready to accept Micronized coal through the new burners. Finally, the Mill Tramp iron gate must be closed as sensed by limit switch [ZSC-CH-15B012E].

3

The Micromill startup proceeds in the sequence described in the following paragraphs:

When the boiler is ready to accept Micronized coal through the new burners and the Transport Gas Fan is running, an alarm bell (by others) will ring for seven (7) seconds to notify anyone near the system of the pending start of the Coal Milling System.

First the Mill Air Supply Solenoid Valve [SV-1A-15B040E] is energized, establishing the Mill Labyrinth Air Seal System, starting the Mill Mist Lubrication System, and simultaneously starting the Mill Lube Mist Demister Unit [TK-CH-15B001]. At the same time that the Mill Air Supply Solenoid Valve [SV-1A-15B040E] is energized, the Mill Bearing Housing Water Jacket solenoid [SV-CW-15B003E, by others] is energized, initiating the closed loop water cooling system for the bearing housing.

After the Labyrinth Seal and Lube System compressed air pressure is above the minimum required pressure (44 psi) as sensed by pressure switch [PS-1A-15B003E], the Tramp Iron Gate is closed as sensed by its position switch [ZSC-CH-15B012E], and the Mill Bearing Housing Water Jacket water circulation is above 3 gpm as sensed

by the flow switch [FS-CW-15B001E, by others] being not low, the Mill Inlet Damper [CZ-TG-15B002E] is moved to the fully open position.

After the Mill Inlet Damper [CZ-TG-15B002E] is in its fully open position as sensed by position switch [ZSO-TG-15B002E], the Mill Mist Lube System oil level [LS-CH-15B001E] is not low, the Mill Mist Lube System air pressure [PS-1A-15B003E] is not low, the Mill upper/lower bearing temperatures [TE-CH-15B048E/TE-CH-15B049E] are not HI-HI, and the Mill vibration [VT-CH-15B001E] is not HI-HI (there is a thirty (30) second bypass of vibration monitor during the mill start-up), and three (3) minutes have elapsed since the Mill air supply Solenoid Valve [SV-1A-15B040E] was energized, the Mill [PM-CH-15B001E] motor is started.

Seventy-five (75) seconds (to allow the mill to ramp up to speed) after starting the Mill [PM-CH-15B001E] motor, as sensed by motion switch [SS-CH-15B004E] not indicating zero speed, the Mill Classifier Rotary Feeder [RV-CH-15B002E] is started.

After the Mill Classifier Rotary Feeder [RV-CH-15B002E] is started, as sensed by motion switch [SS-CH-15B002E] not indicating zero speed, the automatic airflow control portion of the circuit is placed in its normal operating configuration.

Once the Classifier Outlet Temperature [TE-CH-15B050E] (by others) reaches 150°F, at least one hundred twenty five (125) seconds have elapsed since the starting of the Classifier Rotary Feeder [RV-CH-15B002E] as sensed by the motion switch [SS-CH-15B002E] not indicating zero speed, and the oxygen content of the transport gas as sensed by the customer's oxygen analyzer is below eight percent, the Mill Inlet Rotary Feeder [RV-CH-15B001E] is started.

After the Mill Inlet Rotary Feeder [RV-CH-15B001E] is started, as sensed by motion switch [SS-CH-15B003E] not indicating zero speed, the Coal Feed Screw Conveyor (by others) can be started to introduce material flow to the Coal Milling System.

Note: the coal feed screw conveyor (by others) should start at a maximum set point of roughly 50% mill maximum capacity.

D. Normal Operation of the Coal Milling System

Once the System has been started in the manner described in section C, normal operation consists of controlling the following:

The air flow rate into the Mill

The material feed rate into the Mill circuit (by others)

The air flow rate into the mill is controlled by the operation of the Mill Air Inlet Damper [CZ-TG-15B002E]. The control loop consists of a flow indicating controller that permits the operator to set a mill inlet air flow rate set point.

In normal operation, the flow rate at full load is set at 3460 ACFM; however, this value will be verified and adjusted during startup testing of the mill, and a table of mill inlet air flow rates will be prepared for use by the operators.

The feed rate of material into the mill circuit is manually adjusted by the operator.

Note: during startup the maximum mill capacity will be determined, and a table of mill operating points will be established by Fuller.

E. Normal Shutdown of The Coal Milling System

A normal shutdown of the Coal Milling System is a sequenced shutdown of the System, and is either initiated by the system operator, or automatically initiated by one of the following conditions:

Mill Mist Lube System oil level low, as sensed by level switch [LS-CH-15B001E], persisting for a period of 10 minutes or longer

High Mill vibration [VT-CH-15B001E] (in excess of 0.4 in./sec.) which persists for 10 minutes or longer

When normal shutdown is initiated, the shutdown proceeds as described below:

The Coal Feed Screw Conveyor (by others) is stopped to cut-off material flow to the Coal Milling System

Ten seconds after The Coal Feed Screw Conveyor (by others) is stopped, the mill inlet rotary feeder [RV-CH-15B001E], as sensed by motion switch [SS-CH-15B001E] indicating zero speed, is stopped

Once the mill inlet rotary feeder [RV-CH-15B001E] is stopped, as sensed by motion switch [SS-CH-15B001E] indicating zero speed, and after a 10 minute time delay to purge the system, the Classifier Rotary Feeder [RV-CH-15B002E] is stopped

Ten seconds after the Classifier Rotary Feeder [RV-CH-15B002E] is stopped, as sensed by motion switch [SS-CH-15B002E] indicating zero speed, the Mill [PM-CH-15B001E] is stopped

Ten seconds after the mill [PM-CH-15B001E] stop is initiated, the Mill Inlet Damper [CZ-TG-15B002E] is closed

After the Mill Inlet Damper [CZ-TG-15B002E] is closed, as sensed by its position switch [ZSC-TG-15B002E], and the mill [PM-CH-15B001E] is stopped, as sensed by motion switch [SS-CH-15B004E] indicating zero speed, the Mill Compressed Air System Valve (to the Mill Mist Lube System) is closed by de-energizing Solenoid Valve [SV-1A-15B040E], the Mill Bearing Housing Water Jacket solenoid [SV-CW-15B003E, by others] is de-energized, and the Mill Lube Mist Demister [TK-CH-15B001] is stopped. **Note: If Mill No. 2 circuit is running, the Mill Lube Mist Demister is left running.**

The de-energizing of Solenoid Valves [SV-1A-15B040E] and [SV-CW-15B003E] completes the normal shutdown of the Coal Milling System.

Note: The Transport Gas Fan, supplying air to the mill systems, may only be stopped during a shutdown of the boiler. When a coal milling system is shutdown and the boiler is operating, the transport gas will by-pass the mill system to provide cooling air to the burners.

F. Abnormal Shutdowns Of The Coal Milling System

Abnormal shutdowns are those unplanned shutdowns of the system caused by either isolated process or equipment abnormalities, activation of individual equipment safety devices, or automatic activation of personnel safety systems.

Abnormal shutdowns caused by isolated process or equipment abnormalities or activation of individual safety devices will cause the immediate stopping of the affected piece of equipment and will stop all upstream equipment in a cascade fashion. Equipment downstream of the faulted piece of equipment or point at which the abnormality occurs will continue in normal operation.

3 In an abnormal shutdown, the mill circuit MUST cool down for a period of one hour prior to the opening of any equipment or ductwork ports, flanges, or (tramp iron) cleanout gates by maintenance personnel. This will prevent injury from high temperatures and reduce the danger of introducing excess oxygen into the system, which could feasibly lead to fires or explosions.

If, during normal operation of the Coal Milling System, any of the following systems or equipment is activated, all equipment in the System will be stopped without any intentional time delays to allow for equipment clean out and deceleration:

If at any time the boiler becomes unable to continue to receive Micronized coal through the new burners

Transport Gas Fan not running (by others)

Mill air supply system Low (< 44 psi), as sensed by pressure switch [PS-1A-15B003E]

Tramp iron gate not closed, as sensed by limit switch [ZSC-CH-15B012E].

Mill vibration [VT-CH-15B001E] high-high (0.75 in./sec)

Mill upper bearing temperature HI-HI, as sensed by temperature element [TE-CH-15B048E]

Mill lower bearing temperature HI-HI, as sensed by temperature element [TE-CH-15B049E]

During normal operation of the Coal Milling System, if the Mill [PM-CH-15B001E] Motor stalls, as sensed by motion switch [SS-CH-15B004E] indicating zero speed, the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others).

Mill Inlet Rotary Feeder [RV-CH-15B001E]

Classifier Rotary Airlock [RV-CH-15B002E]

During normal operation of the Coal Milling System, if the Classifier Rotary Feeder [RV-CH-15B002E] stalls, as sensed by motion switch [SS-CH-15B002E] indicating zero speed, the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others)

Mill Inlet Rotary Feeder [RV-CH-15B001E]

During normal operation of the Coal Milling System, if the Mill Inlet Rotary Feeder [RV-CH-15B001E] stalls, as sensed by motion switch [SS-CH-15B001E] indicating zero speed, the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others)

During normal operation of the Coal Milling System, if the Mill Inlet Air flow falls below 2425 ACFM or the oxygen content of the transport gas exceeds eight percent (as sensed by the customer's oxygen analyzer), the following equipment is stopped in the sequence indicated without any intentional time delays to allow for equipment clean out and deceleration:

Coal Feed Screw Conveyor (by others)

Mill Inlet Rotary Feeder [RV-CH-15B001E]

Note: After an abnormal shutdown as detailed in the above case, the mill circuit can be restarted once the airflow returns to its normal operating point and the oxygen content in the Mill falls below 7.5 percent. The coal feed screw conveyor should start at its minimum set point, and the circuit brought back to maximum capacity.

During normal operation of the Coal Milling System, if the Mill Bearing Housing Water Jacket water circulation is less than 3 gpm as sensed by the flow switch [FS-CW-15B001E, by others]:

"ALARM ONLY"

During normal operation of the Coal Milling System, if the classifier outlet temperature (by others) falls below 140°F:

"ALARM ONLY"

Note: if the alarm persists, it is recommended that the operator use his discretion whether to **"cut-back"** or **"cut-off"** the coal feed.

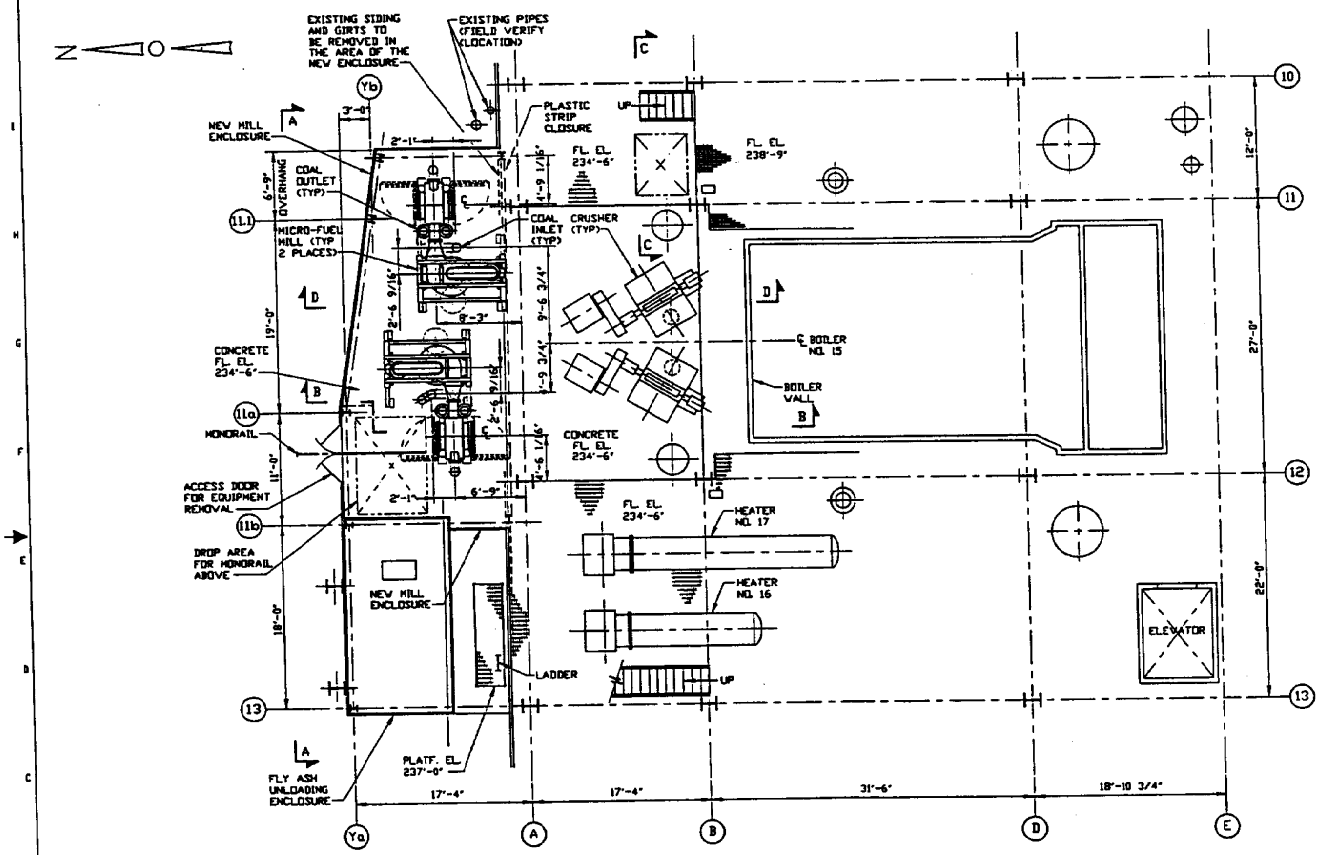
G. Emergency Shutdowns Of The Coal Milling System

Emergency shutdowns will cause the immediate and simultaneous shutdown of the entire Coal Milling System.

Any emergency shutdowns of the entire Coal Milling System shall be at the discretion of the customer.

3 In an emergency shutdown, the mill circuit MUST cool down for a period of one hour prior to the opening of any equipment or ductwork ports, flanges, or (tramp iron) cleanout gates by maintenance personnel. This will prevent injury from high temperatures and reduce the danger of introducing excess oxygen into the system, which could feasibly lead to fires or explosions.

D03115-331-015



PLAN AT EL. 234'-6"

GILBERT/COMMONWEALTH, INC.

ACAD

D

3/16" = 1'-0"

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

REVISIONS	DATE	CUSTOMER APPROVALS	DATE	ENGINEERING APPROVALS	DATE
				DRAWN N.A.	
				DATE 4/17/96	
				CHECKED	
				DATE	
				ISSUED FOR	
				DESIGNED L.E.HARVEY	DATE 8/96

GENERAL ARRANGEMENT
MICRONIZER BLDG ADDITION
FLOOR EL 234'-6"

JOB 31
DRAWING KPE

D03115-331-015

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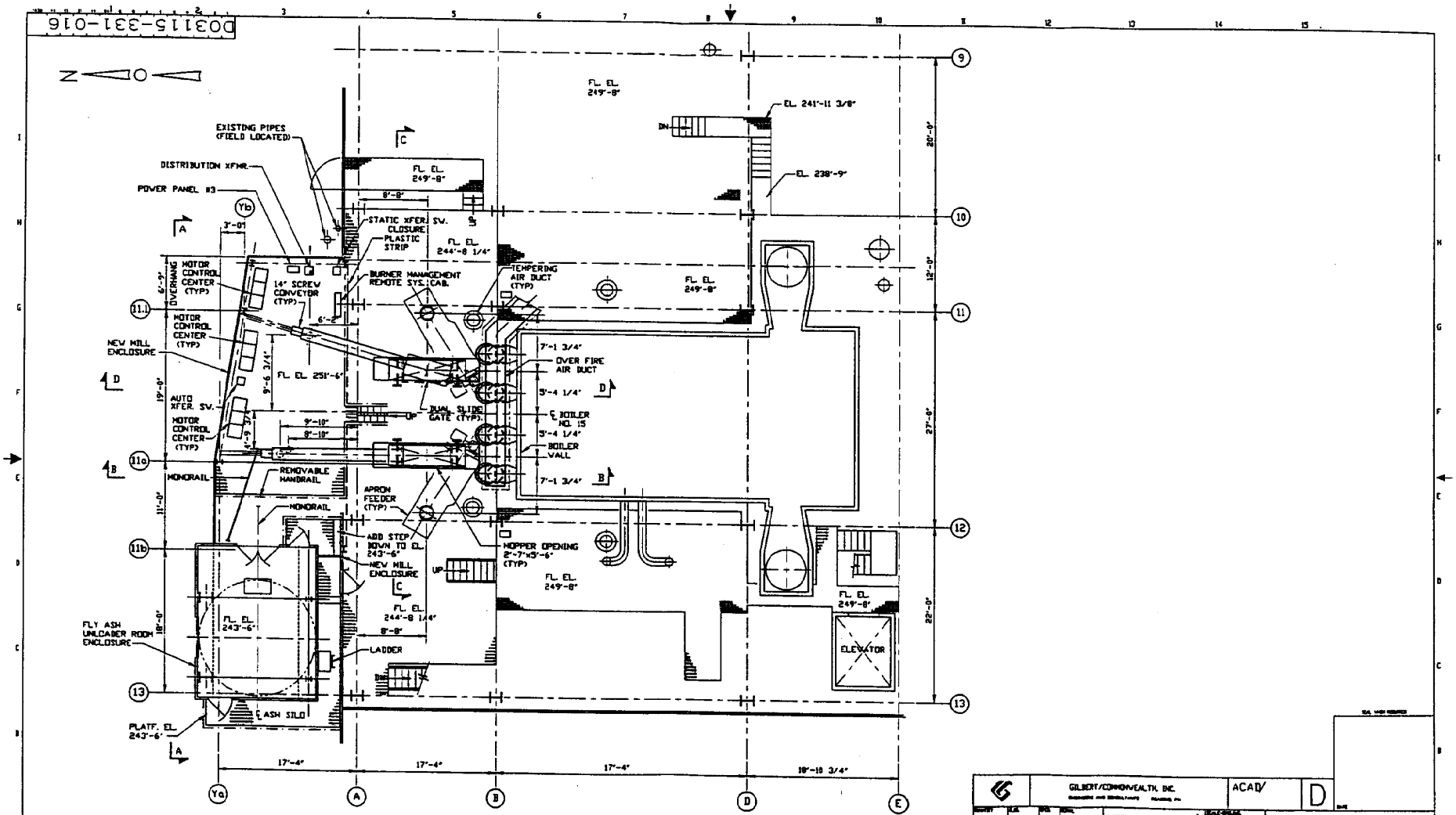

GILBERT/COMMONWEALTH, INC.

ACAD/ D

3/16"=1'-0"

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

N.A.

4/17/96

GENERAL ARRANGEMENT
MICRONIZER BLDG ARRANGEMENT
PLAN AT FLOOR EL 244'-8 1/4"

031

KPE

D03115-331-016

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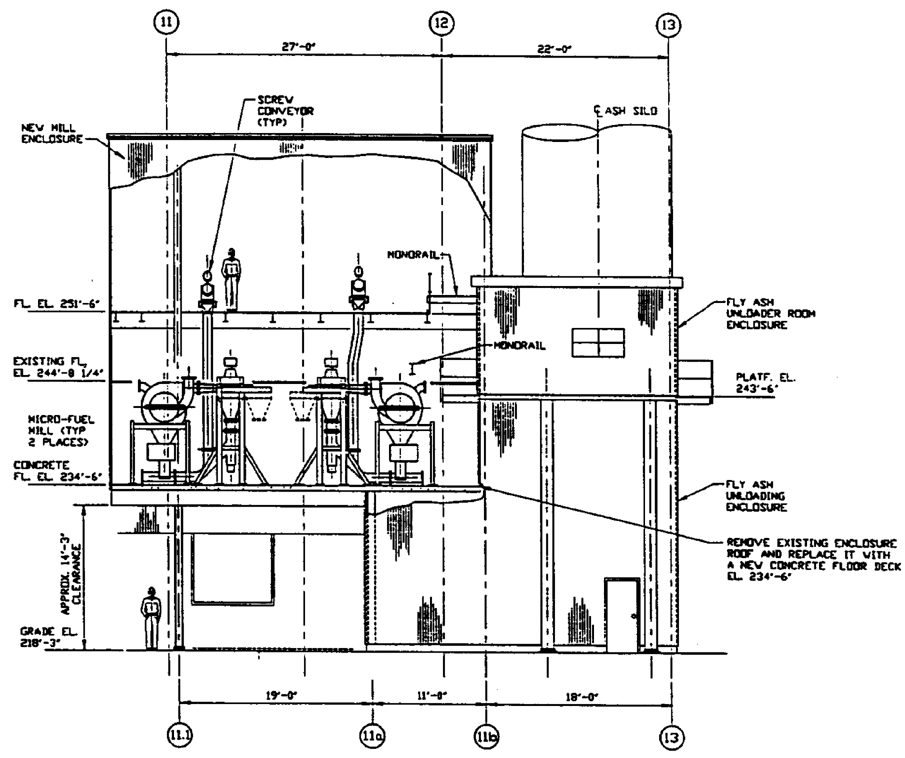
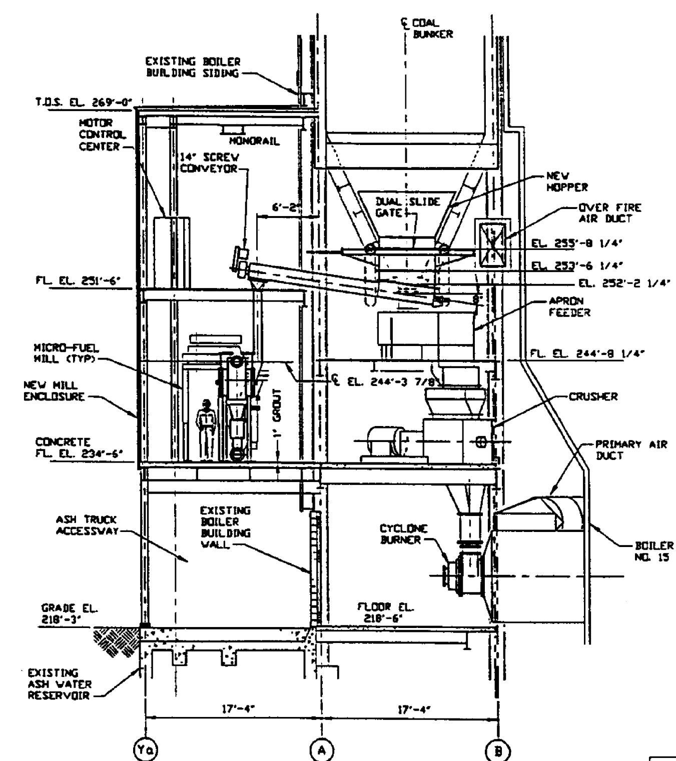
G/C-DATE: 08/14/96 - 3:47 PM

D03115-331-017



SECTION A-A



SECTION D-D

GILBERT/COMMONWEALTH, INC.

ACAD

D

3/16" = 1'-0"

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

N.A.
4/17/96

GENERAL ARRANGEMENT
MICRONIZER BLDG ADDITION
SECTION A-A & SECTION D-D

31

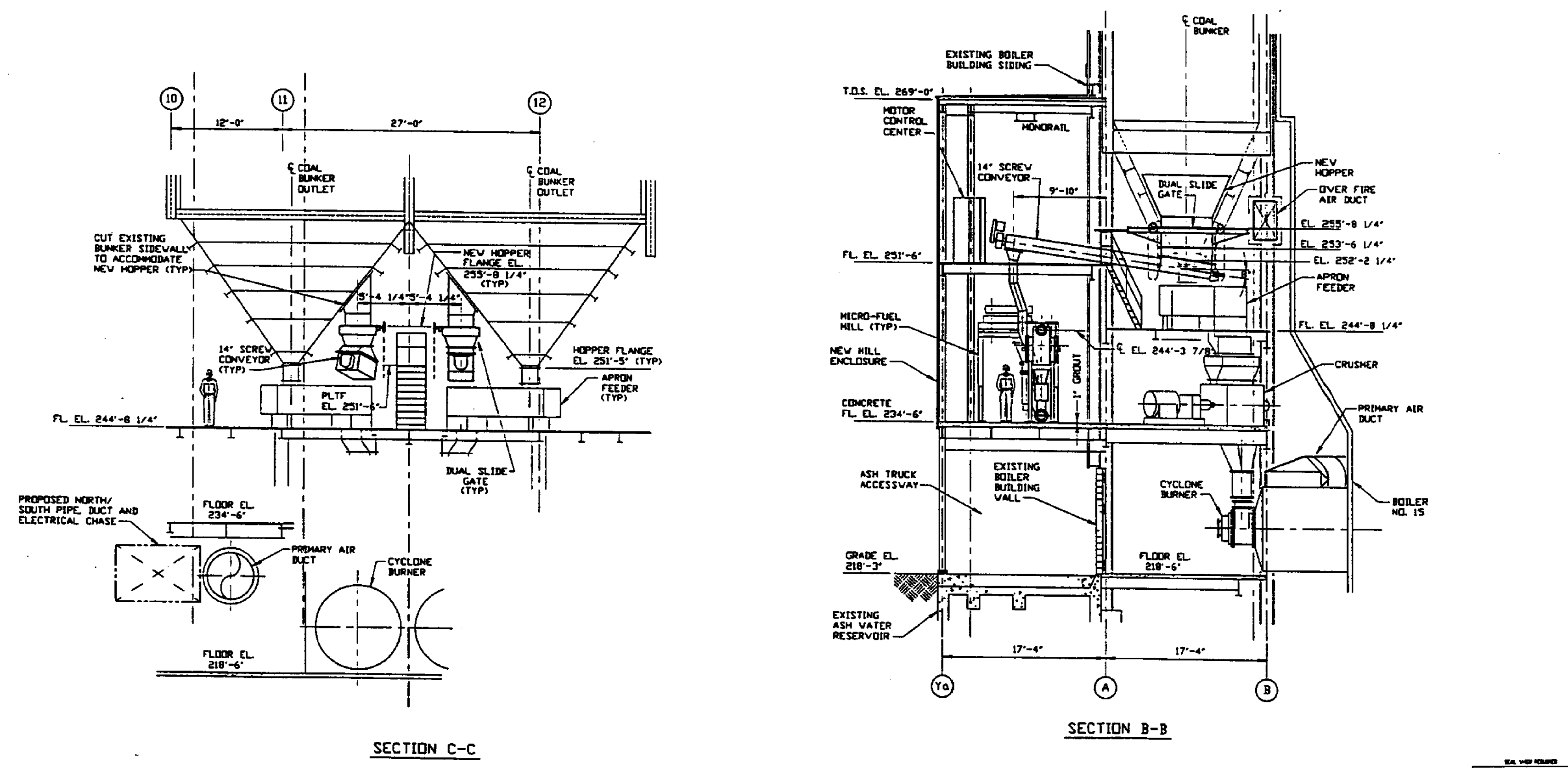
KPE

L.E.HARVEY 8/96

H

G/C-FILE: 464006 :331017.DWG
G/C-DATE: 08/14/96 - 3:52 PM

D03115-331-017



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G/C-DATE: 08/14/96 - 3:59 PM

GILBERT/COMMONWEALTH, INC.

ACAD/

D

3/16" = 1'-0"

N.A.

4/17/96

L.E.HARVEY 8/96

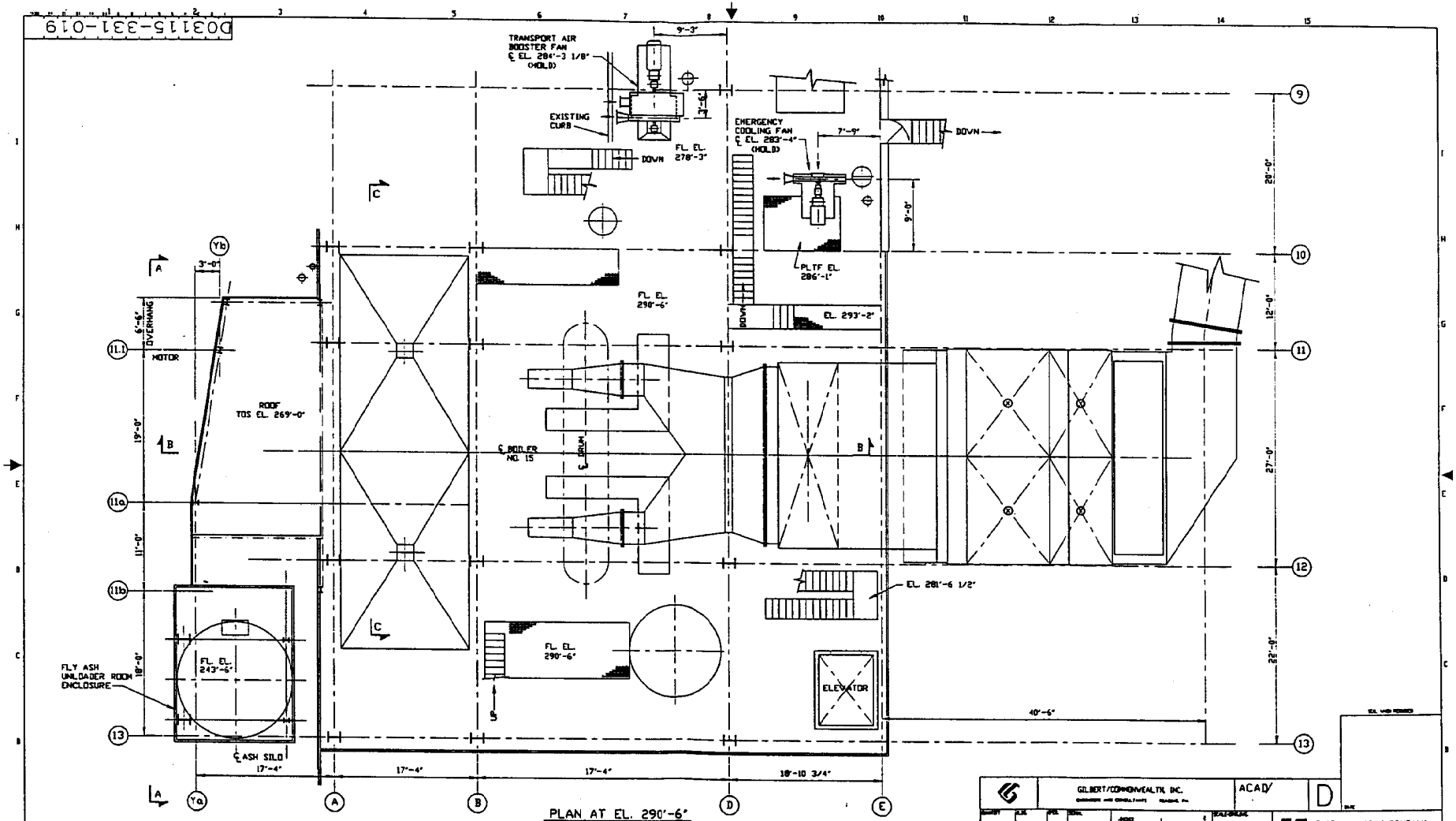
EASTMAN KODAK COMPANY
KODAK PARK DIVISION

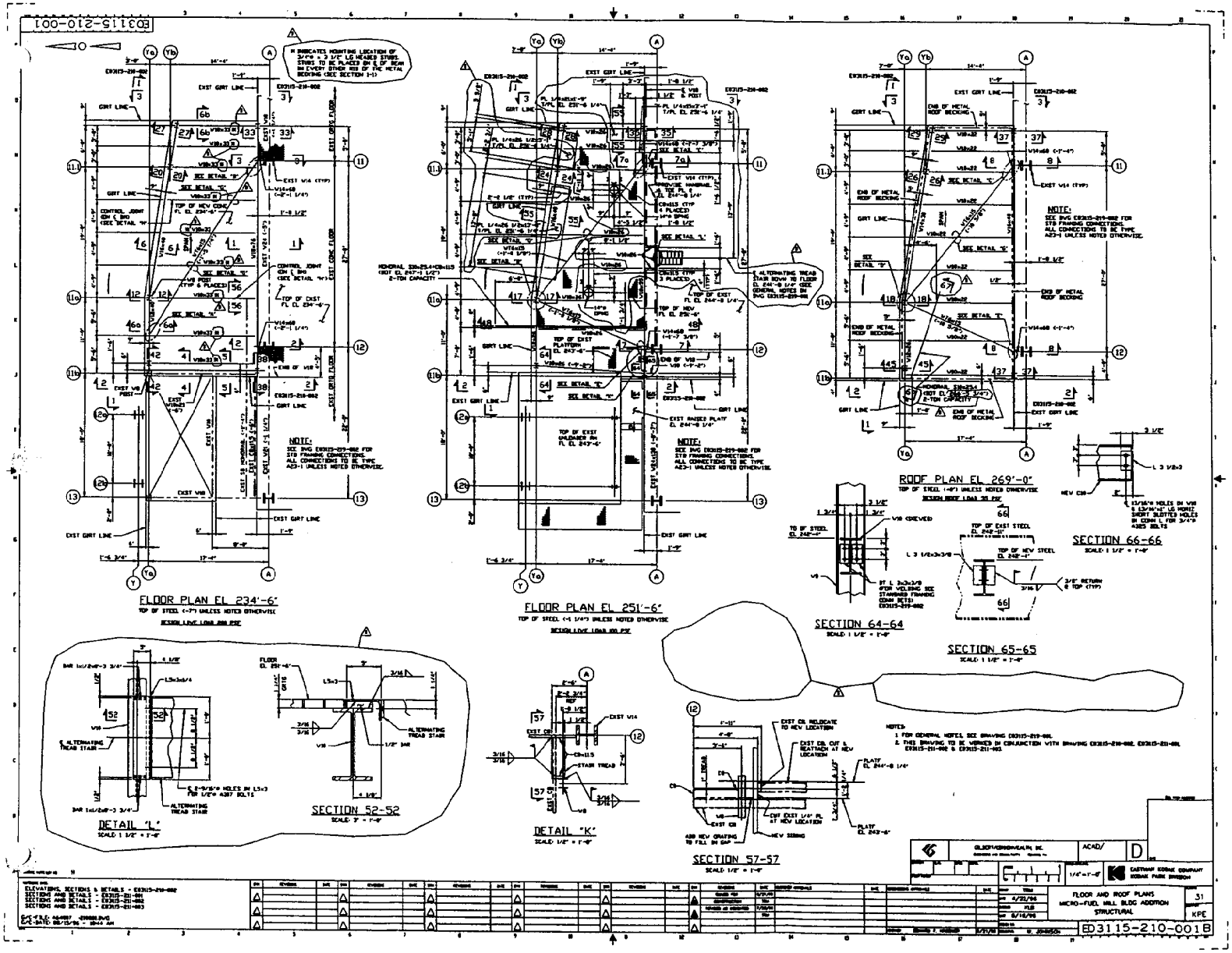
_GENERAL ARRANGEMENT
MICRONIZER BLDG ADDITION
SECTION B-B & C-C

31

KPE

D03115-331-018


D03115-331-019
TRANSPORT AIR BOOSTER FAN ℄ EL. 284'-3 1/8" (HOLD)
EXISTING CURB
FL. EL. 278'-3"
DOWN
EMERGENCY COOLING FAN ℄ EL. 283'-4" (HOLD)
PLTF EL. 286'-1"
FL. EL. 298'-6"
EL. 293'-2"
EL. 281'-6 1/2"
6'-6" OVERHANG
MOTOR
ROOF TOS EL. 269'-0"
℄ BOILER NO. 15
℄ DRUM
FLY ASH UNLOADER ROOM ENCLOSURE
FL. EL. 243'-6"
℄ ASH SILO
ELEVATOR
17'-4"
17'-4"
17'-4"
18'-10 3/4"
40'-6"
PLAN AT EL. 290'-6"
GILBERT/COMMONWEALTH, INC.
ACAD
D
3/16"=1'-0"
EASTMAN KODAK COMPANY
KODAK PARK DIVISION
N.A.
4/17/96
GENERAL ARRANGEMENT
NICRONIZER BLDG ADDITION
PLAN AT FLOOR EL 290'-6"
31
KPE
D03115-331-019
G/C-FILE: 464006 :331019.DVG
G/C-DATE: 08/14/96 - 409 PM



ELEVATIONS, SECTIONS & DETAILS -	ED3115-210-002		
SECTIONS AND DETAILS -	ED3115-210-001		
SECTIONS AND DETAILS -	ED3115-211-002		
SECTIONS AND DETAILS -	ED3115-211-003		

ACAD/	D
1/4"=1'-0"	
4/22/98	
KLB	
5/18/98	

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

FLOOR AND ROOF PLANS
MICRO-FUEL MILL BLDG ADDITION
STRUCTURAL

31

KPE

ED3115-210-001B

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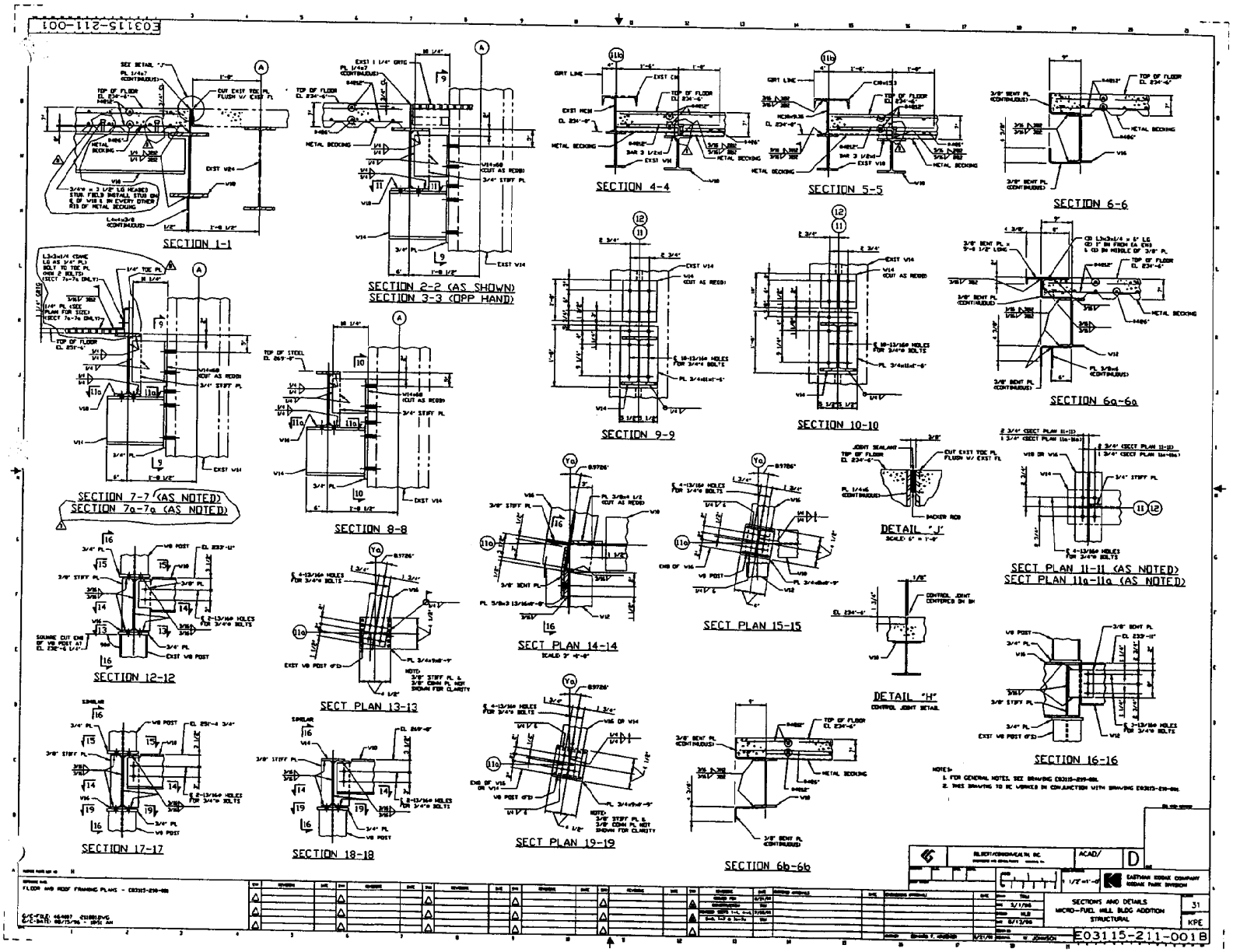
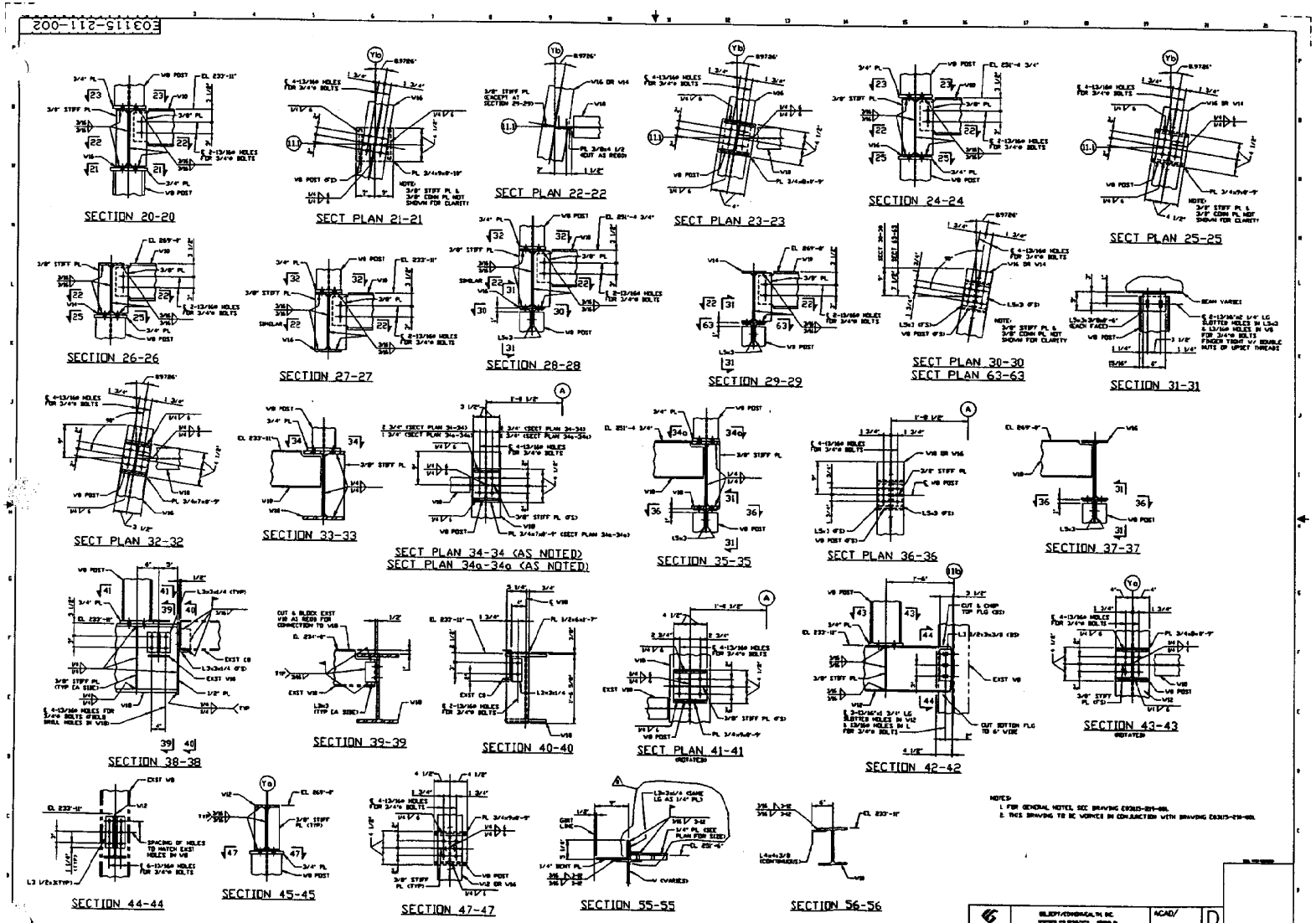
ELEVATION 1-1
ELEVATION 2-2
ELEVATION 3-3
SECTION 4-4
SECTION 5-5
ENLARGED PLAN 'A'
SECTION 6-6
SECTION 59-59
SECTION 60-60
SECTION 61-61
SECTION 62-62
SECTION 63-63
SECTION 64-64
SECTION 65-65
SECTION 66-66
SECTION 67-67
SECTION 68-68
ELEVATIONS, SECTIONS & DETAILS
HOMO-FUEL MILL BLDG ADDITION
STRUCTURE
E03115-210-002B


SECTION 1-1
SECTION 2-2 (AS SHOWN)
SECTION 3-3 (OPP HAND)
SECTION 4-4
SECTION 5-5
SECTION 6-6
SECTION 6a-6a
SECTION 7-7 (AS NOTED)
SECTION 7a-7a (AS NOTED)
SECTION 8-8
SECTION 9-9
SECTION 10-10
SECT PLAN 11-11 (AS NOTED)
SECT PLAN 11a-11a (AS NOTED)
SECTION 12-12
SECT PLAN 13-13
SECT PLAN 14-14
SECT PLAN 15-15
DETAIL "J"
DETAIL "H"
SECTION 16-16
SECTION 17-17
SECTION 18-18
SECT PLAN 19-19
SECTION 6b-6b
NOTES:
1. FOR GENERAL NOTES, SEE DRAWING E03115-210-001.
2. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DRAWING E03115-210-002.
SECTIONS AND DETAILS
MICRO-FUEL MILL BLDG ADDITION
STRUCTURAL
E03115-211-001B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SECTION 20-20
SECT PLAN 21-21
SECT PLAN 22-22
SECT PLAN 23-23
SECTION 24-24
SECT PLAN 25-25
SECTION 26-26
SECTION 27-27
SECTION 28-28
SECTION 29-29
SECT PLAN 30-30
SECT PLAN 63-63
SECTION 31-31
SECT PLAN 32-32
SECTION 33-33
SECT PLAN 34-34 (AS NOTED)
SECT PLAN 34a-34a (AS NOTED)
SECTION 35-35
SECT PLAN 36-36
SECTION 37-37
SECTION 38-38
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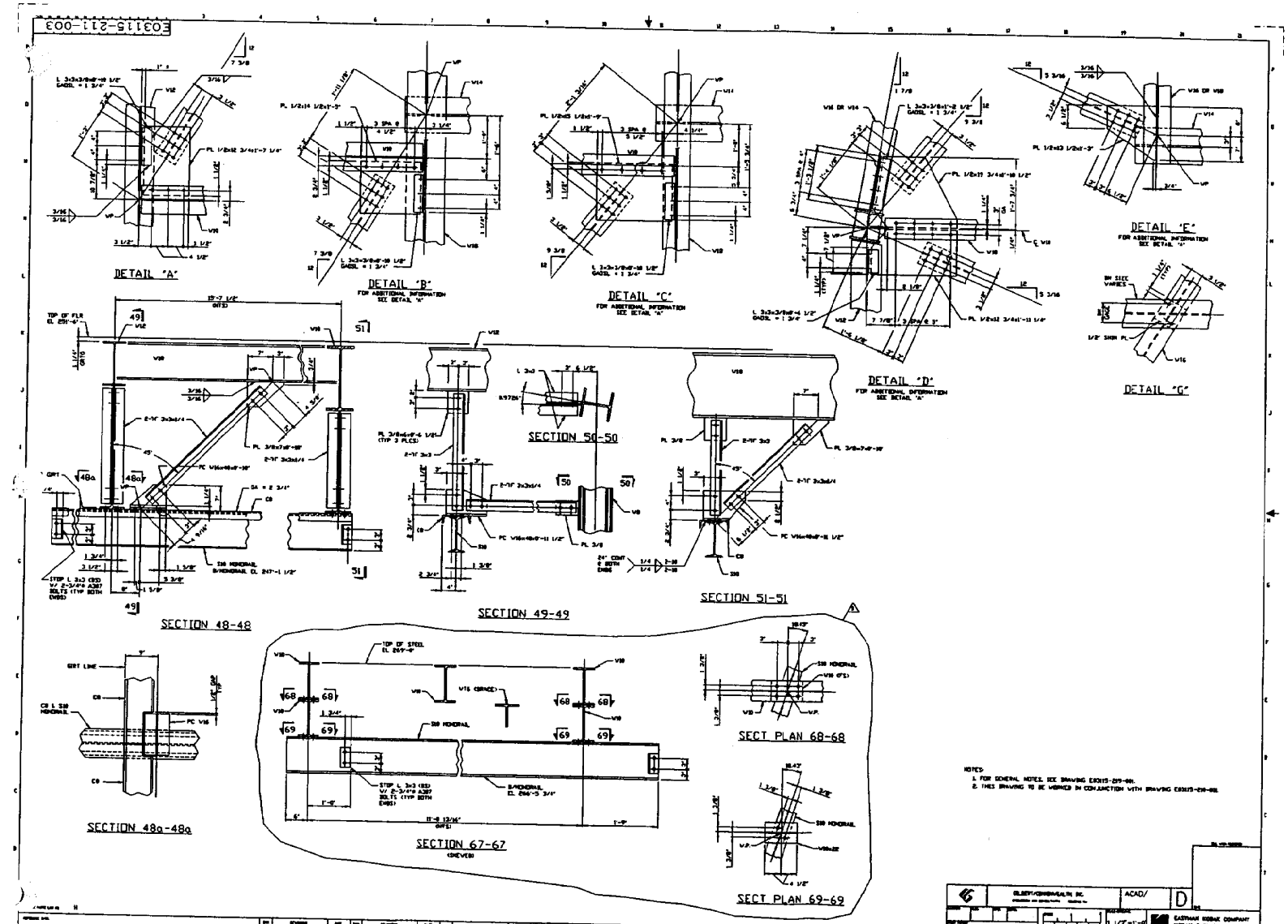
SECT PLAN 41-41
SECTION 42-42
SECTION 43-43
SECTION 44-44
SECTION 45-45
SECTION 47-47
SECTION 55-55
SECTION 56-56
NOTES:
1. FOR GENERAL NOTES, SEE DRAWING E03115-211-001.
2. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DRAWING E03115-210-001.
SECTIONS AND DETAILS
MICRO-FUEL MILL BLDG ADDITION
STRUCTURAL
31
KPE
E03115-211-002 B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DETAIL "C"
FOR ADDITIONAL INFORMATION SEE DETAIL "A"
DETAIL "D"
FOR ADDITIONAL INFORMATION SEE DETAIL "A"
DETAIL "E"
FOR ADDITIONAL INFORMATION SEE DETAIL "A"
DETAIL "G"
SECTION 50-50
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SECTION 67-67
SECT PLAN 68-68
SECT PLAN 69-69
NOTES:
1. FOR GENERAL NOTES, SEE DRAWING E03115-219-001.
2. THIS DRAWING TO BE VIEWED IN CONJUNCTION WITH DRAWING E03115-219-002.
ACAD/
D
EASTMAN KODAK COMPANY
KODAK PARK DIVISION
SECTIONS AND DETAILS
MICRO-FUEL MILL BLDG ADDITION
STRUCTURAL
31
KPE
E03115-211-003B

E03115-219-001

GENERAL NOTES

DESIGN:

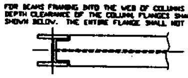
1. CODES AND STANDARDS:
   - A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
     - 1) SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS - ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN.
     - 2) CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.
     - 3) MANUAL OF STEEL CONSTRUCTION, 9TH EDITION (1989), PARTS 1 THROUGH 4.
     - 4) SPECIFICATION FOR STRUCTURAL STEEL JOINTS USING ASTM A 325 OR A 490 BOLTS.
   - B. AMERICAN WELDING SOCIETY (AWS)
     - 1) D1.1 STRUCTURAL WELDING CODE.
   - C. STEEL DECK INSTITUTE (SDI)
     - 1) DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS, ROOF DECKS AND CELLULAR METAL FLOOR DECK WITH ELECTRICAL DISTRIBUTION.
2. DESIGN LOADS:
   - A. FLOOR AND PLATFORM LIVE LOADS:
     - 1) FLOOR AND PLATFORM LIVE LOADS ARE INDICATED ON THE PLAN DRAWINGS OF EACH FLOOR OR LEVEL.
   - B. ROOF LIVE LOADS:
     - 1) ROOFS ARE DESIGNED FOR A UNIFORM LIVE LOAD OF 35 PSF AND SNOW DRIFT LOADS IN ACCORDANCE WITH ASCE 7, SECTION 7.7.
   - C. WIND LOADS:
     - 1) WIND LOADS CALCULATED IN ACCORDANCE WITH THE NEW YORK STATE BUILDING CODE CONSIDERING A DESIGN WIND VELOCITY OF 75 MPH.
     - 2) ROOFS ARE DESIGNED FOR UPWARD SUCTION LOADS OF 19 PSF DUE TO WIND LOAD.

STEEL WORK:

1. ALL STEELWORK SHALL BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS AND DRAWINGS.
   - A. ALL STEEL ROLLED SHAPES, BARS AND PLATES SHALL CONFORM TO ASTM A36.
   - B. HIGH STRENGTH BOLTS SHALL CONFORM TO ASTM A 325, TYPE 1.
   - C. PLAIN BOLTS SHALL CONFORM TO ASTM A 307.
   - D. NUTS SHALL CONFORM TO ASTM A 563 GRADE C. WASHERS SHALL BE HARDENED STEEL WASHERS IN CONFORMANCE WITH ASTM F 436.
   - E. STEEL PIPE HANDRAIL SHALL CONFORM TO ASTM A 53 TYPE E GRADE B.
   - F. STEEL STUDS SHALL CONFORM TO AWS D1.1, SECTION 7.
   - G. GRATING AND STAIR TREADS SHALL BE WELDED GRATING OF THE FOLLOWING TYPE AND SIZE:
     - 1. GRATING: 3/16-INCH THICK, 1 1/4 INCH DEEP BEARING BARS SPACED AT 1 3/16 INCHES CENTER TO CENTER WITH 3/16 INCH THICK CROSS BARS SPACED AT 4 INCHES CENTER TO CENTER (W-19-4, 1 1/4" x 3/16", STEEL)
     - 2. STAIR TREADS: W-19-4, 1" x 3/16", STEEL, 3/16 INCH THICK CROSS BARS.
   - H. ALTERNATING TREAD STEEL STAIRS SHALL BE IN ACCORDANCE WITH THE FOLLOWING:
     - 1. MANUFACTURER: LAPEYRE STAIR, INC. NEW ORLEANS, LA.
     - 2. SUBMITTALS: SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH ATTACHMENT A TO SPECIFICATION SECTION 01300.
     - 3. MATERIAL AND TYPE: CARBON STEEL, 68 DEGREE.
     - 4. FINISH: ONE COAT PRIMER PAINT, SEE SPECIFICATION SECTION 05122.
   - I. WELDING OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH AWS D1.1 AND THE PROVISIONS OF TECHNICAL SPECIFICATIONS 05095 AND 05122, AND AS FOLLOWS:
     - 1) ELECTRODES AND FILLER METAL FOR ALL CARBON STEEL WELDING PROCESSES SHALL PRODUCE A LOW HYDROGEN DEPOSIT OF 70,000 POUNDS PER SQUARE INCH MINIMUM TENSILE STRENGTH. WELDING ELECTRODES AND FILLER METAL FOR WELDING CARBON STEEL SHALL CONFORM TO THE PROVISIONS OF AWS D1.1 TABLE 4.1.1 FOR THE TYPE OF STEEL TO BE WELDED.
   - J. ALL STRUCTURAL STEEL SHALL RECEIVE ONE COAT OF PRIMER PAINT. SEE TECHNICAL SPECIFICATION SECTION 05122 FOR APPLICABLE REQUIREMENTS AND APPROVED MANUFACTURERS FOR PRIMER PAINT.

△

2. GROUT FOR SETTING COLUMN AND EQUIPMENT BASES SHALL BE PREPACKAGED NON-SHRINK GROUT IN ACCORDANCE WITH TECHNICAL SPECIFICATION 03631. NON-SHRINK GROUT SHALL BE MASTERFLOW 928 AS MANUFACTURED BY MASTER BUILDERS COMPANY OR ENGINEER APPROVED EQUAL.
3. FOR STANDARD HANDRAIL AND TOE PLATE DETAILS, SEE DRAWING E03115-219-002.
4. FOR STANDARD STAIR STRINGER DETAILS, SEE KODAK STANDARD KBR-2.
5. HANDRAIL AND TOE PLATE INDICATED THUS: ——·——
6. HANDRAIL ONLY INDICATED THUS: ——··——
7. TOE PLATE ONLY INDICATED THUS: ——···——
8. METAL DECK SPAN INDICATED THUS: ——
9. GRATING SPAN INDICATED THUS: ≠≠≠
10. ALL ABBREVIATIONS ARE IN ACCORDANCE WITH ANSI Y1.1-1972 "ABBREVIATIONS FOR USE ON DRAWINGS AND IN TEXT" OR AS OTHERWISE NOTED ON THE DRAWINGS.
11. DIMENSIONS OF EXISTING WORK SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO FABRICATION OF ANY INTERFACING NEW WORK.
12. DURING ERECTION, CONSTRUCTOR SHALL ADEQUATELY BRACE STRUCTURAL STEEL FOR ALL CONSTRUCTION AND ENVIRONMENTAL LOADS.
13. NO PENETRATIONS ARE PERMITTED THROUGH STRUCTURAL STEEL MEMBERS UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE STRUCTURAL ENGINEER.
14. THE APPROVAL OF THE ENGINEER SHALL BE REQUIRED FOR ALL USES OF FLAME CUTTING IN THE FIELD.
15. CONNECTIONS:
   - A. ALL DESIGN, DETAILING, FABRICATION AND INSTALLATION REQUIREMENTS FOR CONNECTING AND FASTENING STRUCTURAL STEEL, HANDRAIL, GRATING AND STEEL DECKING SHALL BE IN ACCORDANCE WITH THE APPLICABLE TECHNICAL SPECIFICATION SECTIONS AND THE SUPPLEMENTARY REQUIREMENTS SPECIFIED ON THE DRAWINGS.
   - B. CONNECTIONS FOR STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 05122, THE DRAWINGS AND THE FOLLOWING:
     - 1) CONNECTIONS FOR STRUCTURAL STEEL SHALL BE EITHER WELDED OR BOLTED AS INDICATED ON THE DRAWINGS.
     - 2) BOLTED CONNECTIONS SHALL BE MADE OF 3/4 INCH DIAMETER HIGH STRENGTH BOLTS CONFORMING TO ASTM A 325.
     - 3) HIGH STRENGTH BOLTED CONNECTIONS FOR VERTICAL AND HORIZONTAL BRACING MEMBERS AND AT COLUMN SPLICES SHALL BE SLIP CRITICAL TYPE USING ASTM A 325 BOLTS AS SHOWN ON THE DRAWINGS.
     - 4) HIGH STRENGTH BOLTED CONNECTIONS FOR ALL STRUCTURAL MEMBERS, WITH THE EXCEPTION OF VERTICAL AND HORIZONTAL BRACING MEMBERS, COLUMN SPLICES AND MEMBERS CONNECTED WITH BOLTS CONFORMING TO ASTM A 307, SHALL BE FULLY TENSIONED BEARING TYPE BOLTS WITH THREADS EXCLUDED FROM THE SHEAR PLANE.
     - 5) BOLTED CONNECTIONS FOR THE FOLLOWING ITEMS SHALL BE BOLTED WITH 3/4 INCH DIAMETER ASTM A 307 BOLTS.
       - a. STAIRWAYS, LANDINGS AND LADDERS
       - b. GIRTS
     - 6) BOLTED CONNECTIONS SHALL HAVE AT LEAST TWO BOLTS.
     - 7) SLOTTED CONNECTIONS SHALL NOT BE USED UNLESS INDICATED ON THE DRAWINGS.
     - 8) OVERSIZED HOLES SHALL NOT BE USED UNLESS INDICATED ON THE DRAWINGS.
     - 9) FRAMED END CONNECTIONS FOR BEAMS AND GIRDERS SHALL BE TYPE 2, AS DEFINED BY SECTION A2.2 OF THE AISC SPECIFICATION UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
     - 10) BOLTED AND WELDED BEAM CONNECTIONS:
       - a. DEVELOP THE GREATER OF FOLLOWING FOR BEAMS:
         - 1. IN ABSENCE OF STANDARD CONNECTION DETAIL, DEVELOP CONNECTION FOR ONE-HALF OF TOTAL UNIFORM LOAD CAPACITY SHOWN IN "ALLOWABLE UNIFORM LOAD TABLES" OF AISC MANUAL OF STEEL CONSTRUCTION, PLUS AXIAL LOADS GIVEN ON DRAWINGS.
         - 2. STRENGTH OF FRAMED CONNECTION AS SHOWN IN AISC MANUAL OF STEEL CONSTRUCTION PART 4, HAVING CONNECTION LENGTH (L) GREATER THAN ONE-HALF THE DIMENSION "T" GIVEN FOR BEAM IN THE MANUAL OF STEEL CONSTRUCTION.
     - 11) GUSSET PLATES AND CONNECTION ANGLES SHALL HAVE 3/8 INCH MINIMUM THICKNESS, UNLESS OTHERWISE SPECIFIED.
     - 12) FOR BEAMS FRAMING INTO THE WEB OF COLUMNS WITH BEAM FLANGES WIDER THAN DEPTH CLEARANCE OF THE COLUMN FLANGES SHALL BE CUT NARROWER TO FIT AS SHOWN BELOW. THE ENTIRE FLANGE SHALL NOT BE COPED FOR THIS CONDITION.



     - 13) ALL RE-ENTRANT CORNERS OF THE COPED BEAMS AND GUSSET PLATES SHALL BE NOTCH FREE AND AT A MINIMUM RADIUS OF 1/2 INCH.
     - 14) WELDED CONNECTIONS SHALL BE SIZED SUCH THAT WORKING STRESSES WITHIN THE BASE OF WELD METAL SHALL NOT EXCEED THE ALLOWABLE STRESS VALUES PRESENTED IN CHAPTER J TABLE J2.5 OF THE AISC MANUAL OF STEEL CONSTRUCTION.
     - 15) COMPLETE PENETRATION WELDS SHALL BE PROVIDED FOR ALL GROOVE WELDING UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
     - 16) STEEL COLUMN ANCHOR BOLTS SHALL BE TIGHTENED WITH 1/4 OF A FULL TURN AFTER SNUG TIGHT.
   - C. SEE DRAWING E03115-219-002 FOR CONNECTIONS FOR PIPE HANDRAIL.
   - D. CONNECTIONS FOR GRATING AND STAIR TREADS:
     - 1) ALL GRATING PANELS SHALL BE CONNECTED TO STEEL MEMBERS BY 1/4 INCH DIAMETER STUDS, COMPATIBLE NUTS AND SADDLE CLIPS. STUD AND SADDLE CLIP CONNECTIONS SHALL BE PROVIDED AT TWO LOCATIONS AT EACH END OF PANEL AND ONE CONNECTION AT EACH INTERMEDIATE SUPPORT. AS A MINIMUM SPACING, STUD AND SADDLE CLIP SHALL BE NO MORE THAN 3 FEET APART WHEN MEASURED PERPENDICULAR TO THE SPAN OF THE GRATING.
     - 2) GRATING STAIR TREADS SHALL BE CONNECTED TO STAIR STRINGERS WITH 3/8 INCH DIAMETER BOLTS CONFORMING TO ASTM A 307. STAIR TREADS SHALL BE CONNECTED WITH A MINIMUM OF 2 BOLTS PER EACH END.
   - E. SEE TECHNICAL SPECIFICATIONS 05311 AND 05313 FOR FASTENING OF STEEL ROOF AND STEEL FLOOR DECK TO STRUCTURAL STEEL PURLINS AND BEAMS.

CONCRETE WORK:

1. FURNISHING AND DELIVERY OF CONCRETE SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 03001.
2. CONCRETE MIX DESIGN:
   - A. LOCATION ———— ALL WORK
   - B. KODAK MIX NO ———— 43
   - C. DESIGN STRENGTH (PSI) ———— 4000
   - D. CEMENT TYPE ———— III (HIGH EARLY STRENGTH)
   - E. TOTAL AIR (PERCENT) ———— 6
   - F. AGE AT DESIGN STRENGTH (DAYS) ———— 7
   - G. ASTM C33 AGGREGATE GRADATION ———— 7
   - H. MAX W/C RATIO ———— 0.5
3. FORMWORK CONSTRUCTION AND CONCRETE PLACEMENT INCLUDING FINISHING, FINISHING TOLERANCES, CURING, PROTECTION, REPAIR FOR CONCRETE, AND COATINGS SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 03001.
4. ALL EXPOSED PROJECTED CORNERS SHALL BE PROVIDED WITH A 3/4 INCH CHAMFER UNLESS OTHERWISE NOTED ON THE DRAWINGS.
5. CONTROL JOINTS IN ELEVATED SLABS SHALL BE FORMED AND LOCATED AS SHOWN ON THE DRAWINGS.
6. FABRICATION AND DELIVERY OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 03001.
7. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.
8. DEVELOPMENT LENGTHS AND SPLICE LENGTHS FOR REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE:

BAR SIZE	MIN (A) SPACING (IN)	BAR POSITION (C)	STRAIGHT BARS: MIN COVER = 3/4" DEV (IN)	MIN COVER = 3/4" SPLICE (IN)	MIN COVER = 1 1/2" DEV (IN)	MIN COVER = 1 1/2" SPLICE (IN)	MIN COVER = 2" DEV (IN)	MIN COVER = 2" SPLICE (IN)	STD HOOK COVER (B) DEVELOPMENT (IN)
4	3	TOP	19	24	19	24	19	24	7
		OTHER	15	19	15	19	15	19	

(A) SPACING IS THE NOMINAL CENTER TO CENTER DISTANCE BETWEEN BARS BEING DEVELOPED OR BARS BEING SPLICED.
(B) MINIMUM COVER ON STANDARD HOOKS IS 2 1/2" SIDE COVER (NORMAL TO PLANE OF HOOK) AND 2" COVER ON THE 90 DEGREE LEG.
(C) TOP BARS ARE HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

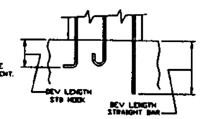


FIGURE 1

9. ALL SPLICES SHALL BE STAGGERED FOR ELEVATED FLOOR SLABS.
10. PLACEMENT OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 03001.

    UNLESS OTHERWISE NOTED ON THE DRAWING, MINIMUM CONCRETE COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:
    - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH ———— 3"
    - CONCRETE EXPOSED TO EARTH OR WEATHER
      - #6 THROUGH #18 BARS ———— 2"
      - #5 BARS, W31 OR D31 WIRE, AND SMALLER ———— 1 1/2"
    - CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND
      - SLABS, WALLS AND JOISTS:
        - #14 AND #18 BARS ———— 1 1/2"
        - #11 BAR AND SMALLER ———— 3/4"
      - BEAMS, GIRDERS AND COLUMNS: PRIMARY REINFORCEMENT, TIES, STIRRUPS AND SPIRALS ———— 1 1/2"
11. WELDING OF REINFORCING STEEL IS NOT PERMITTED FOR ANY REASON.
12. EXPANSION JOINTS SHALL CONSIST OF A FILLER CONFORMING TO ASTM D 1751 OR ASTM D 1752 TYPE II AND A SEALER CONFORMING TO ASTM D 1850 OR ASTM D 1190.
13. ANCHOR BOLTS AND OTHER STEEL EMBEDMENTS SHALL BE POSITIONED AS SHOWN ON THE DRAWINGS. TOLERANCES FOR LOCATING ANCHOR BOLTS AND EMBEDDED ITEMS SHALL NOT VARY FROM THE DIMENSIONS SHOWN BY MORE THAN THE FOLLOWING:
    - A. 1/8 INCH CENTER TO CENTER OF ANY TWO BOLTS WITHIN AN ANCHOR BOLT GROUP.
    - B. 1/4 INCH CENTER TO CENTER OF ADJACENT ANCHOR BOLT GROUPS.
    - C. 1/2 INCH IN ELEVATION FOR THE TOP OF ANCHOR BOLTS.
    - D. 3/8 INCH FROM THEORETICAL LOCATION FOR ALL OTHER EMBEDDED ITEMS.
14. GROUT FOR SETTING OF ANCHOR BOLTS AND DOWELS IN DRILLED HOLES SHALL BE PREPACKAGED NON-SHRINK GROUT IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 03631. NON-SHRINK GROUT SHALL BE MASTERFLOW 928 AS MANUFACTURED BY MASTER BUILDERS COMPANY OR EQUAL.
15. "ROUGHEN CONCRETE" AS SHOWN ON DRAWINGS INDICATES A CONSTRUCTION JOINT WITH SURFACES ROUGHENED TO A 1/4 INCH AMPLITUDE.
16. CONTRACTOR TO ASSURE THAT ALL EMBEDDED ITEMS/UNDERGROUND UTILITIES (GROUNDING, CONDUITS, PIPING, ETC) ARE IN PLACE BEFORE PLACING CONCRETE.

GILBERT/COMMONWEALTH, INC. | ACAD/ | D

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

SCALE: NONE

DRAWN: 5/13/96 · DLD · 6/17/96 · W. JOHNSON

GENERAL NOTES
MICRO-FUEL MILL BLDG ADDITION
STRUCTURAL

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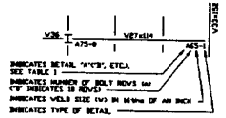
E03115-219-001 B

E03115-219-002

BEAM AND CHANNEL END CONNECTIONS

NOTES

1. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE 3/4" DIA. A325X.
2. ALL BOLT HOLES SHALL BE 13/16" DIA.
3. ALL WELDS SHALL BE MADE USING E70XX ELECTRODES
4. SET BACK DIMENSION (dim) SHALL BE 1/8"



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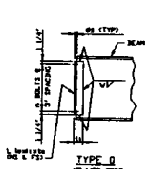
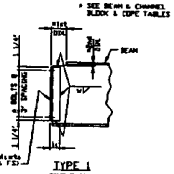
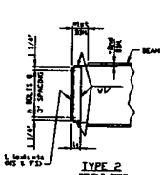
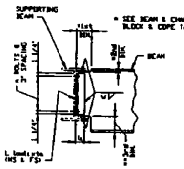








END CONNECTION DETAILS AND TYPES

CHANNEL COPES

MEMBER SIZE		COPE SIZE
C15	50 40 33.9	3 1/2x6 1/2
C12	30 25 20.7	3 1/2x6 1/2
C10	30 25 15.3	3x6 1/4
C9	25 20 13.4	3x6 1/4
C8	18.75 13.75 11.5	2 1/2x6

BEAM BLOCKS

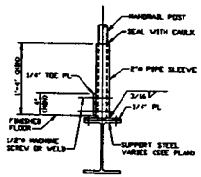
MEMBER SIZE		BLOCK SIZE
W36	300 280 260 245 230	2nd BM 8 1/2x2 3/4 1st BM
W36	210 194 182 170 160	6 1/4x2 3/4
W36	150 135 120 110 100	6 1/4 x2
W33	263 241 221 201 169	8 1/2x2 3/4
W33	152 141 130 118 106	6 1/4x1 3/4
W30	191 173 132 124 116	7 3/4x2 1/4
W30	108 99 90 84 74	5 1/8x1 3/4
W27	194 178 161 146 129	7 1/4x2
W27	114 102 94 84 74	5 1/2x2 3/4
W24	176 162 146 131 117	7x2
W24	104 94 84 76 68	7x1 3/4
W24	62 55 48 43 39	4 3/4x1 1/2
W24	34 31 28 26 24	4x1

MEMBER SIZE		BLOCK SIZE
W21	132 122 111 101 93	6 3/4x1 3/4
W21	83 73 68 62 57	4 1/2x1 1/4
W21	50 44 97	4x1
W18	86 76 71	6x1 3/4
W18	65 60 55 50 46	4 1/2x1 1/4
W18	40 35 89	3 1/2x1
W16	77 67 58	5 3/4x1 3/4
W16	50 45 40	4 1/4x1 1/4
W16	36 31 89	3 1/2x1
W14	74 68 61	7 1/2x1 1/2
W14	53 48 43	5 1/2x1 1/4
W14	38 34 30	4x1

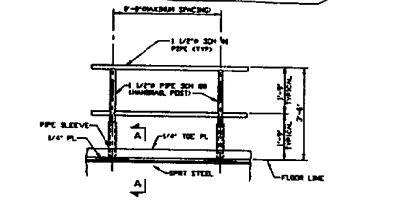
MEMBER SIZE		BLOCK SIZE
W14	26 24 22	4x1
W14	20 22	3 1/2x1
W12	36 30 26 22 19	4 1/2x1 1/4
W12	16 14 12 99 87	4x1
W12	79 72 65 58 53	2 1/2x3/4
W10	49 45 39 33 30	4 1/2x1 1/4
W10	26 22 19 17 15	3 1/2x1
W10	12 77 68 60 54	2 1/2x3/4
W8	48 40 35 31 28	4 1/2x1 1/4
W8	24 21 18 15 13	4x1
W8	10 67 58 48 40	3 1/2x1
W6	35 25 20 16 15	2 1/2x3/4

DETAIL	CONNECTION ANGLE DIMENSIONS			GAGE
	la	li	lva	
A	3 1/2	3	3/8	5
B	4	3 1/2	3/8	5 1/2
C	4	3 1/2	1/2	5 1/2
D	4	4	3/8	5 1/2
E	4	4	1/2	5 1/2
F	5	3 1/2	5/8	7 1/2
G	5	3 1/2	3/4	7 1/2

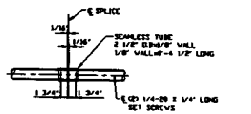
TABLE 1



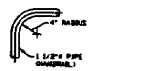
SECTION A-A



TYPICAL REMOVEABLE HANDRAIL DETAIL



REMOVEABLE HANDRAIL SPLICE DETAIL



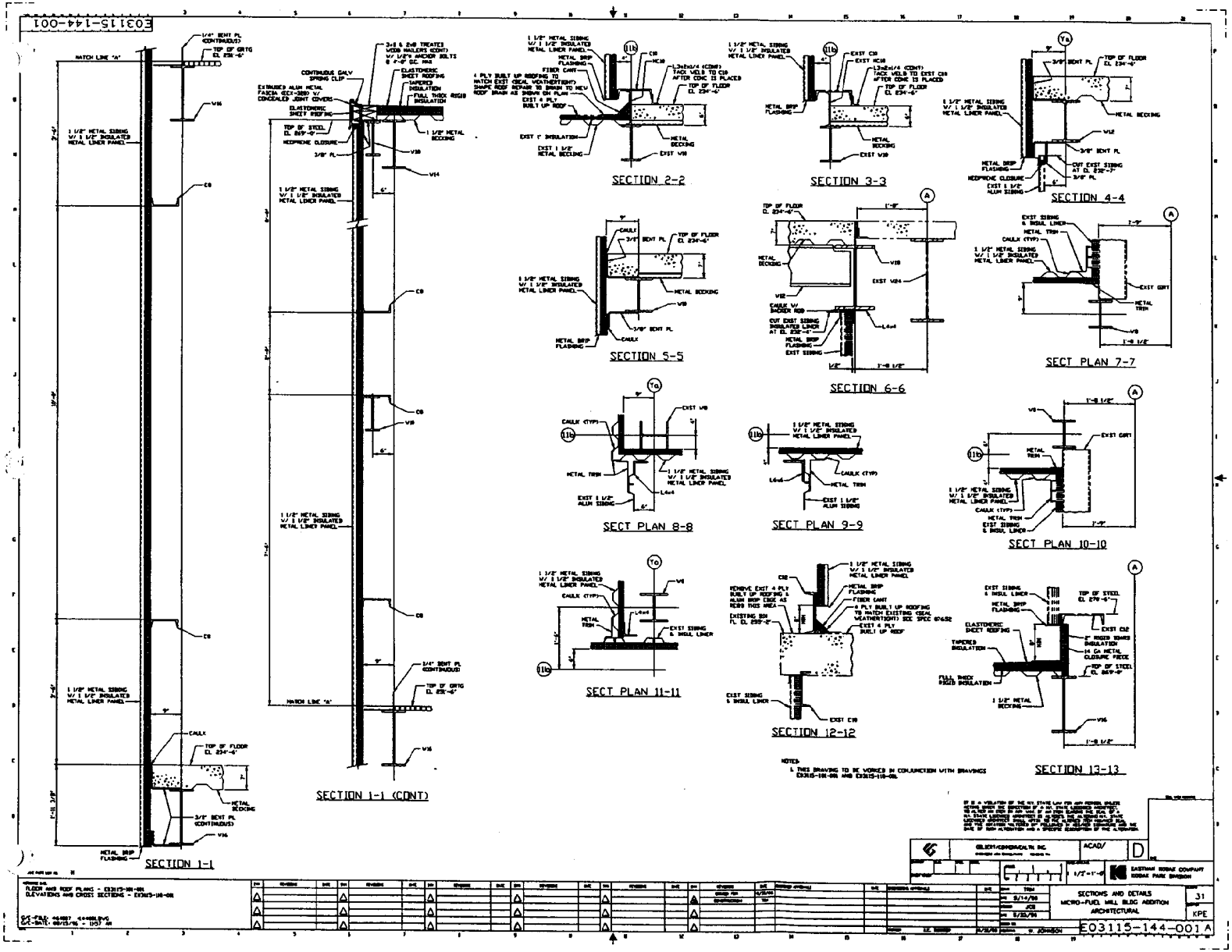
PLAN - CORNER DETAIL

NOTES:
1. FOR GENERAL NOTES, SEE DRAWING E03115-219-001.
2. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DRAWING E03115-219-001.

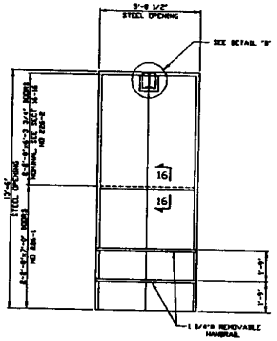
SELECT/KENNEDY PA, INC.	ACAD/	D	
1 1/2"=1'-0"	EASTMAN KODAK COMPANY KODAK PARK DIVISION		
9/15/96	STANDARD FRAMING CONN DETS MICRO-FUEL MILL BLDG ADDITION STRUCTURAL	31	
6/18/96		KPE	
E03115-219-002B			

FLOOR AND ROOF FRAMING PLANS - E03115-219-001

NORTH/SOUTH CROSS SECTION
EAST/WEST CROSS SECTION
EAST ELEVATION
NORTH ELEVATION
WEST ELEVATION
E03115-110-001
E03115-110-001A

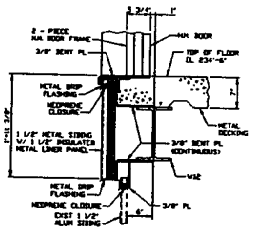

E03115-144-001
SECTION 1-1
SECTION 1-1 (CONT)
SECTION 2-2
SECTION 3-3
SECTION 4-4
SECTION 5-5
SECTION 6-6
SECT PLAN 7-7
SECT PLAN 8-8
SECT PLAN 9-9
SECT PLAN 10-10
SECT PLAN 11-11
SECTION 12-12
SECTION 13-13
NOTES:
1. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DRAWINGS E03115-101-001 AND E03115-116-001.
ACAD/
D
1/2"=1'-0"
EASTMAN KODAK COMPANY
KODAK PARK DIVISION
SECTIONS AND DETAILS
MICRO-FUEL MILL BLDG ADDITION
ARCHITECTURAL
31
KPE
E03115-144-001A

E03115-144-002

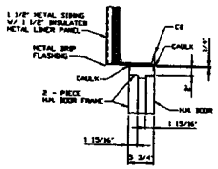


DOOR NOS. 226-1 & 226-2

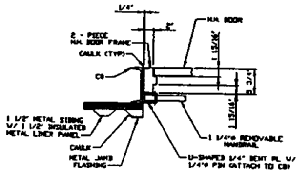
SCALE : 1/2" = 1'-0"



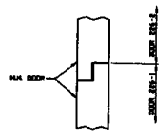
DOOR THRESHOLD DETAIL



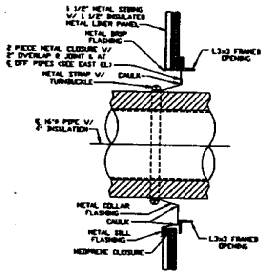
DOOR HEAD DETAIL

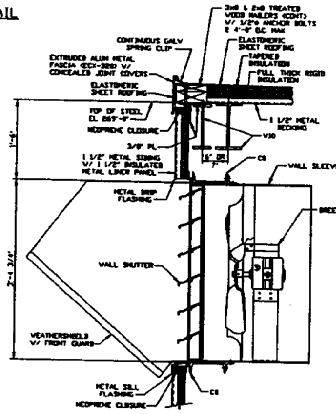


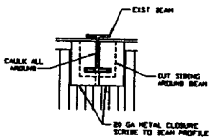
DOOR JAMB DETAIL

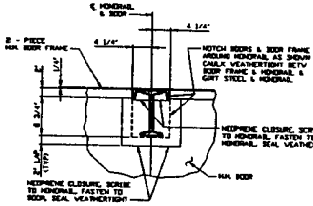


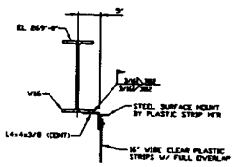
SCALE : 6" = 1'-0"











LIST OF HARDWARE FOR DOORS 226-1 & 226-2

TWO (2) PAIR OF DOORS - ONE ABOVE THE OTHER - FOR MOVEMENT OF EQUIPMENT INTO OR OUT OF ROOM NO 226 TO SHARE V5A MONORAIL.

HARDWARE SET NO 1 - DOOR 226-1, ONE (1) PAIR OF 2'-8"x7'-0"x1 3/4" STEEL DOORS

3 PAIR HINGES, FT3 168, 4 1/2"x4 1/2"x#8 (STANLEY)
2 PAIR HEAVY DUTY SURFACE FLUSH BOLTS, NO 450 (IVES)
1 PAIR HEAVY DUTY SURFACE BOLTS AS SWITCH DOOR LINK TO PAIR OF DOORS ABOVE, NO 450 (IVES)
1 SPLIT ASTRAGAL W/ COMPRESSIBLE NEOPRENE TUBE MEETING STILE GASKET, NO 2894 (ZERO)
2 PAIR HEAVY DUTY FLOOR STOP AND HOLDER, NO 446 (IVES)
1 SET OF SURFACE MOUNTED WEATHERSTRIPPING, EACH LEAF - JAMBS AND HD 307 (ZERO), HEAD NO 315 (ZERO)
1 PAIR OF SILL PROTECTION, SURFACE MOUNTED AUTOMATIC DOOR BOTTOMS, NO 361A (ZERO)
1 PAIR BUNNY TRIPLEVER W/ ESCUTCHEON PLATE, EACH LEAF

HARDWARE SET NO 2 - DOOR 226-2, ONE (1) PAIR OF 2'-8"x6'-3 3/4"x1 3/4" STEEL DOORS (FABRICATED TO ADMIT PASSAGE OF MONORAIL)

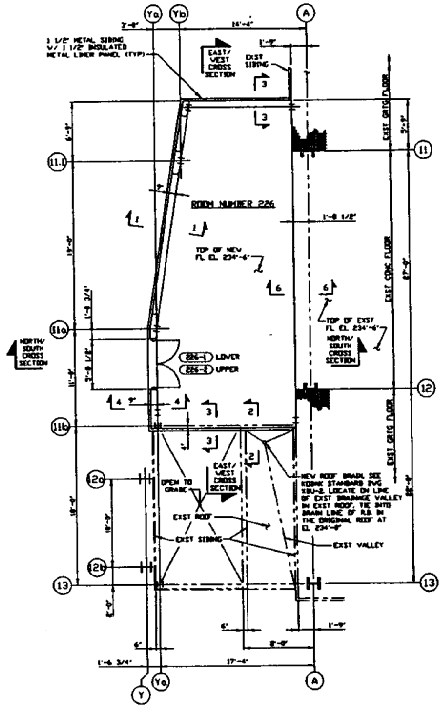
3 PAIR HINGES, FT3 168, 4 1/2"x4 1/2"x#8 (STANLEY)
1 PAIR SPRING LOADED SURFACE MOUNTED HEAD BOLTS W/ PULL CHAINS AND RING FOR REMOTE RELEASE
1 SPLIT ASTRAGAL W/ COMPRESSIBLE NEOPRENE TUBE MEETING STILE GASKET, NO 2894 (ZERO)
1 SET OF SURFACE MOUNTED WEATHERSTRIPPING EACH LEAF - JAMBS AND HD 307 (ZERO), HEAD NO 315 (ZERO)
BOTTOM DOOR BOLT SHARED WITH HARDWARE SET NO 1

NOTES:
1. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DRAWINGS E03115-100-006 AND E03115-110-006.

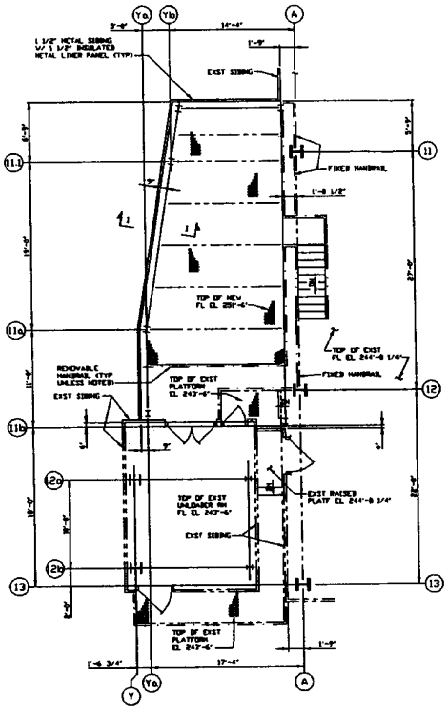
FLOOR AND ROOF PLANS - E03115-100-004
ELEVATIONS AND CROSS SECTIONS - E03115-110-006

GILBERT/COMMONWEALTH, INC.
ACAD/
D
1 1/2"=1'-0"
EASTMAN KODAK COMPANY KODAK PARK DIVISION
SECTIONS AND DETAILS
MICRO-FUEL MILL BLDG ADDITION
ARCHITECTURAL
31
KPE
E03115-144-002 A

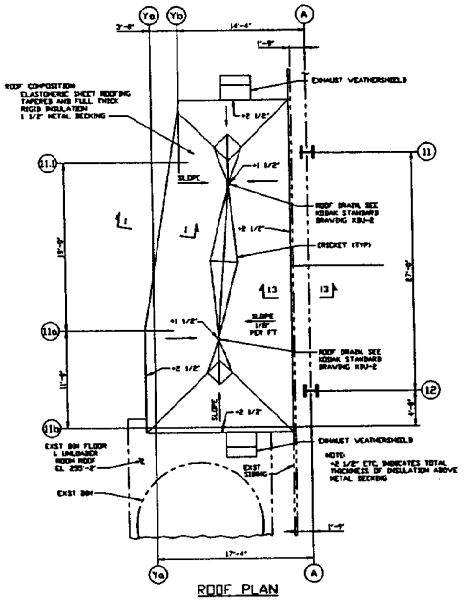
E03115-101-001



FLOOR PLAN EL 234'-6"



FLOOR PLAN EL 251'-6"



ROOF PLAN

KODAK STANDARDS REQUIRED FOR THIS DRAWING

KBU-2 - VAPE BRAIN WITH WATER RETAINING BEVICE FOR METAL DECK

NOTES:
1. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DRAWINGS E03115-110-001, E03115-144-001 AND E03115-144-002.
2. ARCHITECTURAL CRITERIA INDICATES BY THE FOLLOWING:
   a. OFFICIAL COMPILATION OF CODES AND REGULATIONS OF THE STATE OF NEW YORK
   b. USE CLASSIFICATION - CONTIGUOUS BUILDING, 7934 sq.ft. USE GROUP C&I, INDUSTRIAL LOW HAZARD
   c. CONSTRUCTION CLASSIFICATION - CONTIGUOUS BUILDING, 7941 SQ.FT. TYPE II, NONCOMBUSTIBLE
   d. DEAD AND LIVE LOADS - SEE STRUCTURAL DESIGN CRITERIA
   e. APPLICABLE KODAK ENGINEERING STANDARDS DRAWINGS AND SPECIFICATIONS

IT IS A VIOLATION OF THE NY STATE LAW FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A NY STATE LICENSED ENGINEER, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE SEAL OF A NY STATE LICENSED ENGINEER IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

GILBERT/COMMONWEALTH, INC. | ACAD/ | D | 1/4"=1'-0" | EASTMAN KODAK COMPANY KODAK PARK DIVISION

SHEETS AND CROSS SECTIONS - E03115-110-001
SECTIONS AND DETAILS - E03115-144-001
SECTIONS AND DETAILS - E03115-144-002
FLOOR AND ROOF PLANS - STRUCTURAL - E03115-210-001

C/C FILE: 464887 HOWELL.DWG
C/C DATE: 10/25/96 - 1049 AM

NO.	REVISIONS	BY	DATE
1			4/30/96
2			4/24/96

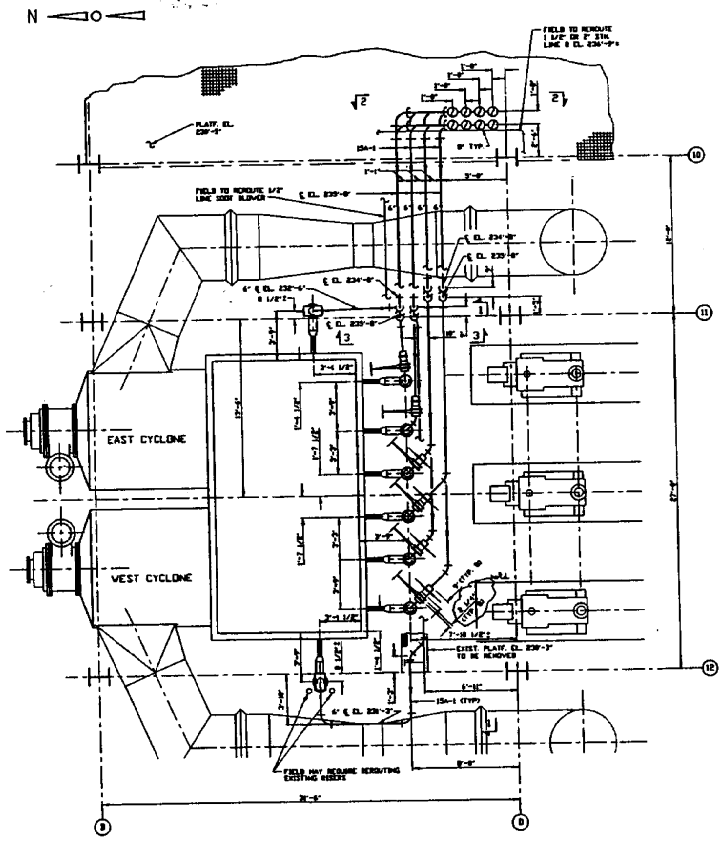
FLOOR AND ROOF PLANS
MICRO-FUEL MILL BLDG ADDITION
ARCHITECTURAL

31

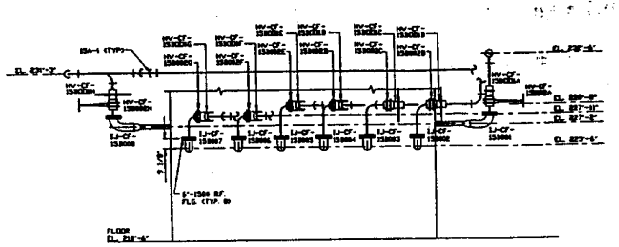
KPE

E03115-101-001A

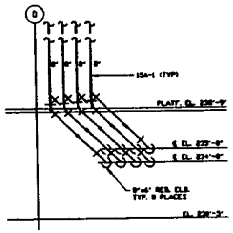
E03115-333-019A



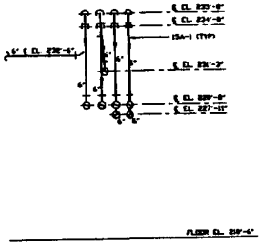
PLAN AT EL. 218'-6"



SECTION 1-1



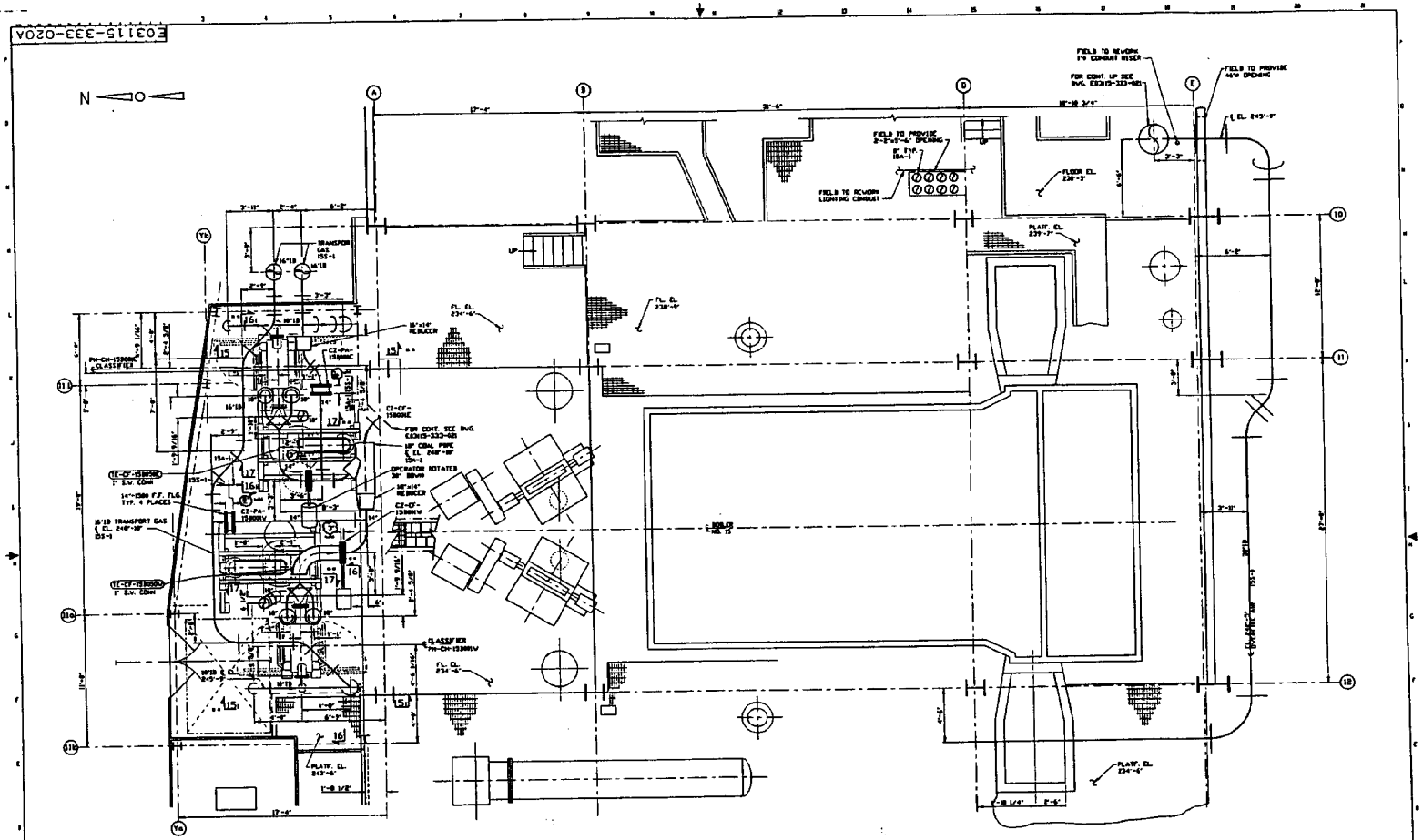
SECTION 2-2



SECTION 3-3

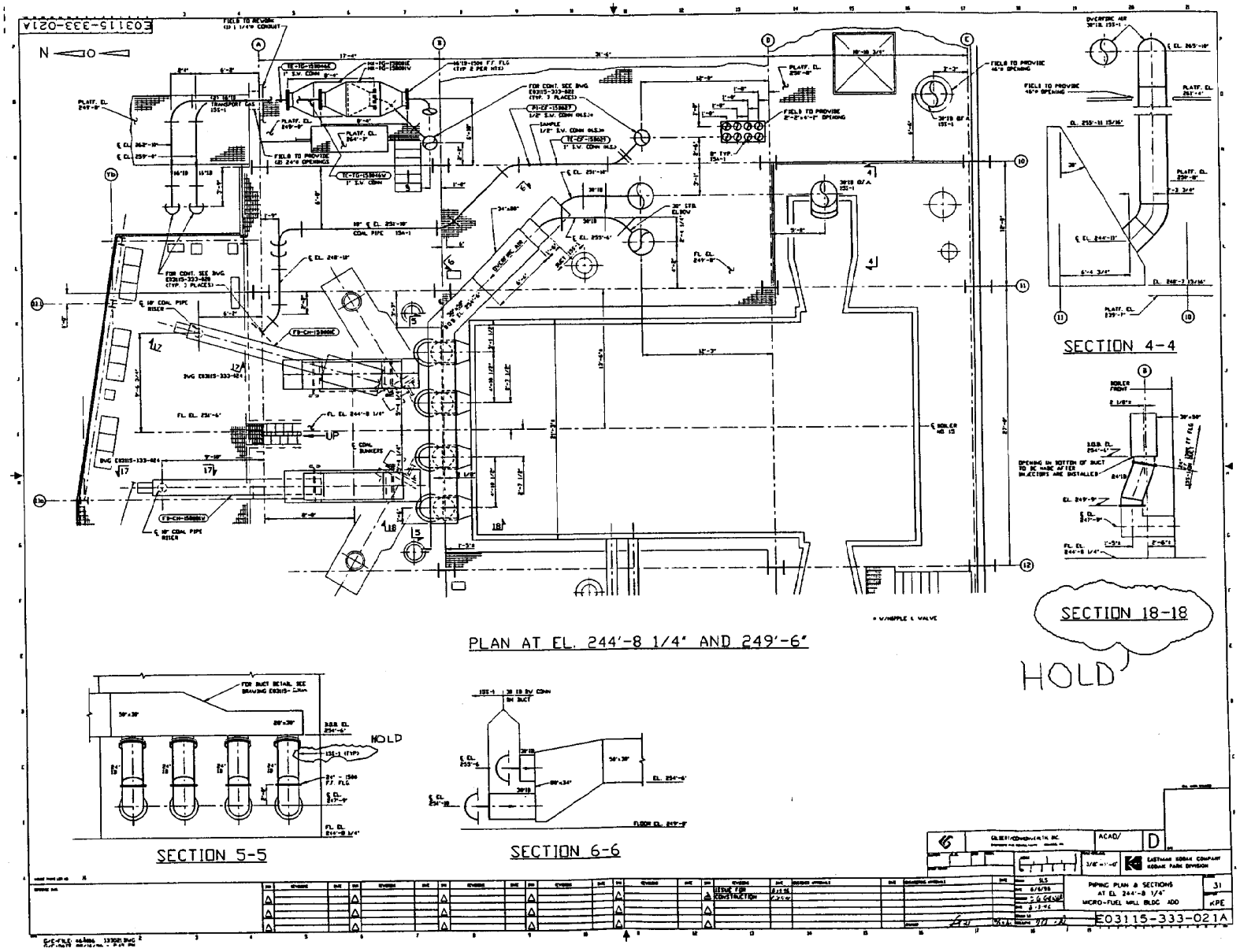
PIPING PLAN & SECTIONS
OPERATING FLR. EL. 218'-6"
MICRO-FUEL MILL BLDG. ADD.

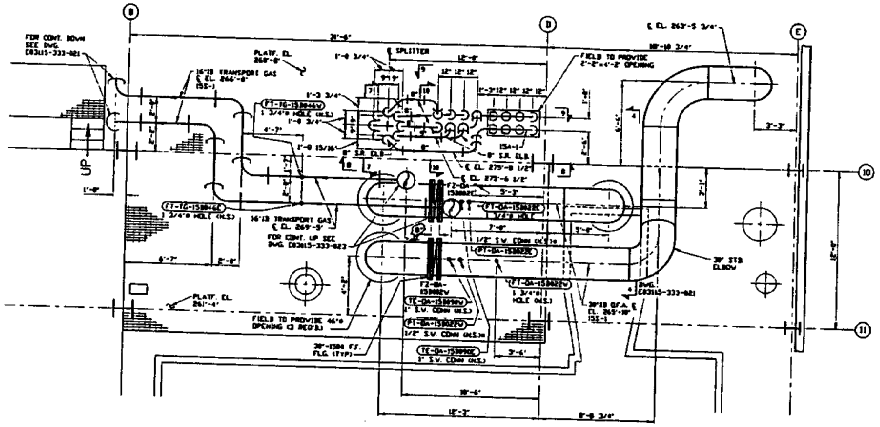
E03115-333-019A



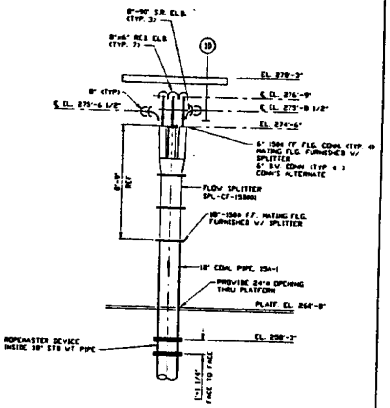
PLAN AT EL. 234'-6" & 238'-9"

EASTMAN KODAK COMPANY ROCHESTER PARK DIVISION	ACAD/	D	
	1/8"=1'-0"		
PIPING PLAN AT EL. 234'-6" MICRO-FUEL MILL BLDG. ADD.			31
			KPE
			E03115-333-020A

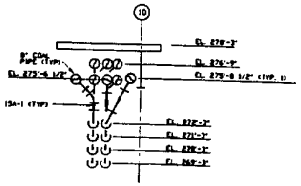

E03115-333-021A
N
PLAN AT EL. 244'-8 1/4" AND 249'-6"
SECTION 4-4
SECTION 18-18
HOLD
SECTION 5-5
SECTION 6-6
PIPING PLAN & SECTIONS AT EL. 244'-8 1/4"
MICRO-FUEL MILL BLDG 100
E03115-333-021A



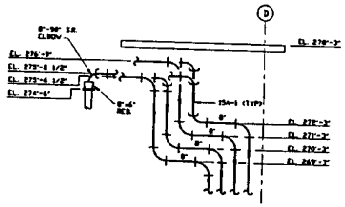
PLAN AT EL. 261'-4"



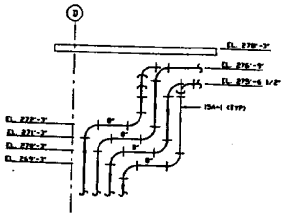
SECTION 7-7



SECTION 10-10



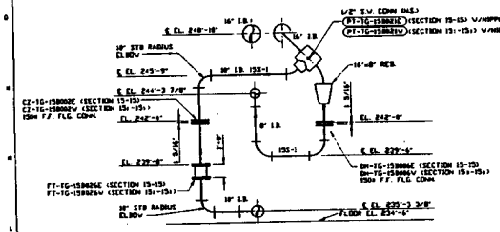
SECTION 8-8



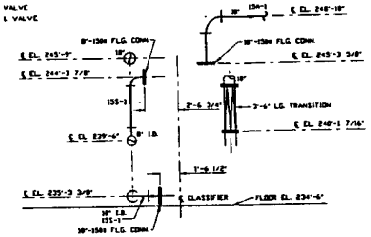
SECTION 9-9

ACAD/	D		
3/8"=1'-0"		EASTMAN KODAK COMPANY ROCHESTER, NEW YORK	
PIPING PLAN & SECTIONS AT EL. 261'-4" MICRO-FUEL MILL BLDG. ADD		31	KPE
E03115-333-022A			

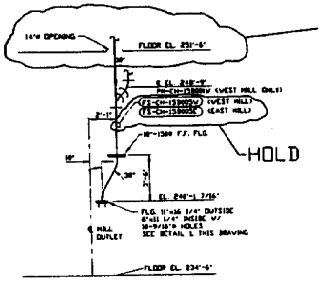
E03115-333-024B



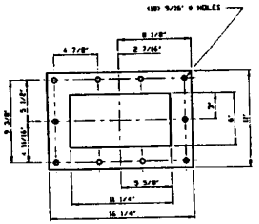
SECTION 15-15 (SHOWN)
SECTION 15₁-15₁ (SIM.)



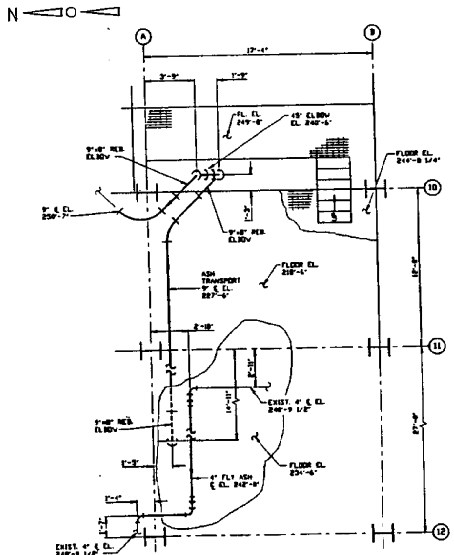
SECTION 16-16
SECTION 16₁-16₁ (SIM.)



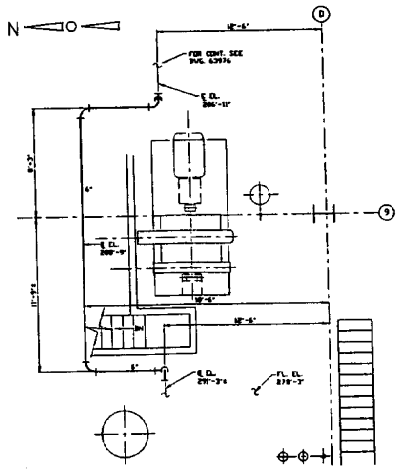
SECTION 17-17



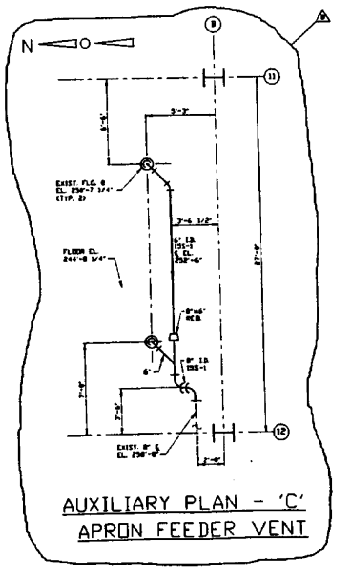
DETAIL 1



AUXILIARY PLAN - 'A'
ASH TRANSPORT & FLY ASH TO SILO PIPING

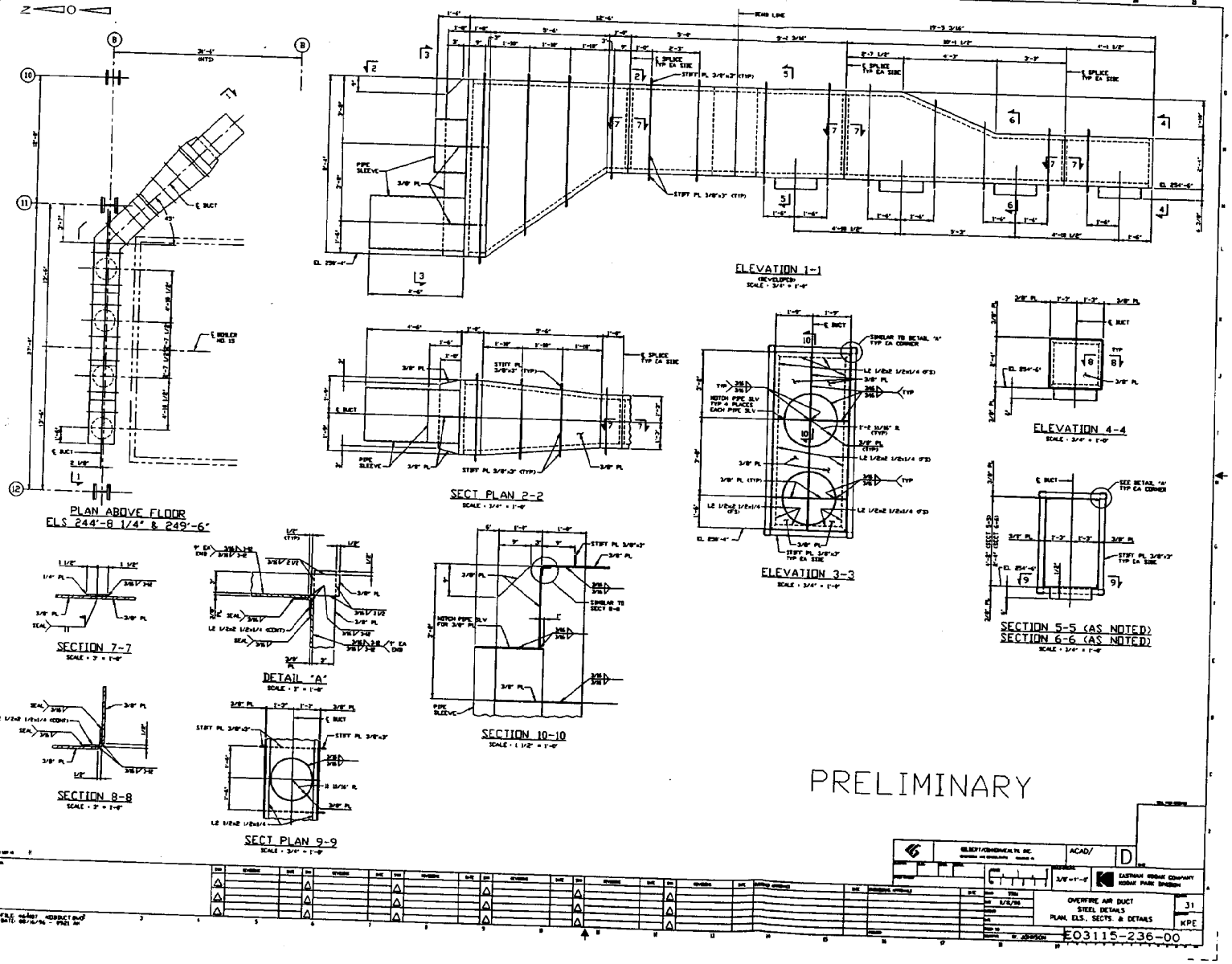


AUXILIARY PLAN - 'B' - EL. 278'-3"
STAGE HEATER DRAIN

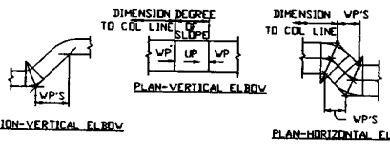


AUXILIARY PLAN - 'C'
APRON FEEDER VENT

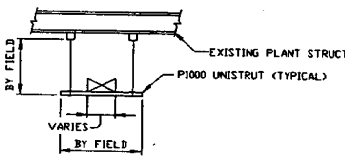
GILBERT/COMMONWEALTH, INC.
ACAD/ D
EASTMAN KODAK COMPANY
KODAK PARK DIVISION
PIPING SECTION & DETAILS
MICRO-FUEL MILL BLDG. ADD
31
KPE
E03115-333-024B


E03115-236-00
PLAN ABOVE FLOOR
ELS 244'-8 1/4" & 249'-6"
ELEVATION 1-1
SECT PLAN 2-2
ELEVATION 3-3
ELEVATION 4-4
SECTION 5-5 (AS NOTED)
SECTION 6-6 (AS NOTED)
SECTION 7-7
DETAIL 'A'
SECTION 8-8
SECTION 10-10
SECT PLAN 9-9
PRELIMINARY
OVERFIRE AIR DUCT
STEEL DETAILS
PLAN, ELS., SECTS. & DETAILS
E03115-236-00

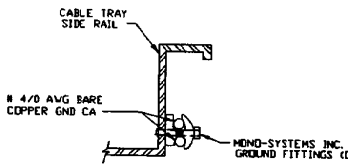
D03115-522-001A



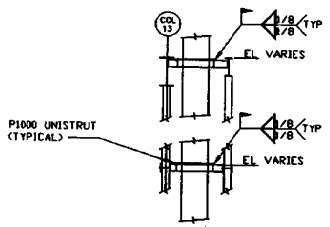
'DETAIL A' STANDARD DETAILS
NO SCALE



'DETAIL "D" TYPICAL TRAY TRAPEZE SUPPORT
NO SCALE



'DETAIL "B" TYPICAL TRAY SIDE RAIL GROUNDING
NO SCALE



DETAIL 'C'
VERTICAL TRAY SUPPORT

BILL OF MATERIAL *

	ITEM NO.	QTY.	DESCRIPTION	MANUFACTURE/ CATALOG NO.
A	1.	8 EA.	STRAIGHT SECTION 24"W X 6"D X10' LONG VENTILATED TROUGH (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777-STR1024A
A	2.	22 EA.	STRAIGHT SECTION 12"W X 6"D X10' LONG VENTILATED TROUGH (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777-STR1012A
A	3.	5 EA.	STRAIGHT SECTION 24"W X 6"D X10' LONG VENTILATED TROUGH (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777-STR1024A
A	4.	48	DIVIDER STRIP, STRAIGHT SECTION, 12' LONG (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3-12S
A	5.	1	30° VERTICAL ELBOW, INSIDE BEND 24"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PT-6-777VIR3012-24-A
A	6.	1	30° VERTICAL ELBOW, OUTSIDE BEND 24"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PT-6-777VOR3012-24-A
A	7.	3	90° HORIZONTAL ELBOW, 24"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777HL9012-24-A
	8.	3	90° HORIZONTAL ELBOW, 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777HL9012-12-A
	9.	2	45° HORIZONTAL ELBOW, 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777HL4512-12-A
	10.	4	30° HORIZONTAL ELBOW, 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777HL3012-12-A
A	11.	1	30° VERTICAL ELBOW, INSIDE BEND 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PT-6-777VIR3012-12-A
A	12.	1	30° VERTICAL ELBOW, OUTSIDE BEND 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PT-6-777VOR3012-12-A
A	13.	5 EA.	PEAKED COVER, 24"W X 15" PEAK X 12' LONG (HDGAF)	MONO-SYSTEMS, INC. CAT. NO. CP24A
A	14.	8 EA.	FLAT COVER, STRAIGHT SECTION 24"W X 12' LONG (MPG)	MONO-SYSTEMS, INC. CAT. NO. CSCP24A
A	15.	22 EA.	FLAT COVER, STRAIGHT SECTION 12"W X 12' LONG (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSC12A
	16.	3	FLAT COVER, 90° HORIZ. ELBOW 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCHL901212-A
	17.	2	FLAT COVER, 45° HORIZ. ELBOW 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCHL451212-A
	18.	4	FLAT COVER, 30° HORIZ. ELBOW 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCHL301212-A
	19.	1	FLAT COVER, 30° VERTICAL ELBOW, INSIDE BEND, 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCIVR301212-A
	20.	1	FLAT COVER, 30° VERTICAL ELBOW, OUTSIDE BEND, 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCOVR301212-A
A	21.	1 PR.	EXPANSION CONNECTOR FOR 6"D TRAY (PROVIDES 1" EXPANSION) (HDGAF)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777-ESP-A
	22.	180 EA.	CLAMP, GROUND WIRE, CABLE TRAY, FOR #4/0 AWG WIRE	MONO-SYSTEMS, INC. CAT. NO. VCP-551
	23.	AS REQD.	STRAIGHT SECT. UNISTRUT SUPPORT, HOT-DIPPED GALVANIZED FINISH, 12' GA STEEL, 1-5/8"W X 1-5/8"D X 20' LONG CHANNEL SERIES	UNISTRUT CO. CAT. NO. P1000
	24.	AS REQD.	3/8" THREADED ROD, 20' LONG	BY FIELD
	25.	3	FLAT COVER, 90° HORIZ. ELBOW 24"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCHL901224-A
A	26.	1	DIVIDER STRIP, 30° INSIDE VERTICAL ELBOW (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3IVR3012-A
A	27.	1	DIVIDER STRIP, 30° OUTSIDE VERTICAL ELBOW (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3OVR3012-A
	28.	2	DIVIDER STRIP, 45° INSIDE VERTICAL ELBOW (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3IVR4512-A
	29.	2	DIVIDER STRIP, 45° OUTSIDE VERTICAL ELBOW (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3OVR4512-A
	30.	1	DIVIDER STRIP, 30° INSIDE VERTICAL ELBOW (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3IVR3012-A
	31.	1	DIVIDER STRIP, 30° OUTSIDE VERTICAL ELBOW (ALUM)	MONO-SYSTEMS, INC. CAT. NO. BS3OVR3012-A
A	32.	1	FLAT COVER, 30° VERTICAL ELBOW, INSIDE BEND, 24"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCVIR301224-A
A	33.	1	FLAT COVER, 30° VERTICAL ELBOW, OUTSIDE BEND, 24"WX12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCOVR301224-A
	34.	2	45° VERTICAL ELBOW, INSIDE BEND 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777-VIR4512-12-A
	35.	2	45° VERTICAL ELBOW, OUTSIDE BEND 12"W X 6"D X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. PV-6-777-VOR4512-12-A

* QUANTITIES INDICATED ARE APPROXIMATE, CONTRACTOR TO PROVIDE ALL MATERIALS REQUIRED FOR A COMPLETE TRAY SYSTEM.

BILL OF MATERIAL *

ITEM NO.	QTY.	DESCRIPTION	MANUFACTURE/ CATALOG NO.
36.	2	FLAT COVER, 45° VERTICAL ELBOW, INSIDE BEND, 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCVIR451212-A
37.	2	FLAT COVER, 45° VERTICAL ELBOW, OUTSIDE BEND, 12"W X 12" RAD (ALUM)	MONO-SYSTEMS, INC. CAT. NO. CSCVOR451212-A
38.			
39.			
40.			

FLOOR ELEVATION LEGEND		
FLOOR DESIG.	DESCRIPTION	ELEV.
B	BASEMENT	202'-4"
O	OPERATING FLOOR	218'-6"
C	COAL CONDITIONER	234'-6"
A	APRON FEEDER	244'-8"
T	ATTEMPERATOR	261'-4"
P	PRECIPITATOR	272'-3"
F	FAN DECK	298'-6"
R	ROOF	310'-4"

NOTES:
1. FIELD TO SUPPLY AND INSTALL ALL ITEMS SHOWN IN ACCORDANCE WITH APPLICABLE KODAK STANDARDS, AND THE SCOPE OF WORK.
2. ALL DIGITAL AND ANALOG TRAYS SHALL HAVE 12" RADII BENDS.
3. ALL TRAY ELEVATIONS ARE TO OUTSIDE BOTTOM OF TRAYS.
4. ALL DIMENSIONS ARE TO INSIDE (SIDEWALL) FACE OR OUTSIDE BOTTOM OF TRAYS.
5. ALL DIMENSIONS TO TRAY ANGLES ARE TO THEORETICAL SHARP CORNERS (WORKING POINTS).
6. ALL DIGITAL AND ANALOG TRAYS SHALL BE "LADDER" TYPE CONSTRUCTION WITH 6" RUNG SPACING.
7. ALL INDOOR TRAYS TO BE ALUMINUM.
8. ALL OUTDOOR TRAYS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION & HAVE HOT DIPPED GALVANIZED, PEAKED STEEL COVERS.
9. MAXIMUM SPACING OF HORIZONTAL AND VERTICAL TRAY SUPPORTING HANGERS SHALL BE 10'-0".
10. MANUFACTURER SHALL PROVIDE SUFFICIENT FASTENER HARDWARE OF PROPER SIZE WITH PROJECTIONS OUTSIDE THE TRAYS, TO FASTEN SIDE AND BOTTOM CONNECTION PLATES. TRAY SPLICES SHALL BE BOLTED TYPE, COATED WITH AN ANTI-CORROSION JOINT COMPOUND BEFORE INSTALLATION, TO PROVIDE ELECTRICAL CONTINUITY.
11. ALL FIELD CUTS, DAMAGED OR MARRED GALVANIZED SURFACES SHALL BE PAINTED WITH A VENDOR APPROVED COATING.
12. TRAYS SHALL BE IDENTIFIED EITHER BY PLATES OR BY SUITABLE PRINTED OR STENCILED LETTERS. CONTRACTOR SHALL IDENTIFY TRAYS BY EITHER ANALOG OR DIGITAL AS SHOWN ON TRAY DRAWINGS AT BOTH ENDS & AT INTERVALS NOT EXCEEDING 50 FEET.
13. ALL DIMENSIONS SHOWN ON THE VERTICAL TRAY RUNS ARE TO THE BOTTOM (BACK) OF TRAY.
14. A #4/0 AWG BARE COPPER GROUND CABLE SHALL BE CONNECTED TO EACH 12 FOOT SECTION OF LOWER VOLTAGE & INSTRUMENT TRAYS AS SHOWN IN THE TYPICAL GROUNDING DETAIL ON THIS DWG. WHERE TRAYS DO NOT PHYSICALLY TOUCH, OR A GAP IS PRESENT A #4/0 AWG BARE COPPER BONDING JUMPER SHALL BE INSTALLED.
15. THIS TRAY DESIGN IS BASED ON A 2 INCH OFFSET.
16. CONTRACTOR TO VERIFY ALL TRAY DIMENSIONS AND LOCATIONS PRIOR TO INSTALLATION.
17. INTERFERENCES WITH OTHER TRADES ENCOUNTERED DURING INSTALLATION ARE TO BE RESOLVED WITH KODAK ELECTRICAL CONSTRUCTION, OR THEIR DESIGNATED REPRESENTATIVE BEFORE CHANGES TO THE ORIGINAL DESIGN WILL BE PERMITTED.
18. ALL TRAY FITTINGS SHOWN ADJACENT TO ONE ANOTHER (NOT DIMENSIONED) ARE TO BE CONSIDERED FITTING TO FITTING WITH OFFSETS.
19. ALL CABLE TRAY PENETRATIONS THROUGH CEILINGS, FLOORS & WALLS SHALL BE PACKED AND SEALED AFTER CABLE INSTALLATION. SEALS SHALL BE FIRE-RESISTIVE MATERIAL PER KODAK STANDARDS.
20. CONTRACTOR SHALL USE EXPANSION CONNECTORS AS REQUIRED, EVEN THOUGH NOT SHOWN ON DWGS.
21. CONTRACTOR SHALL USE ADDITIONAL SPLICE CONNECTORS WHENEVER TRAYS AND/OR TRAY FITTINGS ARE CUT.
22. CONTRACTOR TO SUPPLY AND USE WEATHER-RESISTANT CABLE TIES AT INTERVALS NOT TO EXCEED 18 INCHES ALONG THE LENGTH OF ALL VERTICAL DROPS. "KELLEMS GRIPS" SHALL BE USED FOR SUPPORT OF ALL CABLES AT THE TOP OF ALL VERTICAL DROPS 40 FEET OR LONGER.
23. EASTMAN KODAK CO. TO REVIEW CABLE TRAY BILL OF MATERIAL WITH MONO SYSTEMS INC. REPRESENTATIVE PRIOR TO PURCHASE.

REVISIONS	STN	DATE	CUSTOMER APPROVALS	DATE
REVISED PER TRAY SUPPLIERS COMMENTS	B	8/8/96 R.COLLER		

ENGINEERING APPROVALS — DATE

DRAWN V.J. KOPPENA 6/96 — CHECKED W. JOHNSON

GILBERT/COMMONWEALTH, INC. — ACAD/ D

SCALE: NONE

EASTMAN KODAK COMPANY KODAK PARK DIVISION

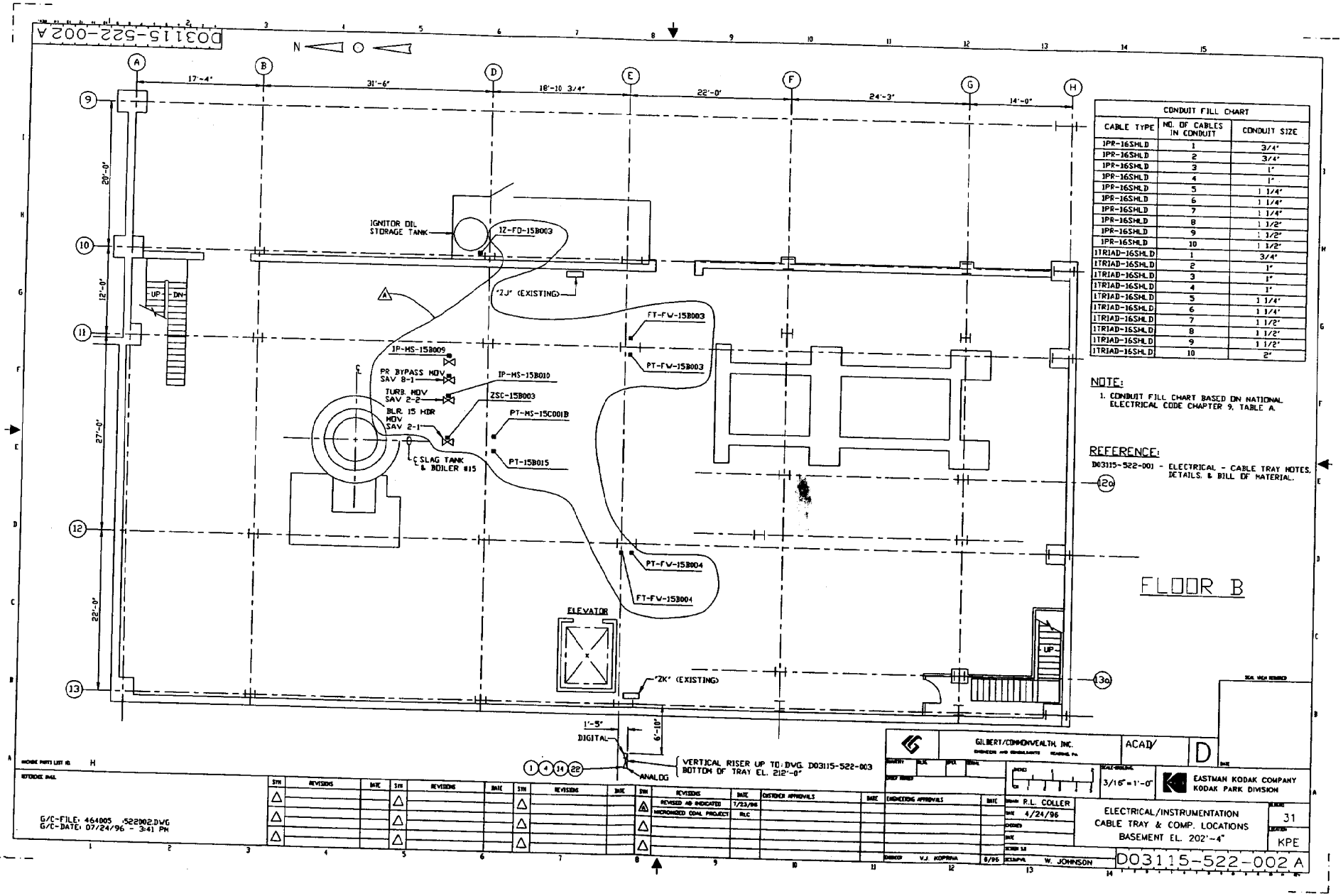
DRAWN R.L. COLLER 4/24/96

ELECTRICAL CABLE TRAY NOTES, DET'S, & BILL OF MAT.

DRAWING 31 — CENTER KPE

D03115-522-001 A

G/C-FILE: 464005 (522001.DWG
G/C-DATE: 08/12/96 - 2:32 PM



CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTE:

1. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE A.

REFERENCE:

D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.

G/C-FILE: 464005 ;522002.DWG G/C-DATE: 07/24/96 - 3:41 PM	REVISIONS	DISTRICT APPROVALS	ENGINEERING APPROVALS
	REVISED AS INDICATED 7/23/96 RLC MICROWIRED COAL PROJECT		
			R.L. COLLER 4/24/96 W. JOHNSON V.J. KOPRINA 8/96

GILBERT/COMMONWEALTH, INC.
ENGINEERS AND CONSULTANTS READING, PA.

ACAD/ D

3/16"=1'-0"

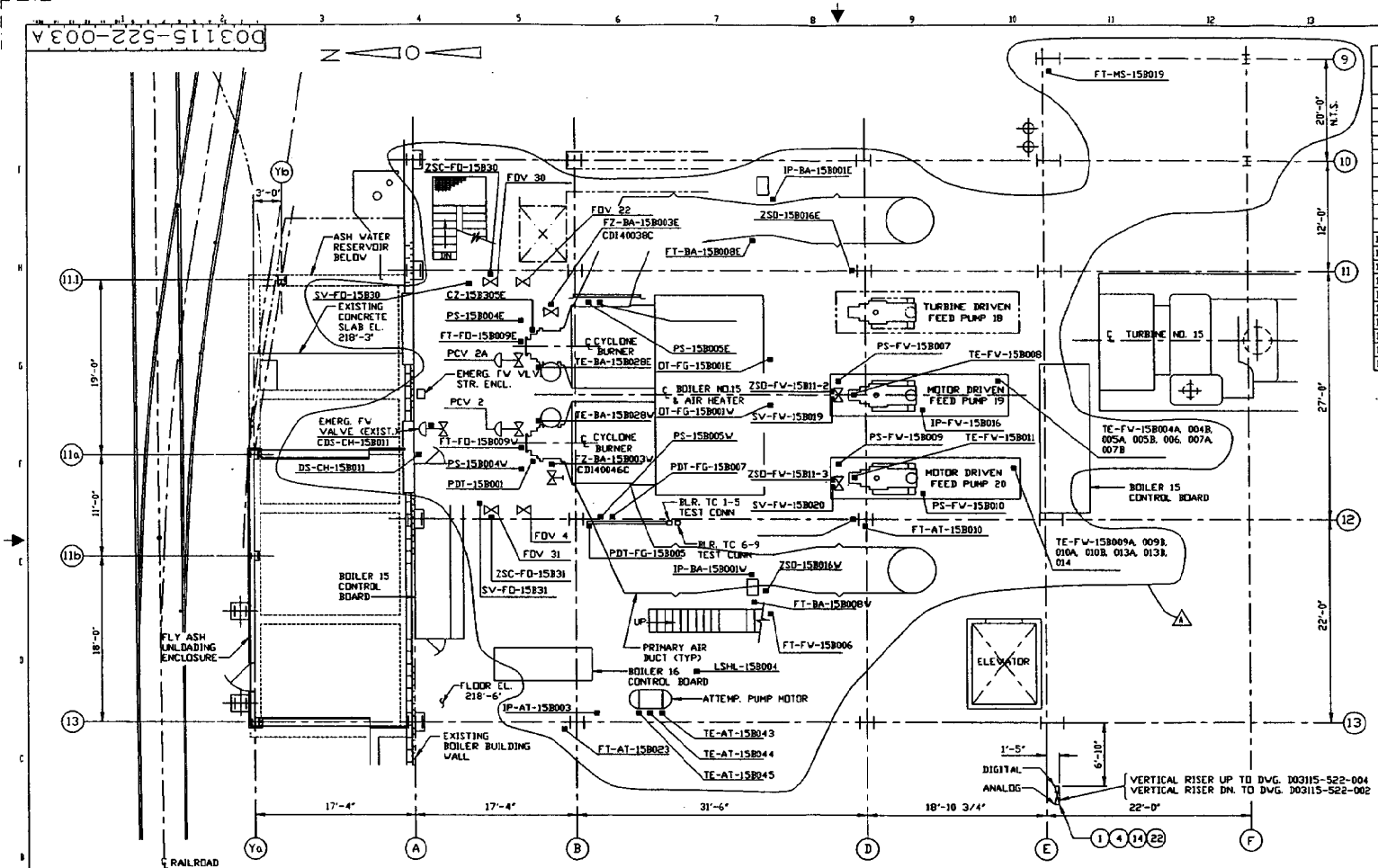
EASTMAN KODAK COMPANY
KODAK PARK DIVISION

ELECTRICAL/INSTRUMENTATION
CABLE TRAY & COMP. LOCATIONS
BASEMENT EL. 202'-4"

31

KPE

D03115-522-002A



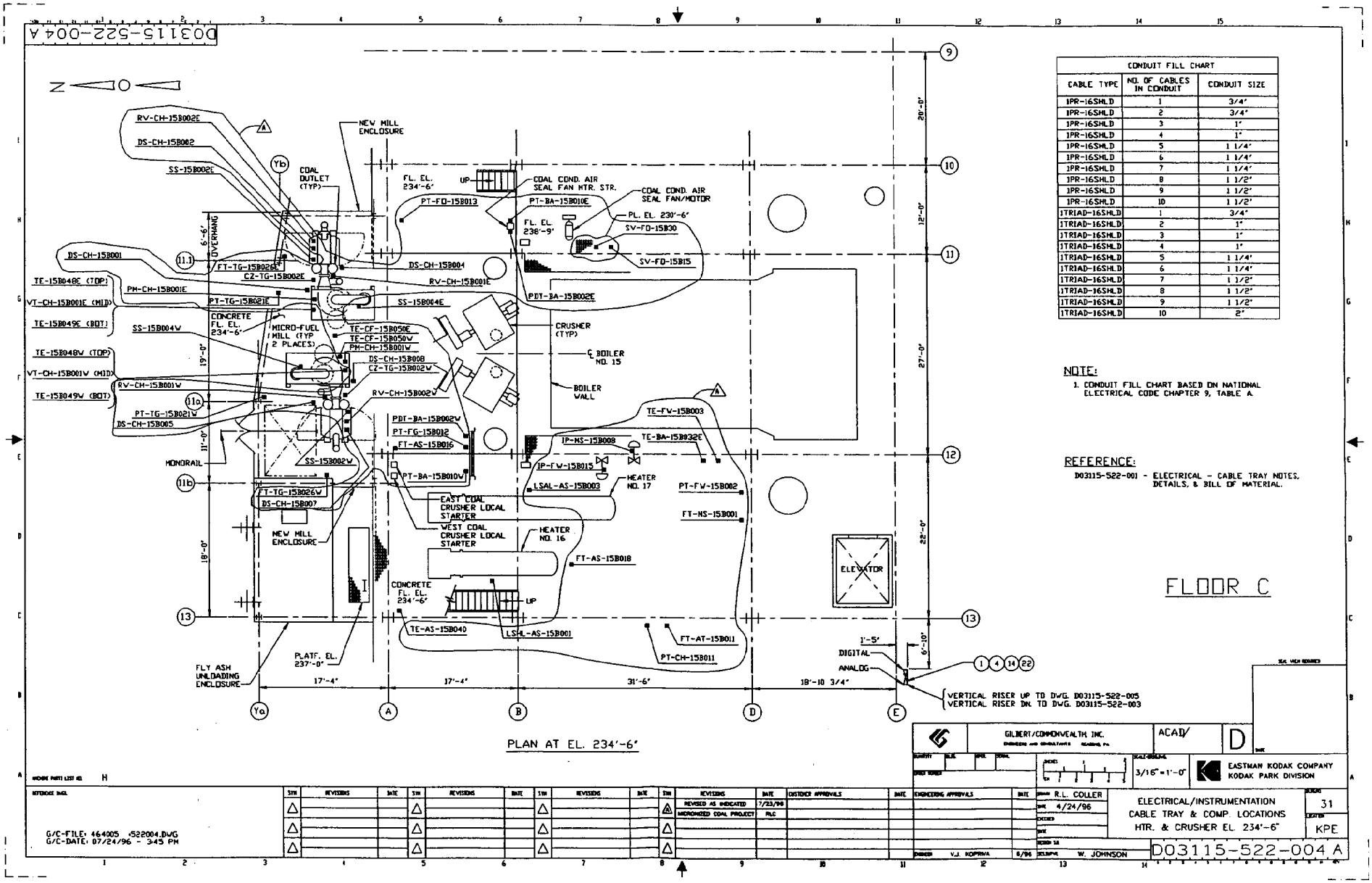
CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTE:
1. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE A.

REFERENCE:
D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.

FLOOR D

GILBERT/COMMONWEALTH, INC.
ACAD
D
3/16"=1'-0"
EASTMAN KODAK COMPANY
KODAK PARK DIVISION
R.L. COLLER 4/24/96
W. JOHNSON 6/96
ELECTRICAL/INSTRUMENTATION
CABLE TRAY & COMP. LOCATIONS
OPER. FLOOR PLAN EL. 218'-6"
31
KPE
D03115-522-003 A
G/C-FILE: 464005 1522003.DWG
G/C-DATE: 07/24/96 - 3:43 PM



CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTE:

1. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE 4.

REFERENCE:

D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.

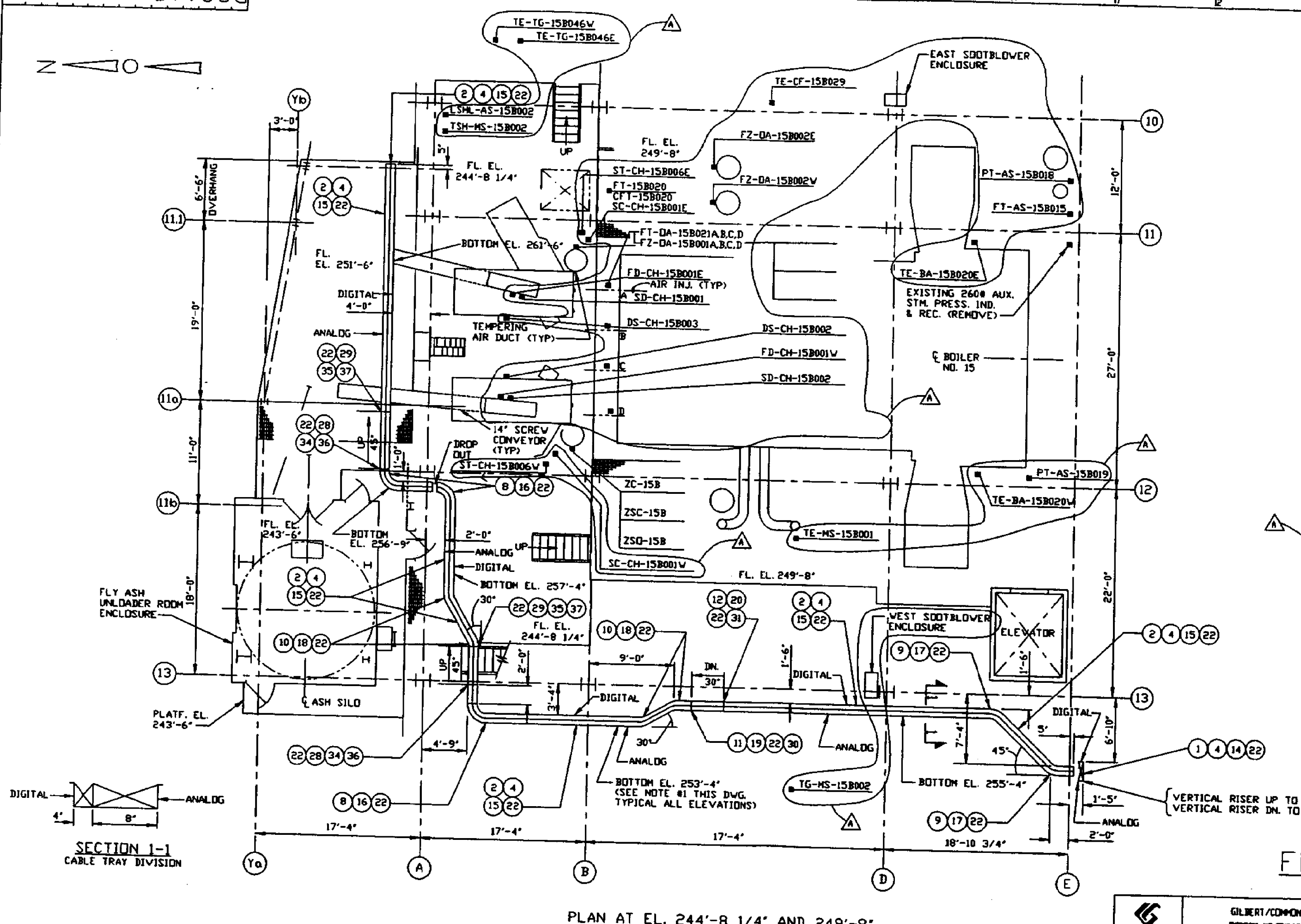
FLOOR C

PLAN AT EL. 234'-6"

GILBERT/COMMONWEALTH INC.	ACAD/	D	
3/16"=1'-0"	EASTMAN KODAK COMPANY KODAK PARK DIVISION		
R.L. COLLER 4/24/96	ELECTRICAL/INSTRUMENTATION CABLE TRAY & COMP. LOCATIONS HTR. & CRUSHER EL. 234'-6"		31
W. JOHNSON	D03115-522-004 A		KPE

REVISIONS	DATE	DISTRICT APPROVALS	DATE	ENGINEERING APPROVALS	DATE
REVISED AS INDICATED	7/23/96			V.J. KOPRIVA	8/96
MICRONIZED COAL PROJECT	PLC				

G/C-FILE: 464005 -S22004.DWG
G/C-DATE: 07/24/96 - 3:45 PM



FLOOR A

PLAN AT EL. 244'-8 1/4" AND 249'-8"

CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTES:

1. ALL CABLE TRAY ELEVATIONS ON THIS DRAWING ARE BASED ON BOILER #15 FLOOR ELEVATION 244'-8 1/4" AND NOT BOILER #16 FLOOR ELEVATION OF 245'-11 3/4".
2. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE A.

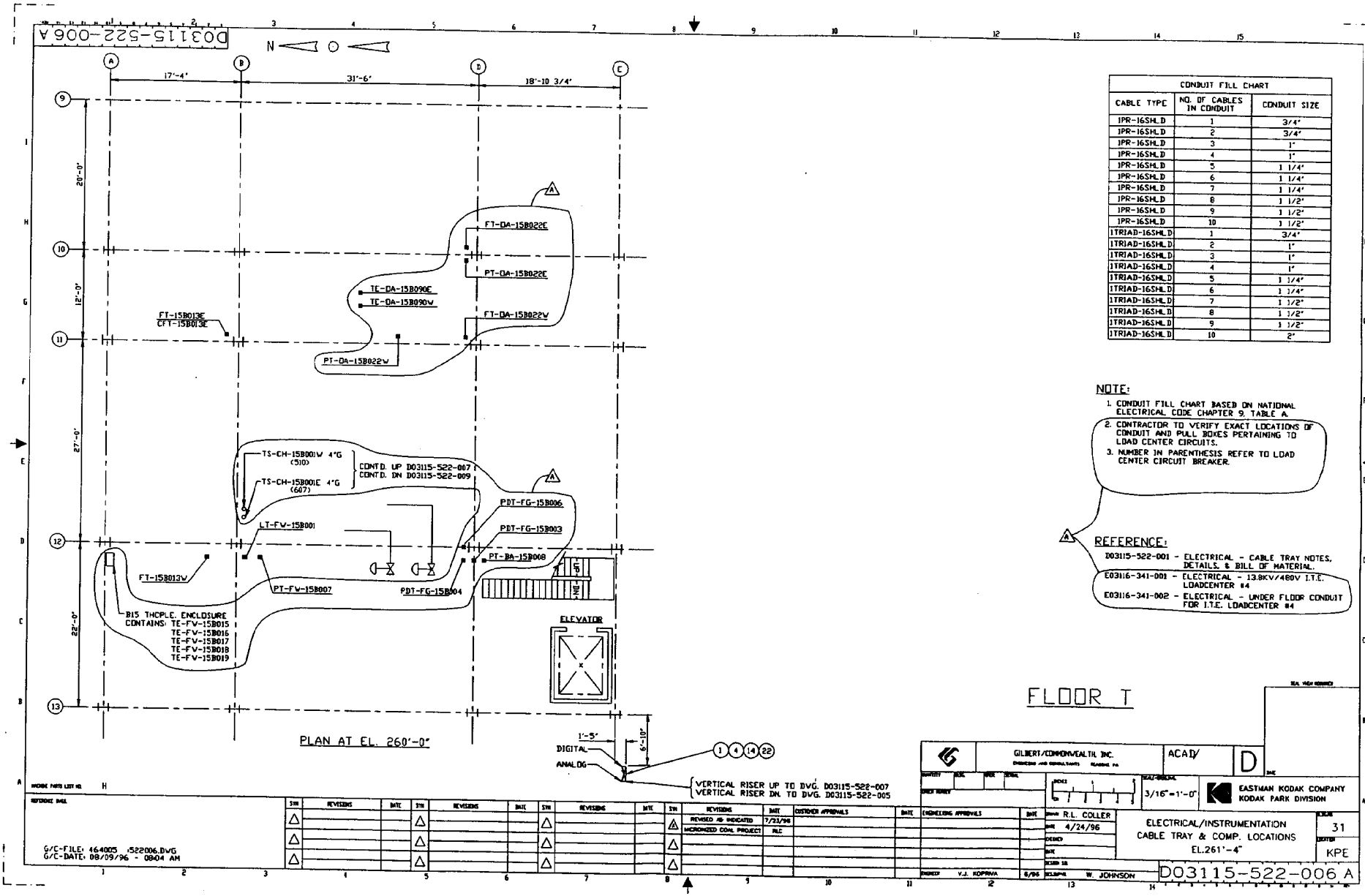
REFERENCE:

D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.
E03116-341-001 - ELECTRICAL - 13.8KV/480V I.T.E. LOADCENTER #4
E03116-341-002 - ELECTRICAL - UNDER FLOOR CONDUIT FOR I.T.E. LOADCENTER #4
D03115-522-009 - ELECTRICAL - EQUIPMENT LOCATIONS APRON FEEDER FLOOR EL. 244'-8 1/4"

SYM	REVISIONS	DATE
A	REVISED AS INDICATED / MICRONIZED COAL PROJECT	7/23/96 RLC

G/C-FILE: 464005 .522005.DWG
G/C-DATE: 07/24/96 - 3:48 PM

GILBERT/COMMONWEALTH, INC.
ACAD
D
DRAWN R.L. COLLER
DATE 4/24/96
CHECKED V.J. KOPRIVA 6/96
W. JOHNSON
SCALE 3/16" = 1'-0"
EASTMAN KODAK COMPANY
KODAK PARK DIVISION
ELECTRICAL/INSTRUMENTATION
CABLE TRAY & COMP. LOCATIONS
APRON FL. EL. 244'-8 1/4"
31
KPE
D03115-522-005 A



CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTE:

1. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE A.
2. CONTRACTOR TO VERIFY EXACT LOCATIONS OF CONDUIT AND PULL BOXES PERTAINING TO LOAD CENTER CIRCUITS.
3. NUMBER IN PARENTHESIS REFER TO LOAD CENTER CIRCUIT BREAKER.

REFERENCE:

D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.

E03116-341-001 - ELECTRICAL - 13.8KV/480V I.T.E. LOADCENTER #4

E03116-341-002 - ELECTRICAL - UNDER FLOOR CONDUIT FOR I.T.E. LOADCENTER #4

FLOOR T

GILBERT/COMMONWEALTH INC.

ACAD/

D

3/16"=1'-0"

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

ELECTRICAL/INSTRUMENTATION CABLE TRAY & COMP. LOCATIONS EL.261'-4"

31

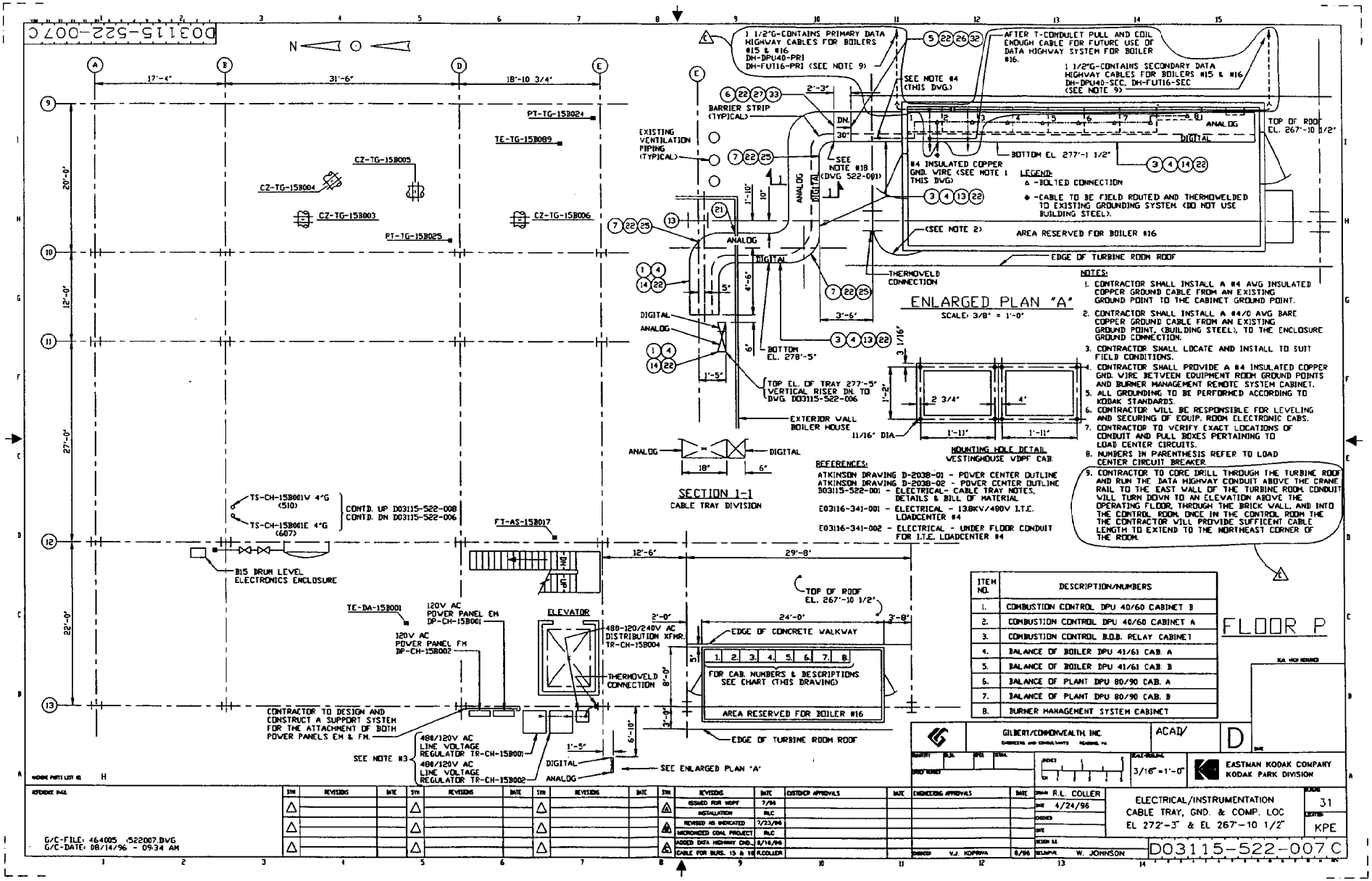
KPE

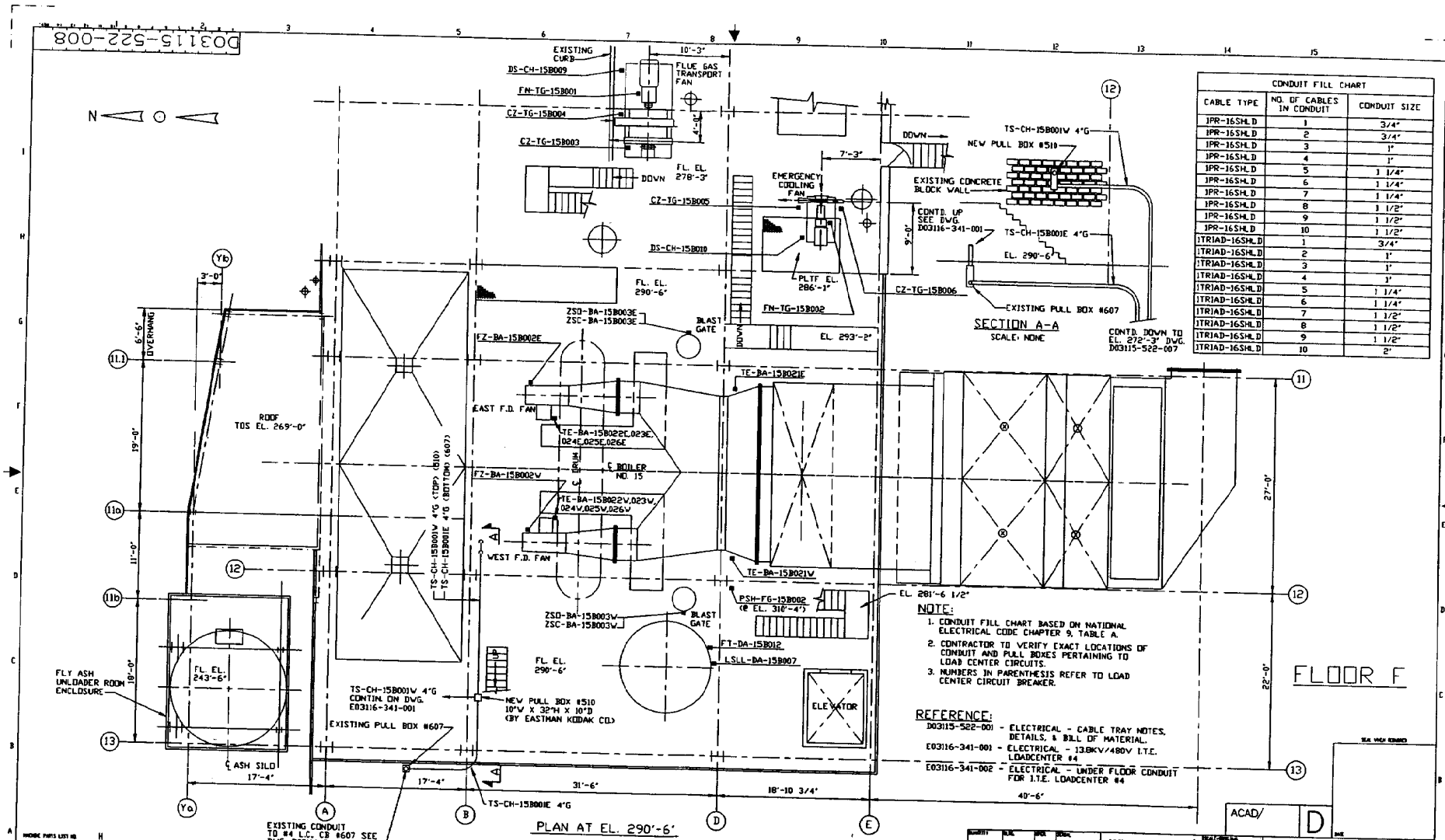
D03115-522-006 A

REVISIONS	DATE	CUSTOMER APPROVALS	DATE	ENGINEERING APPROVALS	DATE
REVISED AS INDICATED	7/23/96				
MICRONIZED COAL PROJECT	RLC				

DRAWN R.L. COLLER 4/24/96
CHECKED V.J. KOPRIVA 6/96
DESIGN W. JOHNSON

G/C-FILE: 464005 ,522006.DWG
G/C-DATE: 08/09/96 - 08:04 AM


D03115-522-007C
N
17'-4"
31'-6"
18'-10 3/4"
20'-0"
12'-0"
27'-0"
22'-0"
PT-TG-153024
TE-TG-153089
CZ-TG-153005
CZ-TG-153004
CZ-TG-153003
CZ-TG-153006
PT-TG-153025
EXISTING VENTILATION PIPING (TYPICAL)
BARRIER STRIP (TYPICAL)
1 1/2"G-CONTAINS PRIMARY DATA HIGHWAY CABLES FOR BOILERS #15 & #16 DH-DPU40-PRI DH-FU116-PRI (SEE NOTE 9)
AFTER T-CONDULET PULL AND COIL ENOUGH CABLE FOR FUTURE USE OF DATA HIGHWAY SYSTEM FOR BOILER #16.
1 1/2"G-CONTAINS SECONDARY DATA HIGHWAY CABLES FOR BOILERS #15 & #16 DH-DPU40-SEC, DH-FU116-SEC (SEE NOTE 9)
SEE NOTE #4 (THIS DWG.)
TOP OF ROOF EL. 267'-10 1/2"
BOTTOM EL 277'-1 1/2"
#4 INSULATED COPPER GND. WIRE (SEE NOTE 1 THIS DWG)
SEE NOTE #18 (DWG 522-001)
LEGEND:
Δ -BOLTED CONNECTION
◆ -CABLE TO BE FIELD ROUTED AND THERMOWELDED TO EXISTING GROUNDING SYSTEM. (DO NOT USE BUILDING STEEL).
(SEE NOTE 2)
AREA RESERVED FOR BOILER #16
EDGE OF TURBINE ROOM ROOF
THERMOVELD CONNECTION
ENLARGED PLAN "A"
SCALE: 3/8" = 1'-0"
TOP EL. OF TRAY 277'-5" VERTICAL RISER DN. TO DWG. D03115-522-006
BOTTOM EL. 278'-5"
EXTERIOR WALL BOILER HOUSE
11/16" DIA
MOUNTING HOLE DETAIL WESTINGHOUSE VDPF CAB.
SECTION 1-1
CABLE TRAY DIVISION
NOTES:
1. CONTRACTOR SHALL INSTALL A #4 AWG INSULATED COPPER GROUND CABLE FROM AN EXISTING GROUND POINT TO THE CABINET GROUND POINT.
2. CONTRACTOR SHALL INSTALL A #4/0 AWG BARE COPPER GROUND CABLE FROM AN EXISTING GROUND POINT, (BUILDING STEEL), TO THE ENCLOSURE GROUND CONNECTION.
3. CONTRACTOR SHALL LOCATE AND INSTALL TO SUIT FIELD CONDITIONS.
4. CONTRACTOR SHALL PROVIDE A #4 INSULATED COPPER GND. WIRE BETWEEN EQUIPMENT ROOM GROUND POINTS AND BURNER MANAGEMENT REMOTE SYSTEM CABINET.
5. ALL GROUNDING TO BE PERFORMED ACCORDING TO KODAK STANDARDS.
6. CONTRACTOR WILL BE RESPONSIBLE FOR LEVELING AND SECURING OF EQUIP. ROOM ELECTRONIC CABS.
7. CONTRACTOR TO VERIFY EXACT LOCATIONS OF CONDUIT AND PULL BOXES PERTAINING TO LOAD CENTER CIRCUITS.
8. NUMBERS IN PARENTHESIS REFER TO LOAD CENTER CIRCUIT BREAKER.
9. CONTRACTOR TO CORE DRILL THROUGH THE TURBINE ROOF AND RUN THE DATA HIGHWAY CONDUIT ABOVE THE CRANE RAIL TO THE EAST WALL OF THE TURBINE ROOM. CONDUIT WILL TURN DOWN TO AN ELEVATION ABOVE THE OPERATING FLOOR, THROUGH THE BRICK WALL, AND INTO THE CONTROL ROOM. ONCE IN THE CONTROL ROOM THE THE CONTRACTOR WILL PROVIDE SUFFICIENT CABLE LENGTH TO EXTEND TO THE NORTHEAST CORNER OF THE ROOM.
REFERENCES:
ATKINSON DRAWING D-2038-01 - POWER CENTER OUTLINE
ATKINSON DRAWING D-2038-02 - POWER CENTER OUTLINE
D03115-522-001 - ELECTRICAL- CABLE TRAY NOTES, DETAILS & BILL OF MATERIAL
E03116-341-001 - ELECTRICAL - 13.8KV/480V I.T.E. LOADCENTER #4
E03116-341-002 - ELECTRICAL - UNDER FLOOR CONDUIT FOR I.T.E. LOADCENTER #4
TS-CH-15B001V 4"G (510)
TS-CH-15B001E 4"G (607)
CONTD. UP D03115-522-008
CONTD. DN D03115-522-006
FT-AS-153017
B15 DRUM LEVEL ELECTRONICS ENCLOSURE
TE-DA-15B001
120V AC POWER PANEL EM DP-CH-15B001
120V AC POWER PANEL FM DP-CH-15B002
ELEVATOR
480-120/240V AC DISTRIBUTION XFMR. TR-CH-15B004
THERMOVELD CONNECTION
EDGE OF CONCRETE WALKWAY
FOR CAB. NUMBERS & DESCRIPTIONS SEE CHART (THIS DRAWING)
AREA RESERVED FOR BOILER #16
EDGE OF TURBINE ROOM ROOF
CONTRACTOR TO DESIGN AND CONSTRUCT A SUPPORT SYSTEM FOR THE ATTACHMENT OF BOTH POWER PANELS EM & FM.
SEE NOTE #3
480/120V AC LINE VOLTAGE REGULATOR TR-CH-15B001
480/120V AC LINE VOLTAGE REGULATOR TR-CH-15B002
SEE ENLARGED PLAN "A"
TOP OF ROOF EL. 267'-10 1/2"
ITEM NO. | DESCRIPTION/NUMBERS
1. COMBUSTION CONTROL DPU 40/60 CABINET B
2. COMBUSTION CONTROL DPU 40/60 CABINET A
3. COMBUSTION CONTROL B.O.B. RELAY CABINET
4. BALANCE OF BOILER DPU 41/61 CAB. A
5. BALANCE OF BOILER DPU 41/61 CAB. B
6. BALANCE OF PLANT DPU 80/90 CAB. A
7. BALANCE OF PLANT DPU 80/90 CAB. B
8. BURNER MANAGEMENT SYSTEM CABINET
FLOOR P
GILBERT/COMMONWEALTH, INC.
ACAD
D
3/16"=1'-0"
EASTMAN KODAK COMPANY KODAK PARK DIVISION
REVISIONS
ISSUED FOR MDPT 7/96
INSTALLATION R.L.C
REVISED AS INDICATED 7/23/96
MONOMODE COAL PROJECT R.L.C
ADDED DATA HIGHWAY CHG. 8/16/96
CABLE FOR BURS. 15 & 16 R.COLLER
R.L. COLLER 4/24/96
V.J. KOPRIVA 8/96
W. JOHNSON
ELECTRICAL/INSTRUMENTATION
CABLE TRAY, GND. & COMP. LOC
EL 272'-3" & EL 267'-10 1/2"
31
KPE
D03115-522-007 C
G/C-FILE: 464005_1522007.DWG
G/C-DATE: 08/14/96 - 09:34 AM



CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTE:
1. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE A.
2. CONTRACTOR TO VERIFY EXACT LOCATIONS OF CONDUIT AND PULL BOXES PERTAINING TO LOAD CENTER CIRCUITS.
3. NUMBERS IN PARENTHESIS REFER TO LOAD CENTER CIRCUIT BREAKER.

REFERENCE:
D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.
E03116-341-001 - ELECTRICAL - 13.8KV/480V I.T.E. LOADCENTER #4
E03116-341-002 - ELECTRICAL - UNDER FLOOR CONDUIT FOR I.T.E. LOADCENTER #4

FLOOR F

ACAD/ D

G/C-FILE: 464005 ,522008.DWG
G/C-DATE: 08/09/96 - 0841 AM

REVISIONS	DATE	CUSTOMER APPROVALS	DATE	ENGINEERING APPROVALS	DATE
				DRAWN R.L. COLLER	7/8/96
				CHECKED	
				DESIGN LD	
				ENGINEER V.J. HOPKINS	8/8/96
				SUPERVISOR W. JOHNSON	

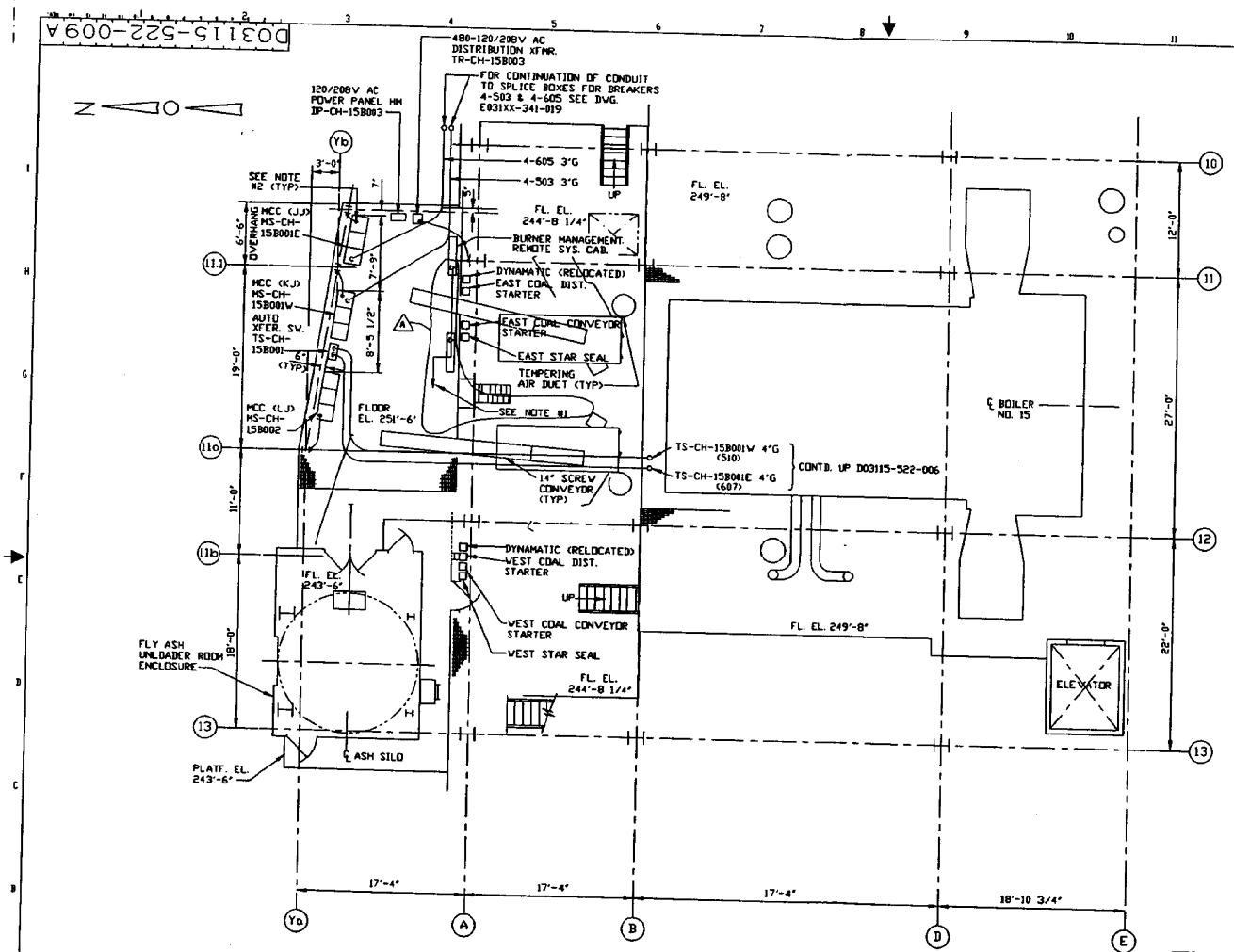
3/16"=1'-0"

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

ELECTRICAL/INSTRUMENTATION
CABLE TRAY & COMP. LOCATIONS
FAN FLOOR EL. 290'-6"

SCALE 31
LOCATION KPE

D03115-522-008



PLAN AT EL. 244'-8 1/4" AND 251'-6"

CONDUIT FILL CHART		
CABLE TYPE	NO. OF CABLES IN CONDUIT	CONDUIT SIZE
1PR-16SHLD	1	3/4"
1PR-16SHLD	2	3/4"
1PR-16SHLD	3	1"
1PR-16SHLD	4	1"
1PR-16SHLD	5	1 1/4"
1PR-16SHLD	6	1 1/4"
1PR-16SHLD	7	1 1/4"
1PR-16SHLD	8	1 1/2"
1PR-16SHLD	9	1 1/2"
1PR-16SHLD	10	1 1/2"
1TRIAD-16SHLD	1	3/4"
1TRIAD-16SHLD	2	1"
1TRIAD-16SHLD	3	1"
1TRIAD-16SHLD	4	1"
1TRIAD-16SHLD	5	1 1/4"
1TRIAD-16SHLD	6	1 1/4"
1TRIAD-16SHLD	7	1 1/2"
1TRIAD-16SHLD	8	1 1/2"
1TRIAD-16SHLD	9	1 1/2"
1TRIAD-16SHLD	10	2"

NOTES:

1. CONTRACTOR SHALL PROVIDE A #4 INSULATED COPPER GND. WIRE BETWEEN BURNER MNGT. REMOTE SYS. CABINET AND BURNER MNGT. SYSTEM CABINET. RUN ALONG CABLE TRAY.
2. CONTRACTOR SHALL INSTALL A #4/0 AWG BARE COPPER GROUND CABLE FROM AN EXISTING GROUND POINT, (BUILDING STEEL), TO THE ENCLOSURE GROUND CONNECTION.
3. MISCELLANEOUS EQUIPMENT GROUNDING SHALL BE DONE BASED ON THE MANUFACTURE'S REQUIREMENTS, OR OWNERS STANDARD PRACTICES.
4. CONDUIT FILL CHART BASED ON NATIONAL ELECTRICAL CODE CHAPTER 9, TABLE A.
5. CONTRACTOR TO VERIFY EXACT LOCATIONS OF CONDUIT AND PULL BOXES PERTAINING TO LOAD CENTER CIRCUITS.
6. NUMBER IN PARENTHESIS REFER TO LOAD CENTER CIRCUIT BREAKER.

REFERENCE:

D03115-522-001 - ELECTRICAL - CABLE TRAY NOTES, DETAILS, & BILL OF MATERIAL.
E03116-341-001 - ELECTRICAL - 13.8KV/480V I.T.E. LOADCENTER #4
E03116-341-002 - ELECTRICAL - UNDER FLOOR CONDUIT FOR I.T.E. LOADCENTER #4
D03115-522-005 - ELECTRICAL/INSTRUMENTATION CABLE TRAY AND COMPONENT LOCATIONS APRON FEEDER FLOOR EL. 244'-8 1/4"

FLOOR A

GILBERT/COMMONWEALTH, INC. — ACAD/ — D

3/16"=1'-0"

EASTMAN KODAK COMPANY
KODAK PARK DIVISION

R.L. COLLER 4/24/96

ELECTRICAL
EQUIPMENT LOCATIONS
APRON FL. EL. 244'-8 1/4"

31

KPE

V.J. KOPRIVA 8/8/96 W. JOHNSON

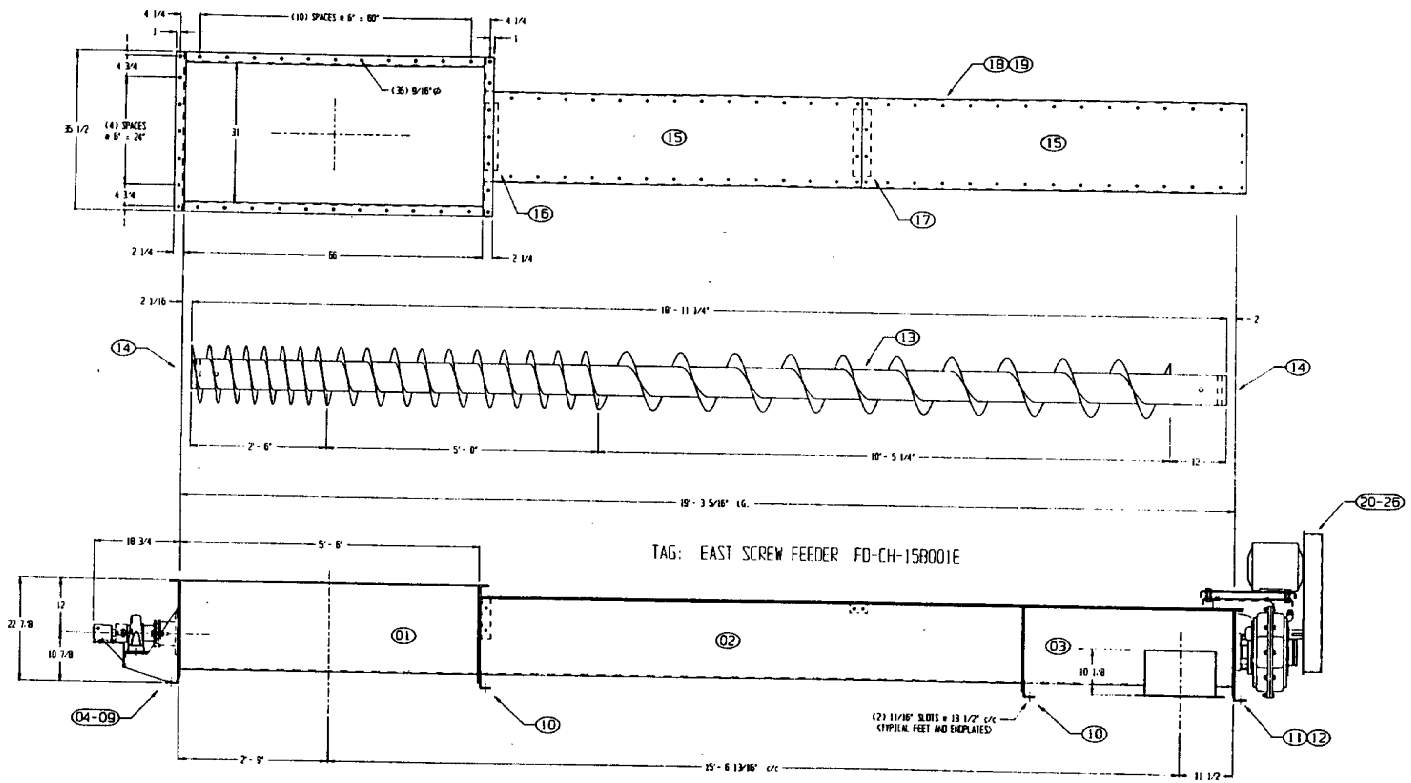
D03115-522-009 A

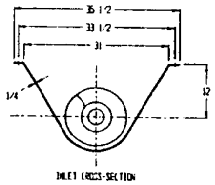
STN	REVISIONS	DATE
A	ADDED ADDITIONAL REMOTE BMS CABINET	R.COLLER

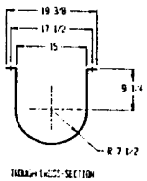
DISTRICT APPROVALS — DATE

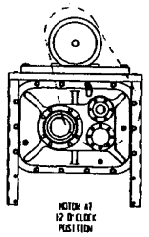
ENGINEERING APPROVALS — DATE

G/C-FILE: 464805 -522009.DWG
G/C-DATE: 08/14/96 - 09:47 AM









14" x 19'-3 5/16" SCREW CONVEYOR CONSISTING OF:

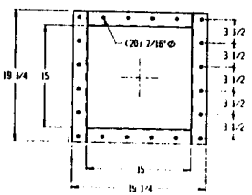
NO.	QTY	DESCRIPTION
01	1	14FCT3-MTO 5'-6" LG., 1/4" THK. FORMED-FLANGE FLARED TROUGH.
02	1	14CTF3-10 10'-0" LG., 1/4" THK. FORMED-FLANGE U-TROUGH.
03	1	14CTF3 3'-9 5/16" LG., 1/4" THK. FORMED-FLANGE U-TROUGH w/ 14TSD7 15" x 15" x 3/16" THK. DISCHARGE FITTED.
04	1	14FTE07-MSE-MTO 3/8" THK. FLARED ENDPLATE w/ FOOT.
05	1	PSC7-HP 3 7/16"Ø AIR-PURGED PACKING GLAND SEAL.
06	1	TP07MB 3 7/16"Ø PILLOW BLOCK BALL BEARING.
07	1	C10122-55 DA7IC ZERO-SPEED SWITCH, 2 - 25 RPM, SPDT w/ NEMA 4/4X CAST IRON HOUSING.
08	1	#5802 1/2" x 1/2" FLEXIBLE K-COUPLING.
09	1	CE7-MTO 3 7/16"Ø C1045 CEI ENDSHAFT w/ STUB SHAFT PROJECTION FOR SPEED SWITCH.
10	2	14TFF 1/4" THK. BOLT-ON FLANGE FOOT.
11	1	14TEF7-BB-P 3/8" THK. ENDPLATE w/ FOOT. < TO BE BOLTED ON FOR SCREW REMOVAL >
12	1	14TFG-SP 1/8" THK. CLOSED-CELL SPONGE RUBBER FLANGE GASKET.

NO.	QTY	DESCRIPTION
13	1	13S716-R 18'-11 1/4" LG., 13" DIA. RIGHT-HAND AR SECTIONAL SCREW w/ 1/4" THICK FLIGHTS CONTINUOUSLY WELDED BOTH SIDES TO 6" SCH 80 PIPE, BUSHED AND DRILLED BOTH ENDS FOR 3 7/16"Ø 2-BOLT SHAFTS. FIRST 2'-6" IS 4" PITCH; NEXT 5'-0" IS 6" PITCH; BALANCE IS 12" PITCH w/ 12" BARE PIPE AT DISCHARGE.
14	4	LCB7-H-MTO 7/8" x 7 3/4" Gr 5 COUPLING BOLT w/ LOCKNUT.
15	2	14TCF7 5'-11 1/2" LG., 3/16" THK. FORMED-FLANGE COVER.
16	1	BOLT-IN STRIKE-OFF PLATE.
17	1	BOLT-IN COVER SPLICE BAR.
18	33'	SP200 1/8" x 2" SPONGE RUBBER COVER GASKET.
19	66	1/2" x 1 1/4" HHCS COVER BOLT @ 6" c/c.
		7 1/2 HP @ 15 RPM DRIVE UNIT:
20	1	7 1/2 HP 1750 RPM MOTOR < SUPPLIED BY BUSH-MILLER >
21	1	315TL40x3-7/16c DODRIS SCREW CONVEYOR DRIVE, 38.790:1 RATIO, w/ CEMA ADAPTOR
22	1	3HW DODRIS MOTOR MOUNT, ORIENTATION 'S', LOW POS'N

NO.	QTY	DESCRIPTION
23	1	G4 GUARDIAN DRIVE GUARD
24	1	1800-8M-30 HTS BELT
25	1	P48-8M-30-SDS w/ SDS 1 3/8 MOTOR HTS SPROCKET
26	1	P144-8M-30-SF w/ SF 2 REDUCER HTS SPROCKET

GENERAL NOTES:

1. SHOP ASSEMBLED AND TESTED.
2. ONLY DISCHARGE ENDPLATE HAS GASKET; ALL OTHER TROUGH JOINTS TO BE SEAM WELDED.
3. CONVEYOR COMPONENTS TO HAVE ONE COAT OF MARTIN STANDARD GRAY HI-ALKYD ENAMEL PRIMER.



DISCHARGE FLANGE
(SCALE: 1/8" = 1")

FILE COPY / FOR REFERENCE
WE ARE PROCEEDING w/
FABRICATION PER THIS PRINT

ISSUED
AUG 01 1996
MARTIN SPROCKET & GEAR DANIELSVILLE, PA 18038

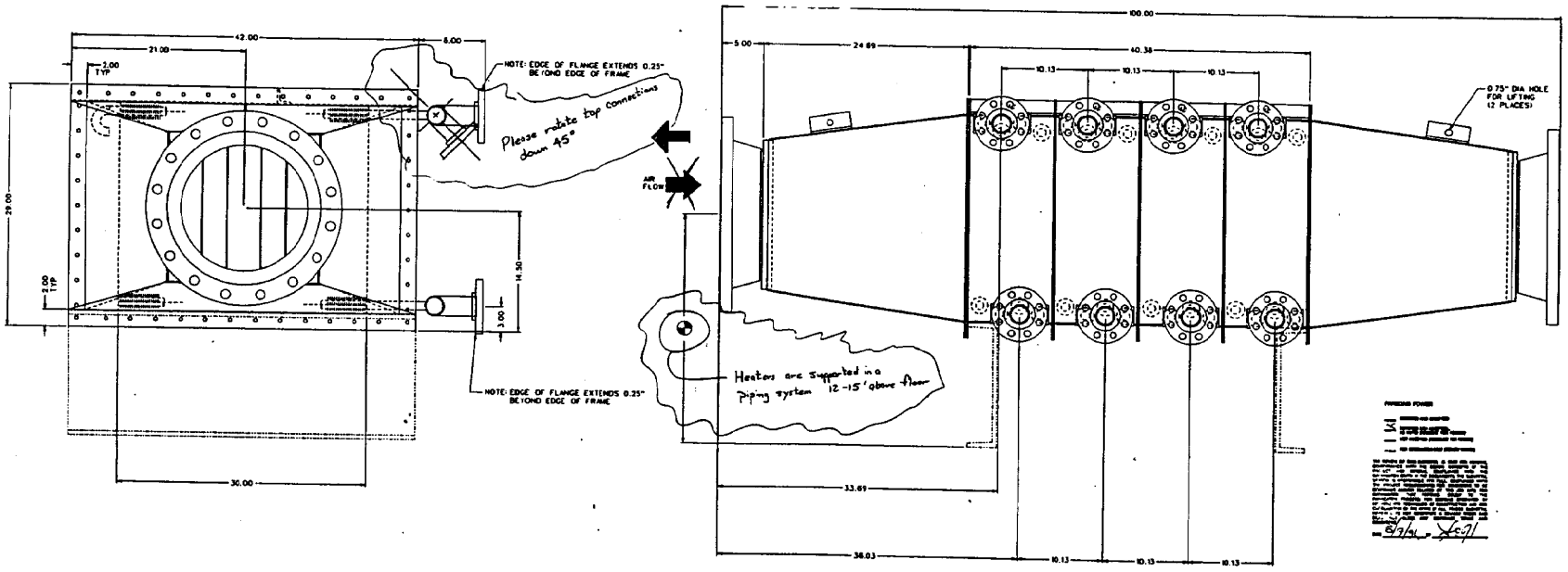
Martin SPROCKET & GEAR, INC.
3376 DELPS ROAD
P.O. BOX 267
DANIELSVILLE PA 18038
PHONE: (610) 837-1841
FAX: (610) 837-7337

BUSH-MILLER INC.
READING PA

14" DIA. x 19'-3 5/16" LONG
SCREW CONVEYOR ASSEMBLY

REVISIONS	#	BY	DATE
ALTERED LENGTH	1	JRB	8-1-96

SCALE: 1" = 1'-0" | DWG. NO. 3019609
DRAWN: J. BETZENBERGER | DATE: 7-17-96
APPR: S-4030-12
M12-63962-2



CONSTRUCTION

TRANSITION	10 GA HOT ROLLED STEEL WELDED AIRTIGHT FOR 2 PSIG, PAINTED WITH HIGH TEMPERATURE ALUMINUM PAINT
CORE CASING	12 GA HOT ROLLED STEEL WELDED AIRTIGHT FOR 2 PSIG, PAINTED WITH HIGH TEMPERATURE ALUMINUM PAINT
HEADERS	2" SCH 40 CARBON STEEL
CONNECTIONS	2" 300 LB RAISED FACE SLIP-ON FLANGE
FINNED TUBE	1" OD X .083" WALL WELDED SEAM CARBON STEEL
FIN SPACING	7.0 FINS PER INCH
FINS	½" HIGH X .015" THICK CARBON STEEL EMBEDDED
NOMINAL TUBE LENGTH	2'-8"
TUBE FACE	12
TUBE FACE CENTERS	2"
ROW	4
JOINTS	WELDED
TRANSITION CONNECTIONS	18" 150# ANSI RAISED FACE WELD NECK OR SLIP-ON CARBON STEEL
CIRCUIT	2
CORE DESIGN	250 PSIG @ 650°F
CORE TEST	380 PSIG HYDROSTATIC
GASKET	⅛" SILICONE 70 DUROMETER

Flat

Normal Operating Conditions - System can occasionally rise to a maximum of 600°F & 300 psig - Use these for design conditions

PERFORMANCE

GAS FLOW (MBH)	273.5
ENT GAS TEMP (°F)	330
LVG GAS TEMP (°F)	400
STEAM PRESS (PSIG)	280
STEAM TEMP (°F)	450
CONDENSATE RATE (#/HR)	322
GAS FRICTION ON WG	2.84

* GAS FRICTION IS CORRECTED FOR AVERAGE TEMP AND ALTITUDE

ARRANGEMENT

A HEATER CONSISTS OF 4 LRR COILS BOLTED TOGETHER IN FACE WITH TRANSITIONS BOLTED TO THE TWO (2) OUTER COILS. HEATER ARRANGED 1 HIGH X 4 DEEP. TOTAL OF 1 HEATER REQUIRED.

SUBJECT

CUSTOMER	EASTMAN KODAK CO.
CUSTOMER P.O.	LM-855-94023X
JOB NAME	KODAK
SHOP NUMBER	961273

WEIGHTS

ASSEMBLY	2430
COIL	350 (EA)
TRANSITION	340 (EA)
BASE	350

8/3/94 - Jeff

NO	REVISION	DATE	DR	ENG
A	CHECKED	8-2-94	MLB	BWH

AEROFIN CORP.
LYNCHBURG, VA.

TITLE: TYPE "LRR" STEAM COILS WITH TRANSITION

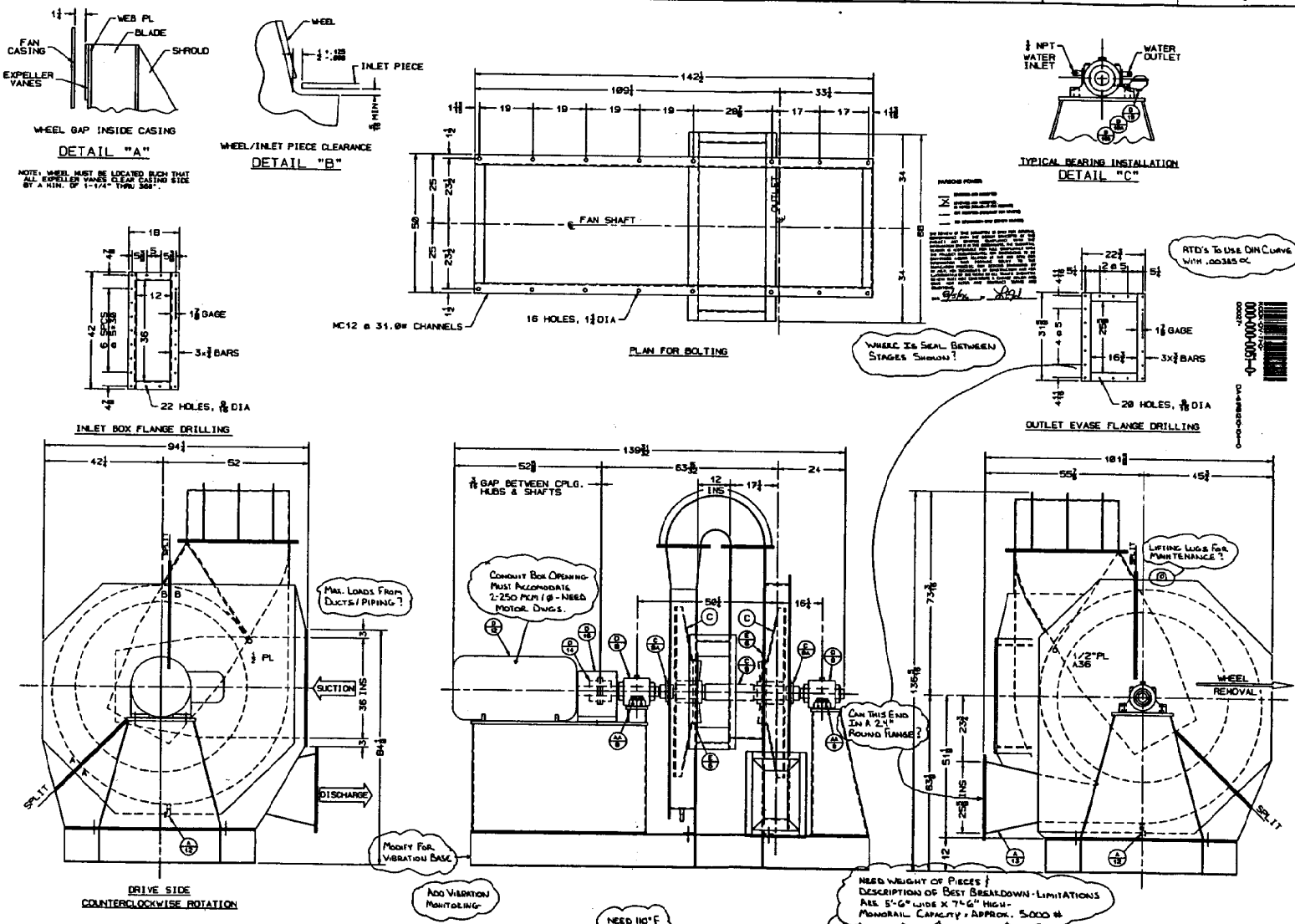
DWG.NO. SK-4093

\SUBDWGS\SK\SK4093

CUSTOMER TO ADVISE FLOOR TO TRANSITION NOZZLE CENTER LINE DISTANCE

ACTUAL DIMENSIONS ARE SUBJECT TO AEROFIN COIL FABRICATION TOLERANCES AND WILL APPROXIMATE THE DESIGN DIMENSIONS SHOWN

TOLERANCE
1. CONNECTION LOCATIONS ± .250
2. CASING DIMENSIONS ± .125
(ALL DIMENSIONS ARE IN INCHES)



MATERIAL LIST

ITEM	REQ'D	DESCRIPTION
A_{11}	2	BEARING SHIM- 1/4"PL. MILD STEEL
A_{12}	1	DRAIN- HALF OF A STD. 2"PIPE COUPLING
A_{13}	1	EVASE- BY ROBINSON
A_{14}	1	INSPECTION DOOR-15"x 18"OPENING WT.=82 lbs. BOLTED w/ HINGES
C	2	WHEEL- A-242 STEEL
C_{13}	1	SHAFT- AISI 4140 HTSR
C_{14}	2	SHAFT SEAL-SINGLE CARBON RING JOHN CRANE 400B48-48S-S-ALUM-SSD w/PROVISION ON SHAFT LGTH. FOR DOUBLE RING
C_{15}	1	SHAFT GUARD- MILD STEEL
D_9	1	FIXED- 3-7/16"DIA.DODGE SLEEVOIL "STL" BRG. STATIC OIL LUBED & WATER COOLED. C/W THRUST COLLARS & SIGHT GAGE. SEE NOTE # 8.
D_{10}	1	FLOAT- 3-7/16"DIA.DODGE SLEEVOIL "STL" BRG. STATIC OIL LUBED & WATER COOLED. C/W SIGHT GAGE. LINER TO BE 50% UNDERCUT. SEE NOTE #8
D_{12}	1	MOTOR-300 HP 1800 RPM, 460 V, 3 PH, 60 Hz, CLASS F/40°C(BOTH INSUL.), 1.15 S.F. 40°C AMBIENT, 80°C TEMP. RISE @ 1.0 S.F. NEMA DESIGN A, 120 V SPACE HEATERS, TACONITE SEALS(BOTH ENDS), 100 ohm BRG.RTD'S, 100 ohm STATOR RTD'S. TYPE TEFC-324, FRAME # 449T, BY ROBINSON
D_{14}	1	FAST # 3.5 MODEL B FULL-FLEX COUPLING FAN HALF BORE 3.372 +.0015/-.0000 KEYWAY 7/8"x 7/16" MOTOR HALF BORE 3.372 +.0015/-.0000 KEYWAY 7/8"x 7/16"
D_{15}	1	COUPLING GUARD- 014 ga.MILD STEEL
D_{16}	2	1-TEC #1050-A-12-S-A, PLATINUM, 100 ohm @ 0°C SINGLE ELEMENT
D_{17}	2	1-TEC #1050-33 SPRING LOADED FITTING c/w O-RING
D_{18}	2	1-TEC #1050-34/32 WEATHER PROOF HEAD c/w TERMINAL BLOCK
E_6	2	INLET PIECE- A-36 MAT'L.
S	1	SUB-BASE - MILD STEEL

NOTES:

1. FAN HOUSING & INLET PIECE FABRICATED FROM A-36 MAT'L. WHEEL & SHAFT AS NOTED ABOVE.
2. BEARING/MOTOR BASE, SUB-BASE, SHAFT & COUPLING GUARDS FABRICATED FROM MILD STEEL.
3. FAN TO RECEIVE ONE COAT OF OUR STANDARD RED RUST-INHIBITIVE PRIMER, (1.5 to 2.0 mils DFT).
4. FAN BASKET MATERIAL TO BE 1/8"SILICONE RUBBER.
5. FAN HOUSING TO BE SPLIT FOR WHEEL AND SHAFT REMOVAL.
6. TOTAL APPROX. WHEEL AND SHAFT WEIGHT = 2868 lbs. (2-WHEELS & 1-SHAFT)
7. TOTAL APPROX. FAN WEIGHT (INCL. BASE) = 18,570 lbs.
8. BEARINGS ITEMS D8 AND D9 ARE STATIC OIL LUBRICATED. USE A PREMIUM GRADE SAE 20 WT. OIL. DO NOT USE MULTI-GRADE OILS. BRGS. TO BE WATER COOLED @ 6PM PER BRG. MAX. WATER INLET TEMP. TO BE 90°F. MAX. WATER PRESS. TO BE 120 PSI.
9. EXPANSION JOINTS IN ALL PIPING TO AND FROM FAN ARE REQUIRED. THESE JOINTS ARE TO BE IMMEDIATELY ADJACENT TO THE FAN. CUSTOMERS DUCT WORK MUST BE STRUCTURALLY ANCHORED WITHIN APPROX. 24"OF EXPANSION JOINT.
10. TEMPERATURE DETECTORS SHOWN ARE PICKUPS ONLY. MONITORS BY OTHERS.
11. ~~ROBINSON RECOMMENDS A CONCRETE MAT UNDER FAN WITH A MINIMUM MASS EQUAL TO 21,500 lbs.~~
12. CASING WELDED FOR GAS TIGHT CONSTRUCTION.
13. QUALIFIED WELDERS REQUIRED ON THIS JOB.

TAG: BOILER #15 MCRD PROJECT
TRANSPORT GAS FAN

WHEEL & SHAFT WR^2 = 4888 lbs-ft²

NO.	REVISION	DATE	BY	MICRO. DATE
	CAD GENERATED DRAWING. DO NOT CHANGE BY HAND			

BEARINGS ARE DESIGNED FOR A MAXIMUM AMBIENT TEMPERATURE OF 100°F.

DO NOT USE SUBSTITUTE LUBRICANTS OR OVER LUBRICATE. WARRANTY WILL BE VOIDED UNLESS ROBINSON LUBRICATION INSTRUCTIONS ARE FOLLOWED.

FAN UNIT WILL BE SHIPPED (B) ASSEMBLED (X) DISASSEMBLED

FINAL ALIGNMENT OF BEARINGS, COUPLING, V-BELTS, WHEEL & SHAFT ARRY, MUST BE CHECKED BEFORE OPERATION OF THIS EQUIPMENT. SEE DIM. "E" THAT ARE TO BE CHECKED FOR PROPER SETTING PER INSTRUCTION MANUAL AND CERTIFIED DRAWING

UNITS PER ORDER 1(one)

CERTIFIED FOR

YOUR ORDER L46880-1295K

OUR JOB NO. 82723

BY ____ DATE 7-23-98

FAN PERFORMANCE

MAXIMUM FAN DESIGN TEMPERATURE 400°F @ 1780 RPM

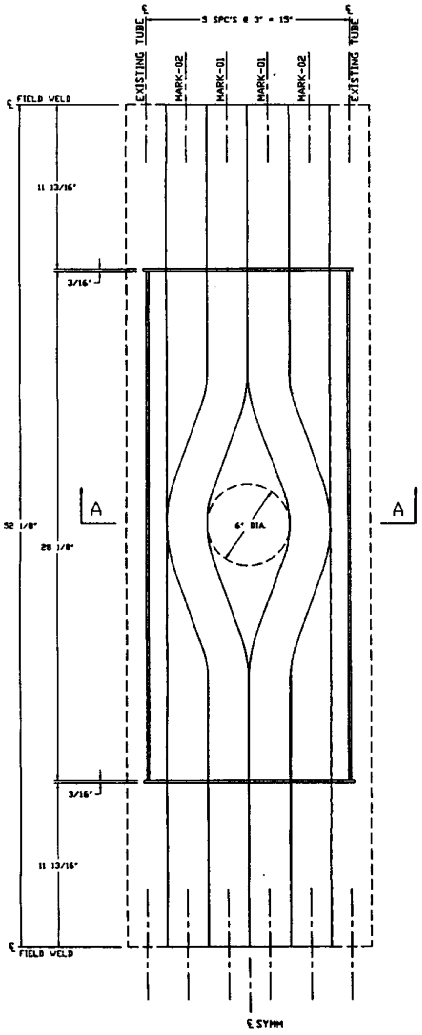
1780	11157	84.0	.0478	358°F	45811.	229
1780	13848	86.0	.0478	358°F	45811.	272
RPM	CFM	FSP	DENSITY	TEMP	ELEV	BHP

	BY	DATE	ALL DIMENSIONS ARE IN INCHES
DRAWN	JK	7-31-98	
CHECKED			DA-61RB1210-104
MICRO			

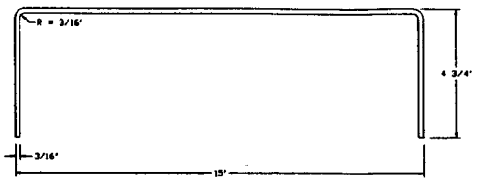
ROBINSON INDUSTRIES, INC
ZELIENOPLE, PENNSYLVANIA 16063

TYPE 61"x1-13/16"RB1210-4, TWO STAGE UNIT, CCW ROT. @ 270°DISCH., ARR. #7, D., IV, 98" INLET BOX

FOR EASTMAN KODAK CO.
ROCHESTER, NY

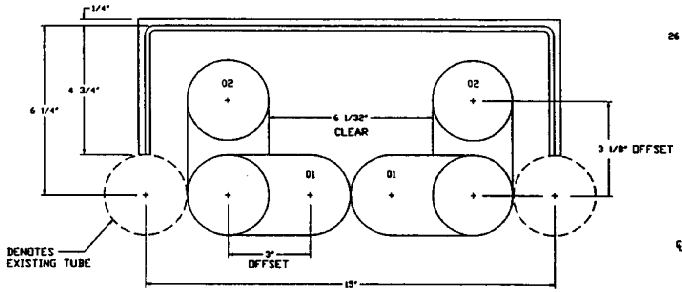


COAL INJECTOR OPENING

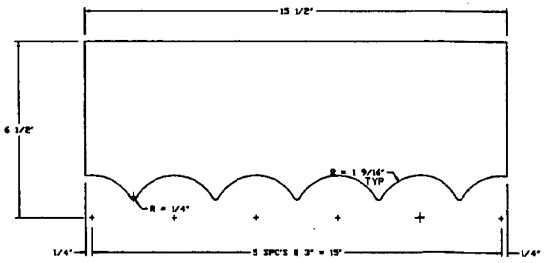


SEAL BOX DETAIL

3/16" THK CARBON STEEL
8 REQ'D

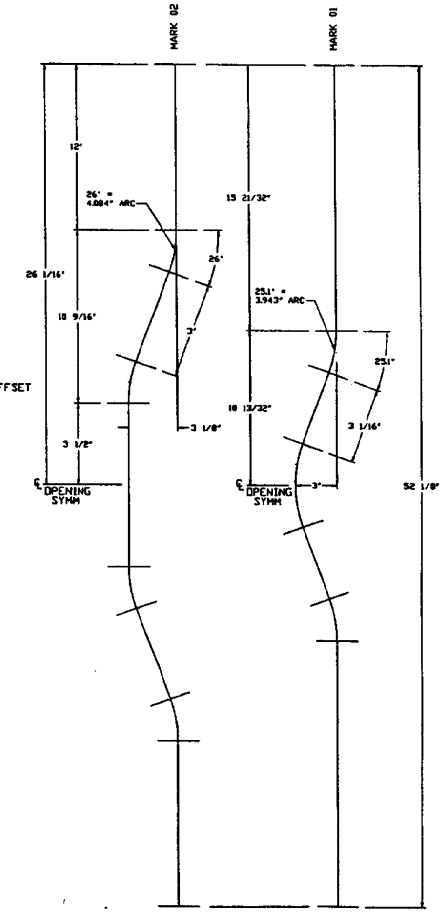


SECTION A-A



END PLATE DETAIL

3/16" THK CARBON STEEL
16 REQ'D



TUBING DETAIL

16 EACH REQ'D

NOTE:
1- TUBING: 2 31/32" O.D. x .200" MW
SA-210 A-1
2- BEND RADIUS = 9"
3- EIGHT OPENINGS REQ'D.

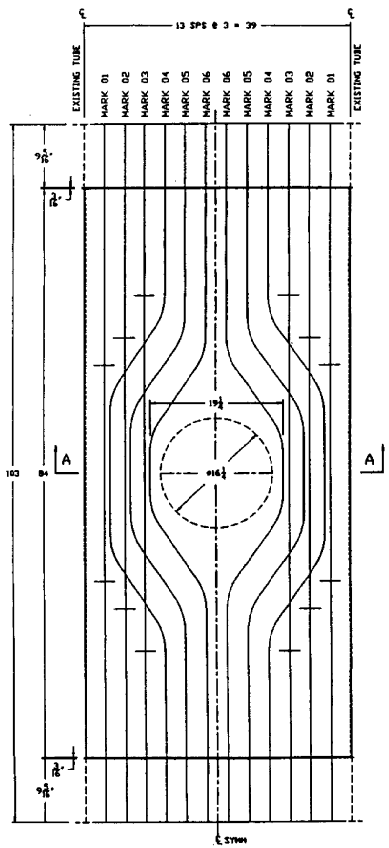
REV	DESCRIPTION	BY	DATE

POTTS WELDING & BOILER REPAIR CO., INC.

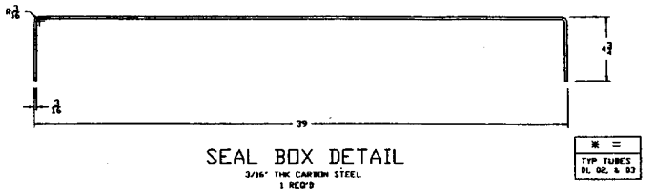
EASTMAN KODAK
ROCHESTER N.Y.

COAL INJECTOR OPENING

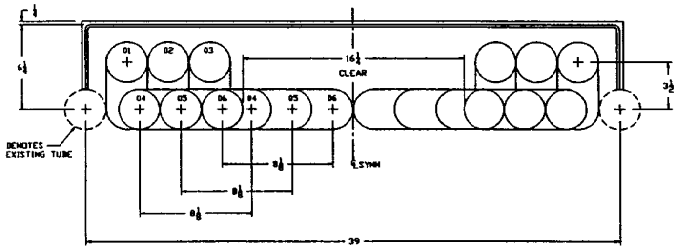
D-960704A



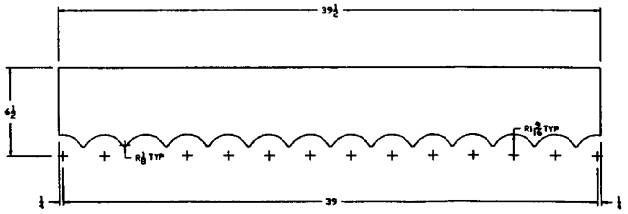
ACCESS DOOR OPENING



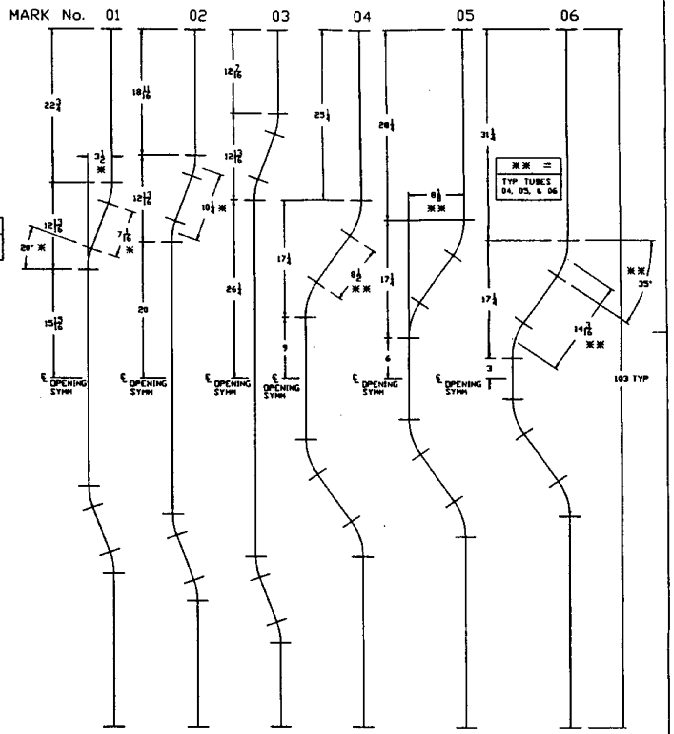
SEAL BOX DETAIL
3/16" THK CARBON STEEL
1 REQ'D



SECTION A-A



END PLATE DETAIL
3/16" THK CARBON STEEL
2 REQ'D



TUBING DETAIL
2 EACH REQ'D

NOTE
1- TUBING 2 31/32" O.D. x .200" MW SA-216-A-1
2- BEND RADIUS 9"
3- 1 OPENING REQ'D.

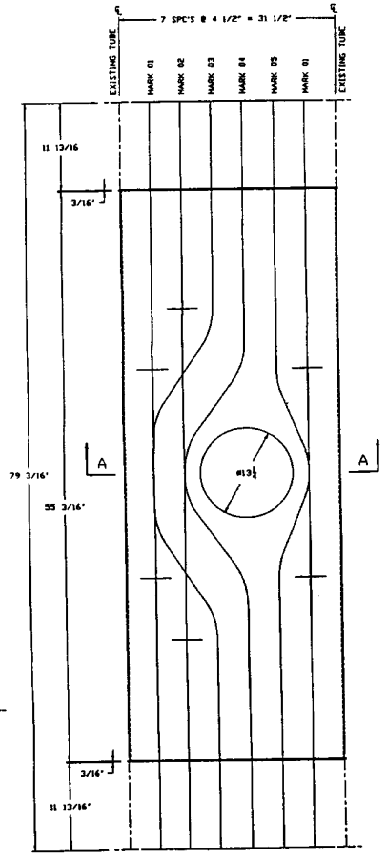
REV	DESCRIPTION	BY	DATE

POTTS WELDING & BOILER REPAIR CO., INC.

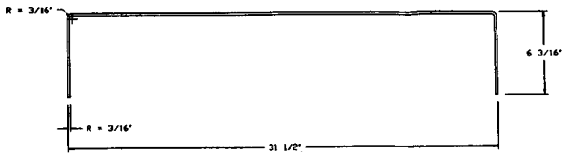
EASTMAN KODAK
ROCHESTER N.Y.

ACCESS DOOR OPENING

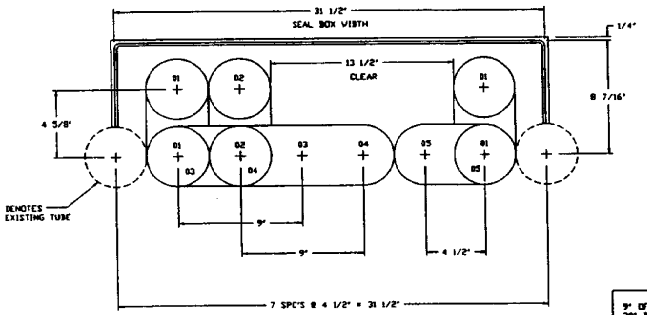
D-960704B



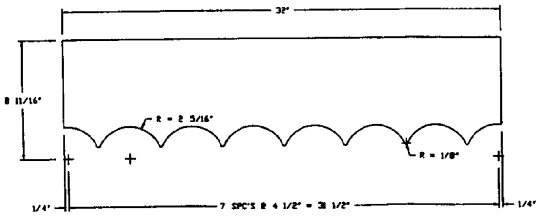
OVERFIRE AIR
INJECTION OPENING
4 REQ'D



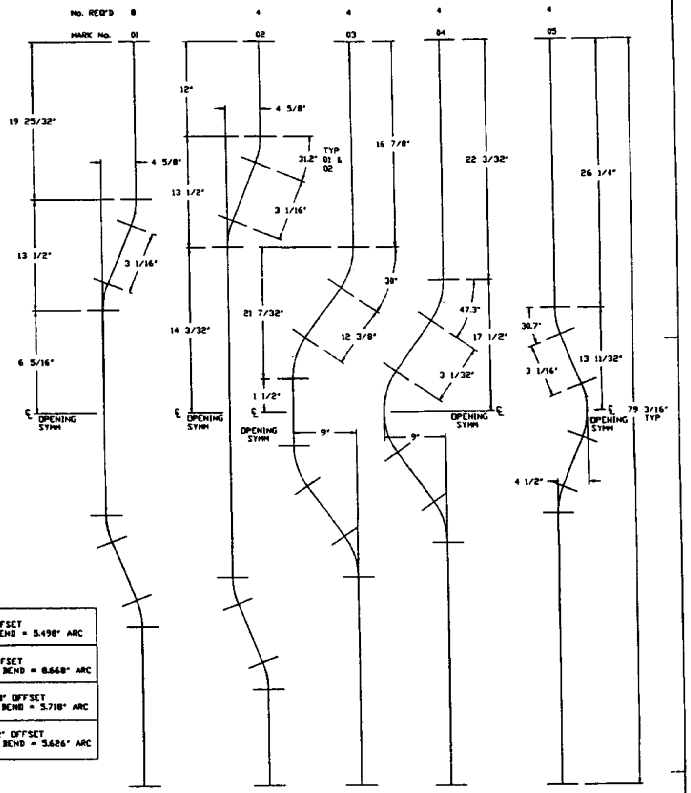
SEAL BOX DETAIL
3/16" THK CARBON STEEL
4 REQ'D



SECTION A-A



END PLATE DETAIL
3/16" THK CARBON STEEL
8 REQ'D



TUBING DETAIL

5° OFFSET 30° BEND = 5.498" ARC
9° OFFSET 47.3° BEND = 8.668" ARC
4 5/8" OFFSET 31.2° BEND = 5.718" ARC
4 1/2" OFFSET 30.7° BEND = 5.626" ARC

NOTE
1- TUBING 4 1/2" O.D. x .320" NW
SA-192
2- BEND RADIUS 10 1/2"
3- 4 OPENINGS REQ'D.

REV	DESCRIPTION	BY	DATE

POTTS WELDING & BOILER REPAIR CO., INC.

EASTMAN KODAK
ROCHESTER N.Y.

OVERFIRE AIR
INJECTION OPENING

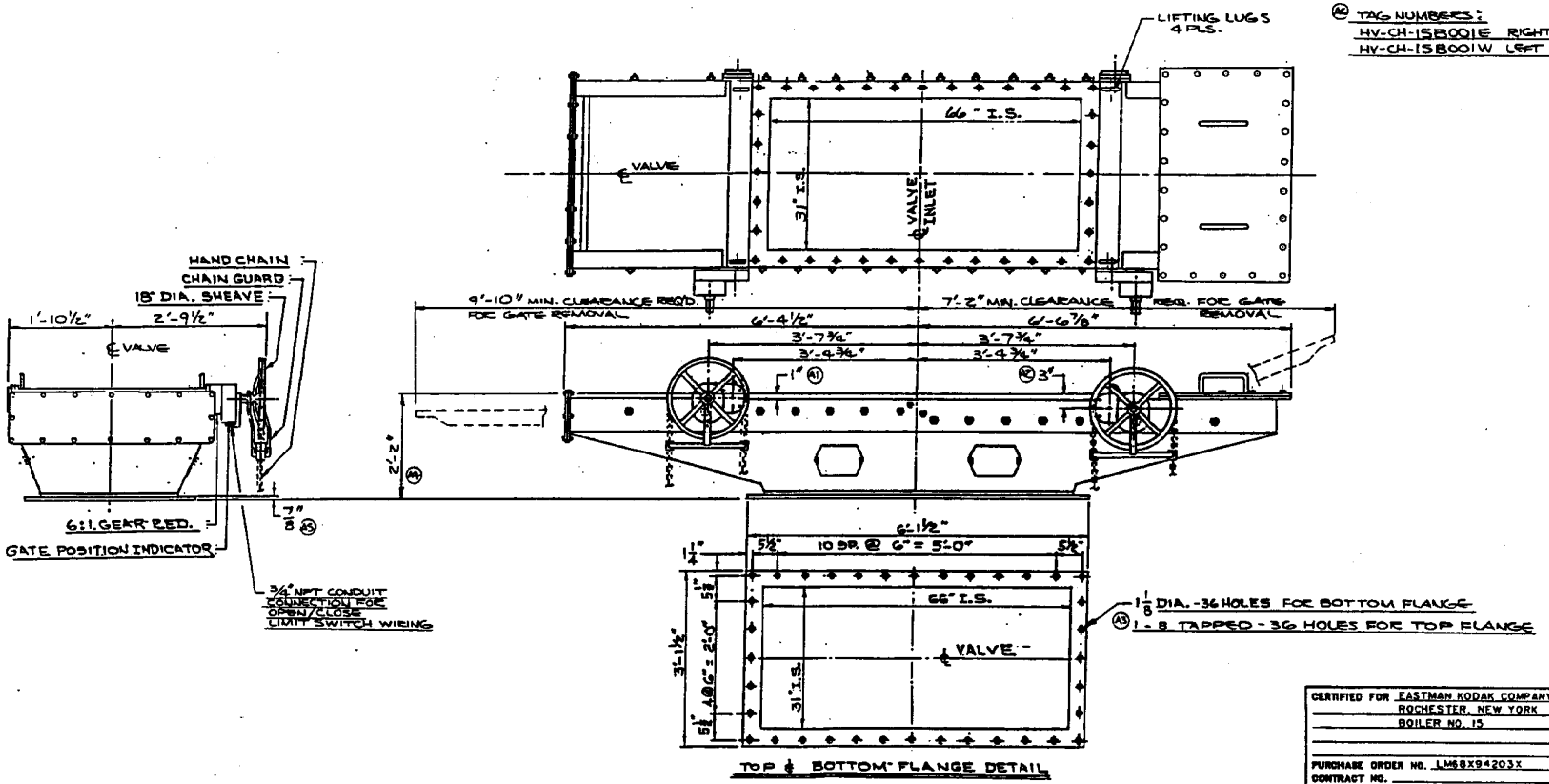
DRAWN JAS 08/05/96
CHECKED
SCALE NONE

D-960704C

SPECIFICATIONS

QUANTITY VALVES REQ'D RIGHT HAND 1 LEFT HAND 1
VALVE SIZE AND TYPE SIX66 VTW SS-VB-SP
MANUAL [X] SHEAVE/GUARD [X]
FT. HAND CHAIN 19'-4"
POSITION INDICATOR TYPE ELECT/MECH [X]
SPECIAL FEATURES: INLET SKIRT- 1/4" 304 SST
BODY PLATES- 1/4" 304 SST IN ACTIVE COAL FLOW

(AC) TAG NUMBERS:
HV-CH-1SB001E RIGHT HAND VALVE
HV-CH-1SB001W LEFT HAND VALVE



TOP & BOTTOM FLANGE DETAIL

(A3) NOTE: RIGHT HAND VALVE SHOWN, LEFT HAND VALVE HAS OPERATORS ON THE OPPOSITE SIDE.

STOCK
JUL 31 1996
PRINTED

CERTIFIED FOR EASTMAN KODAK COMPANY
ROCHESTER, NEW YORK
BOILER NO. 15

PURCHASE ORDER NO. LM68X94203X
CONTRACT NO.
REQUISITION NO.
STOCK SALES ORDER NO. 07246-0000
RELATED DWG. 'S
CERTIFIED BY DONALD A. POLEWAN DATE 07-01-96

REF DWG D29422 NEXT ASSY. S.O.NO. 7246

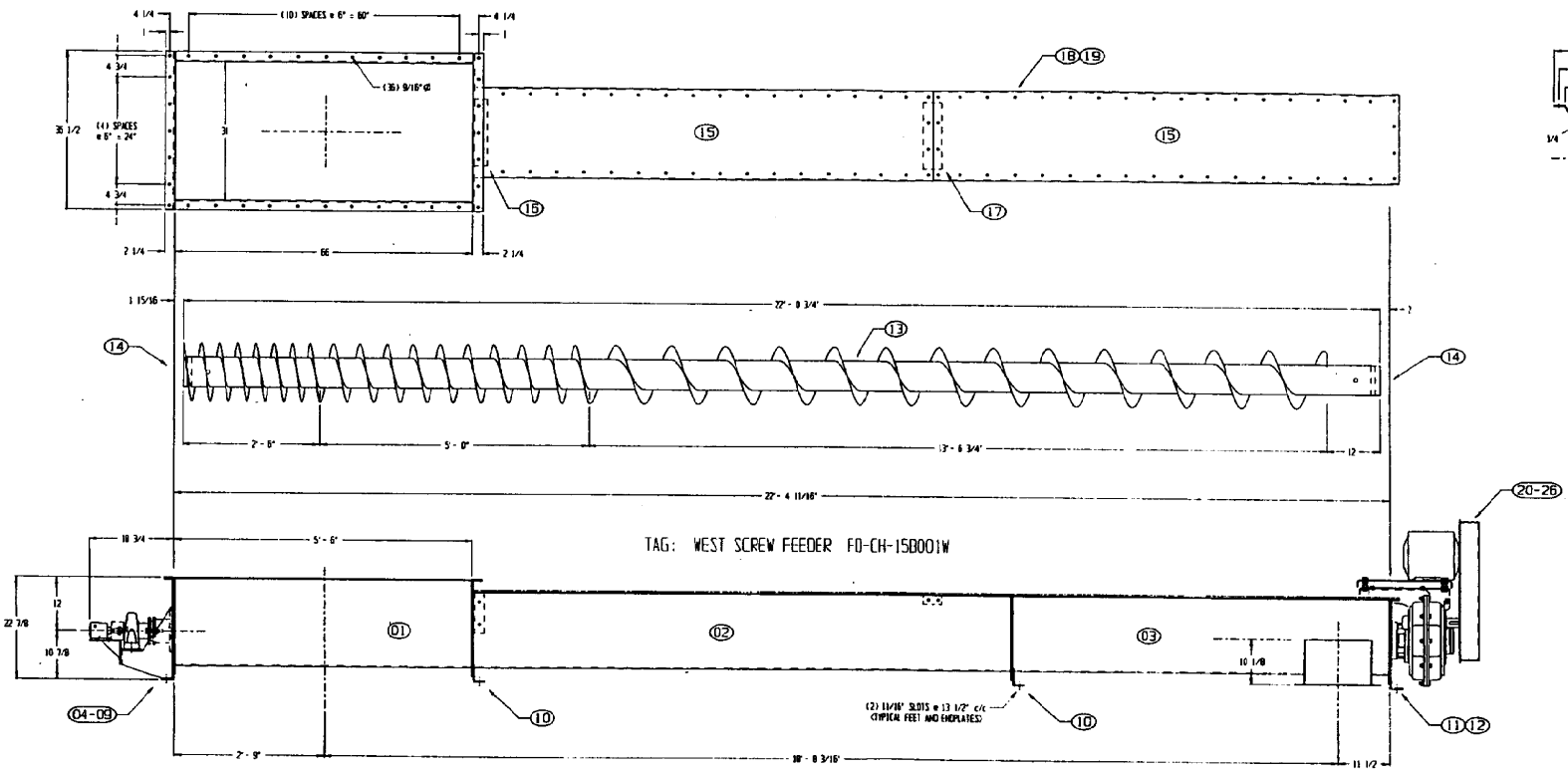
SCALE: NONE
DWN DATE
CHK DATE
APVD DATE

STOCK

STOCK TWIN STYLE COAL VALVE
TYPE 31 X 66 VTW-SS-VT-SP
FOR EASTMAN KODAK COMPANY
ROCHESTER, NEW YORK

SHEET 1 OF 1
D32566 A

NOTE: PURCHASER TO CHECK HIS SUPPORT STEEL FOR LOADS IMPOSED BY THIS EQUIPMENT



14" x 22'-4 11/16" SCREW CONVEYOR CONSISTING OF:		
NO.	QTY	DESCRIPTION
01	1	14FCT3-HTD 5'-8" LG., 1/4" THK. FORMED-FLANGE FLARED TROUGH.
02	1	14CTF3-10 10'-0" LG., 1/4" THK. FORMED-FLANGE U-TROUGH.
03	1	14CTF3 6'- 10 11/16" LG., 1/4" THK. FORMED-FLANGE U-TROUGH w/ 14TS07 15" x 15" x 3/16" THK. DISCHARGE FITTED.
04	1	14FTE07-PGC-HTD 3/8" THK. FLARED ENCPLATE w/ FOOT.
05	1	PGC7-AP 3 7/16" Ø AIR-PURGED PACKING GLAND SEAL.
06	1	YSP07RR 3 7/16" Ø PILLOW BLOCK BALL BEARING.
07	1	C10L22-SS QAZIC ZERO-SPEED SWITCH, 2 - 25 RPM, SPDT w/ NEMA 4/4X CAST IRON HOUSING.
08	1	FSB02 1/2" x 1/2" FLEXIBLE K-COUPLING.
09	1	CE7-HTD 3 7/16" Ø C1045 CRS ENDSHAFT w/ STUB SHAFT PROJECTION FOR SPEED SWITCH.
10	2	14TFF 1/4" THK. BOLT-ON FLANGE FOOT.
11	1	14TEF7-BB-P 3/8" THK. ENDPLATE w/ FOOT. (TO BE BOLTED ON FOR SCREW REMOVAL)
12	1	14TFG-SP 1/8" THK. CLOSED-CELL SPONGE RUBBER FLANGE GASKET.

NO.	QTY	DESCRIPTION
13	1	13S716-R 22'-0 3/4" LG., 13" DIA. RIGHT-HAND AR SECTIONAL SCREW w/ 1/4" THICK FLIGHTS CONTINUOUSLY WELDED BOTH SIDES TO 6" SCH 80 PIPE, BUSHED AND DRILLED BOTH ENDS FOR 3 7/16"Ø 2-BOLT SHAFTS. FIRST 2'-6" IS 4" PITCH; NEXT 5'-0" IS 8" PITCH; BALANCE IS 12" PITCH w/ 12" BARE PIPE AT DISCHARGE.
14	4	CC07-H-HTD 7/8" x 1 3/4" Gr 5 COUPLING BOLT w/ LOCKNUT.
15	2	14TCF7 8'-6" LG., 3/16" THK. FORMED-FLANGE COVER.
16	1	BOLT-IN STRIKE-OFF PLATE.
17	1	BOLT-IN COVER SPLICE BAR.
18	39'	SP200 1/8" x 2" SPONGE RUBBER COVER GASKET.
19	80	1/2" x 1 1/4" HHCS COVER BOLT @ 6" c/c.
		7 1/2 HP @ 15 RPM DRIVE UNIT:
20	1	7 1/2 HP 1750 RPM MOTOR (SUPPLIED BY BUSH-MILLER)
21	1	315TL40x3-7/16c DORRIS SCREW CONVEYOR DRIVE, 38.790:1 RATIO, w/ CEMA ADAPTOR
22	1	3MM DORRIS MOTOR MOUNT, ORIENTATION 'S', LOW POS'N

NO.	QTY	DESCRIPTION
23	1	G4 GUARDIAN DRIVE GUARD
24	1	1600-8M-30 HTS BELT
25	1	P48-8M-30-3QS w/ QDS 1 3/8 MOTOR HTS SPROCKET
26	1	P144-8M-30-SF w/ SF 7 REDUCER HTS SPROCKET

GENERAL NOTES:
1. SHOP ASSEMBLED AND TESTED.
2. ONLY DISCHARGE ENCPLATE HAS GASKET; ALL OTHER TROUGH JOINTS TO BE SEAM WELDED.
3. CONVEYOR COMPONENTS TO HAVE ONE COAT OF MARTIN STANDARD GRAY HI-ALKYD ENAMEL PRIMER.

FILE COPY / FOR REFERENCE
WE ARE PROCEEDING W/
FABRICATION PER THIS PRINT

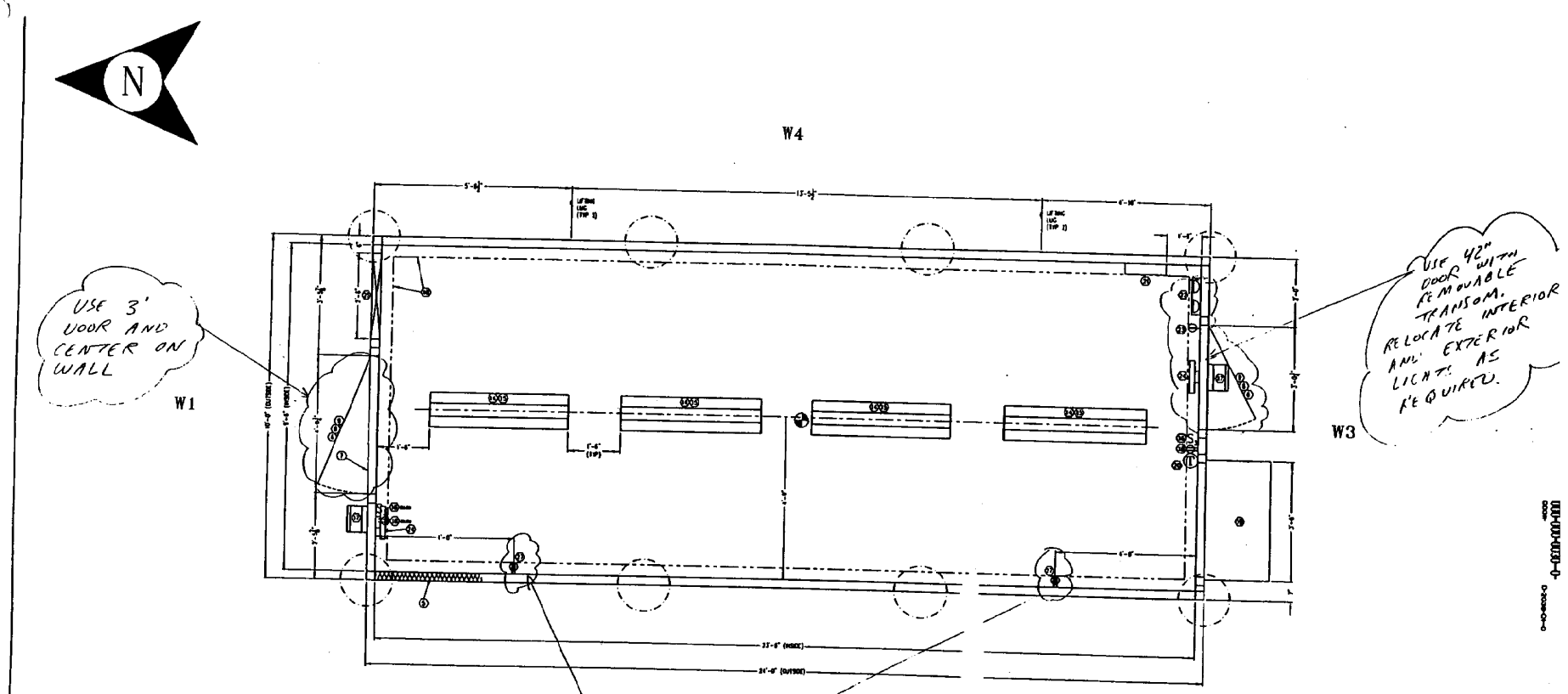
ISSUED
AUG 01 1996
MARTIN SPROCKET & GEAR DANIELSVILLE, PA 18038

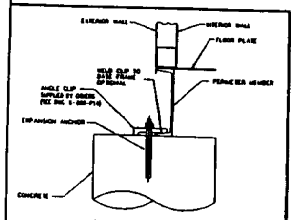
Martin SPROCKET & GEAR, INC.
3376 DELPS ROAD
P.O. BOX 267
DANIELSVILLE PA 18038
PHONE: (810) 837-1841
FAX: (810) 837-7337

BUSH-MILLER INC.
READING PA

14" DIA. x 22'-4 11/16" LONG
SCREW CONVEYOR ASSEMBLY

REVISIONS					
ALTERED LENGTH	1	JTD	8-1-96	SCALE 1" = 1'-0"	DWG. NO. 3019509
				DRAWN J.BETZENBERGER	DATE 7-17-96
				CHECKED S-4030-12	M12-63962-1





NOTES:
1. USE THIS DRAWING IN CONJUCTION WITH ATKINSON DRAWINGS D-2038-01 AND THE OUTLINE-LEGEND/DESIGN CRITERIA
2. SEE OUTLINE LEGEND FOR PAINT SPECIFICATION, ITEM DESCRIPTION, AND DESIGN CRITERIA
3. POWER CENTER TO BE SUPPORTED ON 6 PIERS.
4. ANCHOR CLIPS/BOLTS PROVIDED BY OTHERS.
5. DEPTH AND DIAMETER OF PIERS DETERMINED BY OTHERS ACCORDING TO LOCAL SOIL CONDITIONS
6. ESTIMATED WEIGHT: 94,000 POUNDS (MINUS CUSTOMER SUPPLIED AND INSTALLED EQUIPMENT)
7. CENTER OF GRAVITY: X = 245 3/4" Y = 58" (MINUS CUSTOMER SUPPLIED AND INSTALLED EQUIPMENT)
8. POWER CENTER SHOULD BE OFF-LOADED WITH CRANE USING SPREADER BARS AND RIGGING PROVIDED BY OTHERS

FOR APPROVAL
DATE SUBMITTED JUN 11 1996
RETURN BY JUN 17 1996
APPROVED AS SUBMITTED ☑
APPROVED AS NOTED ☐
NOT APPROVED RESUBMIT ☐
BY VA Kruse DATE 6/14/96
DRAWINGS NOT RETURNED BY THE DATE INDICATED COULD CAUSE DELAY IN DELIVERY

EASTMAN KODAK P.O. #JM-88K-474201

ATKINSON INDUSTRIES, INC.

THIS DRAWING IS OUR PROPERTY AND MUST NOT BE USED (EXCEPT IN CONNECTION WITH OUR WORK IF IS PREPARED IN ACCORDANCE WITH OUR INTERPRETATION OF THE CUSTOMER'S REQUIREMENTS AND/OR SPECIFICATIONS

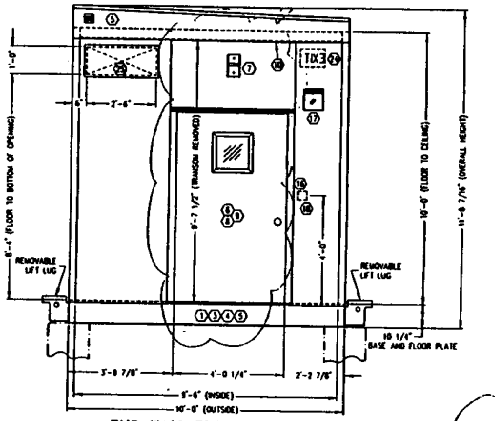
ATKINSON POWER CENTER
OUTLINE - PLAN

C6116-00

PARSONS POWER GROUP, INC.
EASTMAN KODAK
BOILER #5 MICRONIZED COAL REBURNER PROJECT
ROCHESTER, NY

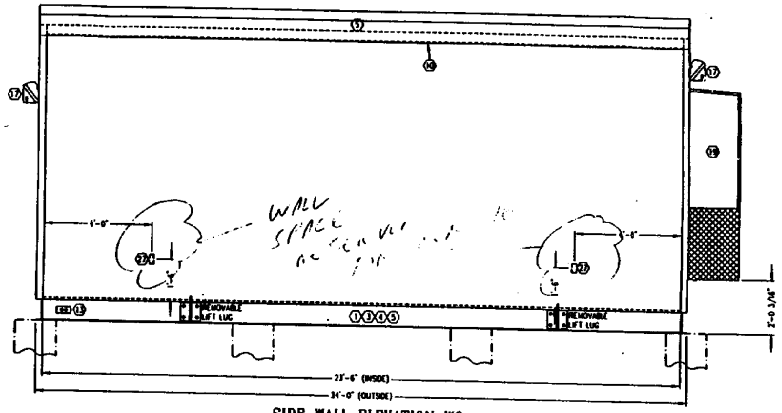
3/4"=1'-0"

D-2038-Q1



END WALL ELEVATION W1

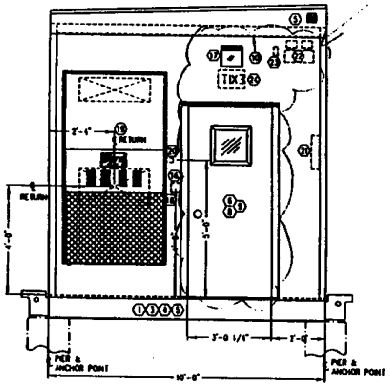
(VIEWED FROM OUTSIDE)



SIDE WALL ELEVATION W2

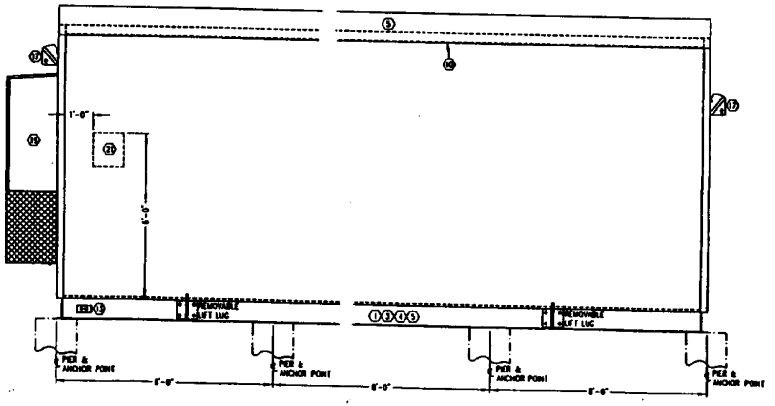
(VIEWED FROM OUTSIDE)

Door NOW 42". AND TRANSOM RELOCATE OTHER EQUIP AS REQD



END WALL ELEVATION W3

(VIEWED FROM OUTSIDE)



SIDE WALL ELEVATION W4

(VIEWED FROM OUTSIDE)

SEE ATKINSON DRAWING D-2038-Q1 FOR NOTES

FOR APPROVAL

DATE SUBMITTED JUN 11 1996

RETURN BY JUN 17 1996

APPROVED AS SUBMITTED ☐

APPROVED AS NOTED ☑

NOT APPROVED RESUBMIT ☐

BY _____ DATE 6/14/96

DRAWINGS NOT RETURNED BY THE DATE INDICATED COULD CAUSE DELAY IN DELIVERY

EASTMAN KODAK P.O. #JK-66X-673401

ATKINSON INDUSTRIES, INC.

THIS DRAWING IS THE PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH OUR WORK. IT IS PREPARED IN ACCORDANCE WITH OUR INTERPRETATION OF THE CUSTOMER'S REQUIREMENTS AND/OR SPECIFICATIONS.

3				
2				
1				
0	ISSUED FOR APPROVAL	6/6/96		6/6/96
REV	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED BY	DATE

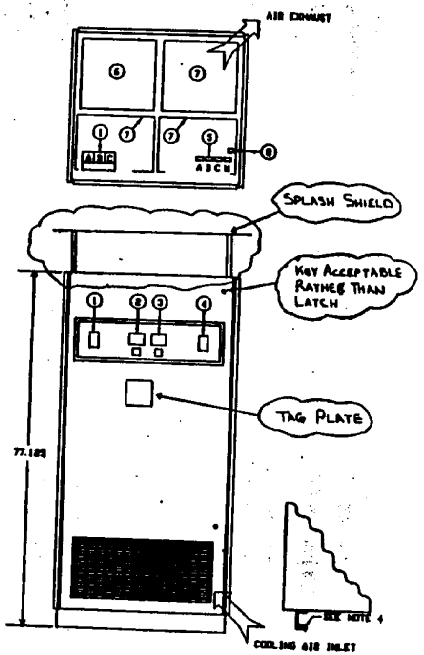
ATKINSON POWER CENTER
OUTLINE - ELEVATION

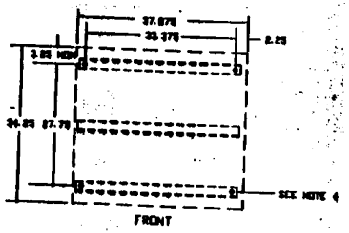
SHOP ORDER C6116-00

PARSONS POWER GROUP, INC.
EASTMAN KODAK
BOILER #5 MICRONIZED COAL REBURNER PROJECT
ROCHESTER, NY

SCALE 1/2"=1'-0" REV 0

DRAWING NO D-2038-Q2





FLOOR PLAN

ITEMS:

1. AC INPUT CIRCUIT BREAKER
2. OUTPUT VOLTMETER & PHASE SW
3. OUTPUT AMMETER & PHASE SW
4. OUTPUT NON-AUTO CIRCUIT BREAKER
5. AC OUTPUT TERMINALS
6. COOLING FAN
7. REMOVABLE COVER FOR CABLE ENTRY
8. GROUND LUG

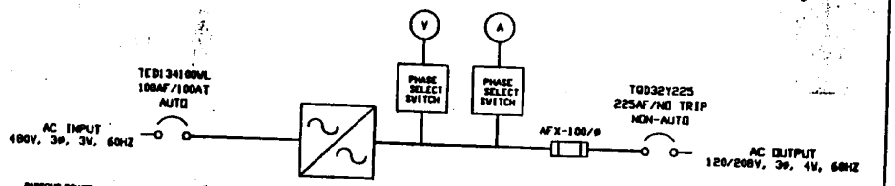
CONNECTIONS TO EQUIPMENT: (SEE NOTE 6 AND TABLE)

1) AC INPUT: CONNECT TO ITEM 1 AS INDICATED.
PHASE SEQUENCE MUST BE A-B-C IF USED
WITH A UPS SYSTEM, NEUTRAL CONNECTED
TO 8 AS INDICATED.
2) AC OUTPUT: CONNECT TO ITEM 5 AS INDICATED.
3) ENCLOSURE GROUND: CONNECT BUILDING GROUND TO ITEM 8.

MODEL	WEIGHT LBS	BTU/HR @ F.L.	AC INPUT (3Ø, 60HZ) VOLTS	AC INPUT (3Ø, 60HZ) MAX AMPS (NOTE 6)	AC OUTPUT (3Ø) VOLTS 4 WIRE	AC OUTPUT (3Ø) KVA
480-120/208Y83	2100	11,000	480 3 WIRE	94	120/208	50

NOTES:

1) RECOMMENDED MINIMUM CLEARANCES:
FRONT: 36", REAR: 0", TOP: 18", SIDES: 0"
2) ALL DIMENSIONS IN INCHES
3) SYSTEM MUST HAVE ALL PANELS & DOORS INSTALLED FOR PROPER OPERATION
4) BOLT-DOWN HOLES ARE .531 DIA. SQUARE BEVEL WASHER 16 2/3% SLOPE NEEDED AT BOLTDOWN HOLES WHEN EQUIPMENT IS SECURED TO FLOOR.
5) INPUT ISOLATION TRANSFORMER HAS AN ELECTROSTATIC SHIELD WITH GND. WIRE.
6) INSTANTANEOUS TRIPS ON UNIT ENERGIZATION MAY BE 15X RATED FOR 1/2 CYCLE.
7) MAX AMBIENT TEMP. 40°C
8) TYPICAL FOR BOTH UNITS
9) COLOR ANSI LIGHT GREY, INSIDE & OUT



REGULATOR ONE-LINE DIAGRAM

PARSONS POWER

CUSTOMER
EASTMAN KODAK Co.
P.O. No. L4680X-94008X
FOR: CDAL REBURN PROJECT
TAG No's: TR-CR-001
TR-CR-002

ISSUE	DESCRIPTION	BY	APPVD	DATE
A	REL FROM C23454-2 'B'	DTB	GJB	7/8/96

CYBEREX INC. 7171 INDUSTRIAL PARK BLVD. MENTOR, OHIO 44060 (216)946-1783 TELEX: 980844

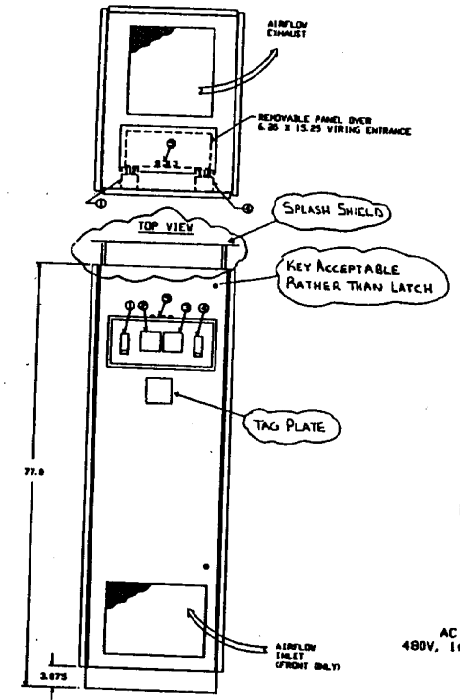
STATUS	SCALE	DWN. BY	CHKD.
		DTB	GJB
		APPVD.	DATE
		GJB	7/8/96

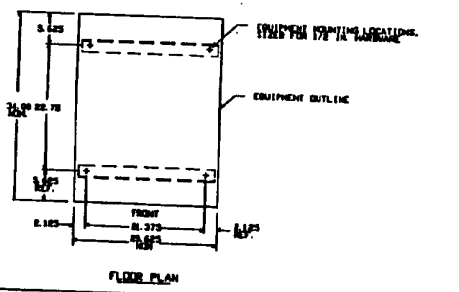
TITLE: OUTLINE & MOUNTING DIMENSIONS 3Ø AC REGULATOR

DWG. SIZE. NUMBER: C12847-1

SHEET 1 OF 1

MODEL	INPUT VOLTS @ 60HZ, 1 PH	MAX INPUT AMP.	MAX INSTANTANEOUS INRUSH AMP.	RATED OUTPUT V, KVA	WEIGHT LBS	HEAT GENERATION BTU/HR
480-120/15VBI	384-528	48	700	120, 15	1100	3300





ITEMS:

1. AC INPUT CIRCUIT BREAKER.
2. AC OUTPUT VOLTMETER.
3. AC OUTPUT AMMETER.
4. AC OUTPUT TERMINALS OR NON-AUTO CIRCUIT BREAKER.
5. GROUND TERMINAL.

EXTERNAL CONNECTIONS:

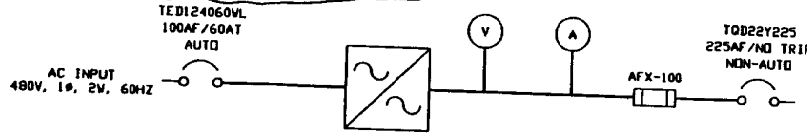
1. REGULATOR AC INPUT: VOLTAGE & CURRENT PER TABLE (FEED BREAKER INSTANTANEOUS TRIP MUST HOLD MAX INSTANTANEOUS AMP FOR 10 MSEC.) CONNECT TO ITEM 1, L1 TO TERMINAL 1, L2 TO TERMINAL 2.
2. REGULATOR AC OUTPUT: 120V, 1PH., 60HZ, RATED KVA PER TABLE @ PF 1.0-0.8 LAG CONNECT AT ITEM 4, HOT ON TERM. 1 AND NEUTRAL ON TERM. 2.
3. ENCLOSURE GROUND CONNECTION: CONNECT BUILDING GROUND SYSTEM TO ITEM 5.
4. BREAKERS HAVE STANDARD MANUFACTURER'S TERMINALS. IF OUTPUT BREAKER NOT INCLUDED, OUTPUT TERMINALS ACCEPT NEMA 2-HOLE LUGS.

NOTES:

1. RECOMMENDED MINIMUM CLEARANCES: FRONT: 30 IN., TOP: 18 IN. REAR AND SIDE CLEARANCES NOT MANDATORY.
2. MAXIMUM AMBIENT: 40°C NOTE AIRFLOW DIRECTION FOR ROOM AIR CONDITIONING LAYOUT. HEAT GENERATED AT FULL LOAD PER TABLE
3. ALL DIMENSIONS IN INCHES.
4. INPUT ISOLATION TRANSFORMER HAS AN ELECTROSTATIC SHIELD WITH GND WIRE

5. TYPICAL FOR BOTH UNITS
6. COLOR ANSI LIGHT GREY INSIDE & OUT

WILL UNIT OPERATE CORRECTLY @ SPECIFIED MAX TEMP W/O FAN? IF NOT FAN SHOULD BE ADDED. NOTE - DUSTY ENVIROMENT.



REGULATOR ONE-LINE DIAGRAM

PARSONS POWER

CUSTOMER:
EASTMAN KODAK Co.
P.O. No. LM68X-94008X
FOR: COAL REBURN PROJECT
TAG NO'S: TR-CH-158001
TR-CH-158002

ISSUE	DESCRIPTION	BY	APPVD	DATE
A	RELEASED FROM C28026-1 'D'	DTB	GJB	7/8/96

CYBEREX INC. 7171 INDUSTRIAL PARK BLVD. MENTOR, OHIO 44060 (216)946-1783 TELEX: 980644

STATUS	SCALE	DWN. BY	CHKD.
JOB 10938		DTB	GJB
		APPVD. GJB	DATE 7/8/96

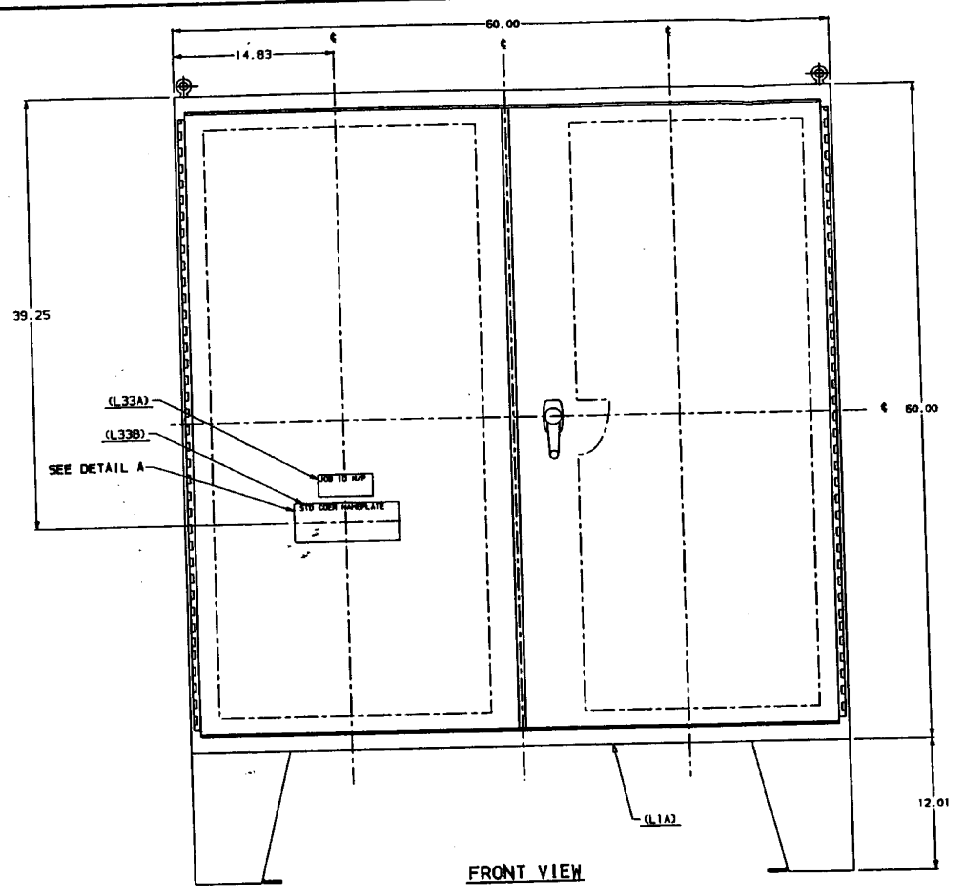
TITLE: OUTLINE & MOUNTING DIMENSIONS, 1ø AC REGULATOR

DWG. SIZE, NUMBER: C12847-2

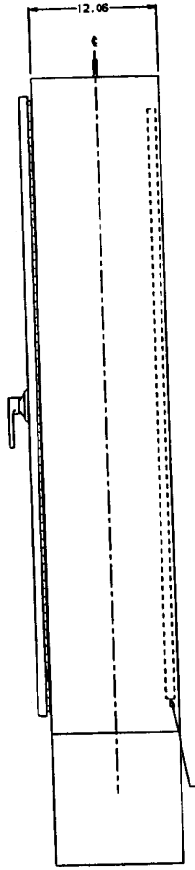
SHEET 1 OF 1

C28026-1-D

C28847-2-1-A



FRONT VIEW
A-606012LP



SIDE VIEW

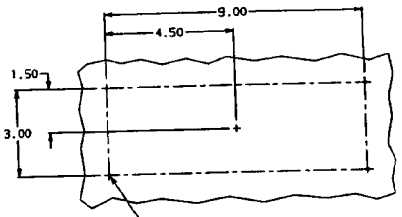
NOTES:

1. BMS LOGIC PANEL IS NEMA 12 HOFFMAN A-604812-LP CARBON STEEL.

   FINISH: WHITE ENAMEL INSIDE WITH RECOATABLE ANSI 61 GRAY OUTSIDE.

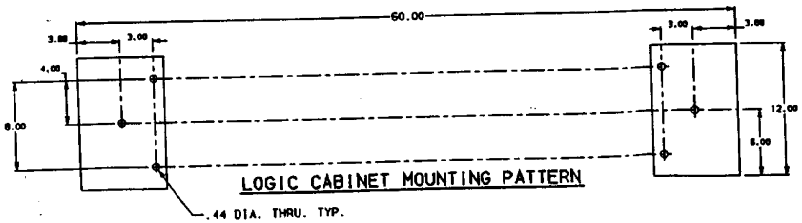
2. FOR WIRING AND WIRE NOTES SEE D-9681-044.

3. FOR SUB-PANEL ARRANGEMENT SEE SHEET 2 OF THIS DRAWING.



DETAIL A

SCALE: 1/2



LOGIC CABINET MOUNTING PATTERN

MASTER REV.
X
Date:

WARNING: DO NOT SCALE, DRAWING MAY BE REDUCED.

UNLESS OTHERWISE NOTED:
1. ALL DIMENSIONS ARE IN INCHES
2. TOLERANCES:
   a. ANGULAR ±.X
   b. LINEAR .X= ±.X
   .XX= ±.03
   .XXX= ±.003

UNLESS OTHERWISE STATED BREAK SHARP EDGES

REV	BY	CHD	APP	DESCRIPTION	DATE

DATE: 6-6-96
DRAWN: TK
CHECKED:
APPROVED:
PUBL. NO.:
COEN FILE NO. 300-12870-1
SCHEMATIC DIAGRAM D-0881-044
CUTOUT DWG. D-3730-XXX

COEN COMPANY, INC. — COMBUSTION ENGINEERS — BURLINGAME, CALIFORNIA

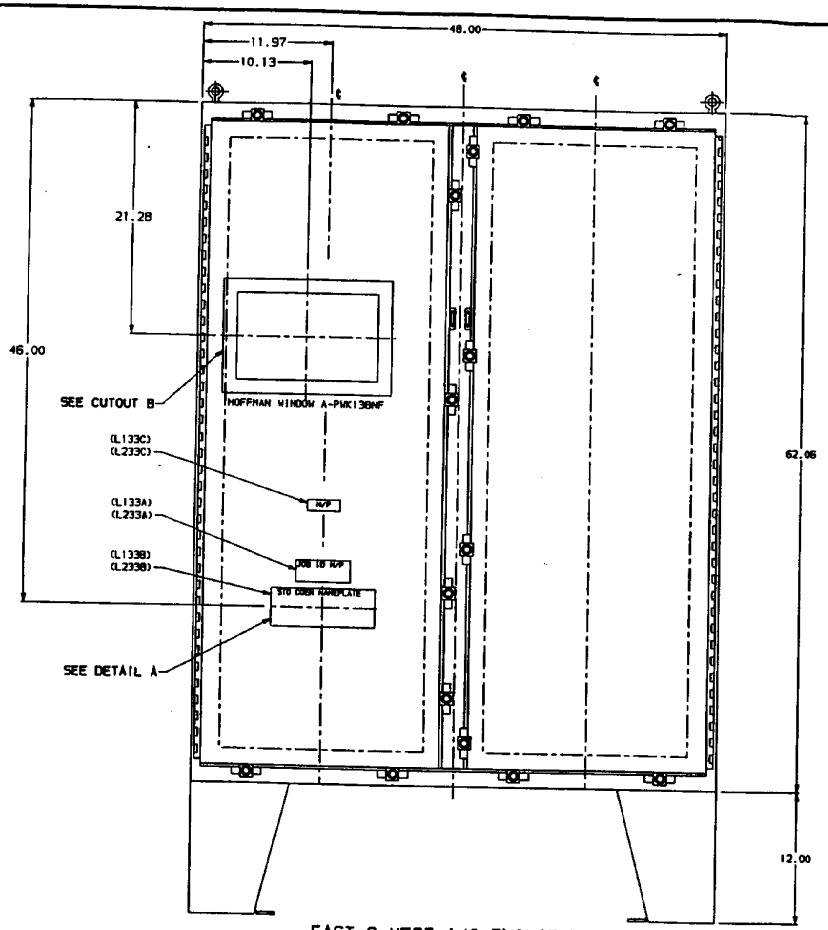
ENCLOSURE DIAGRAM
PLC LOGIC PANEL
BOILER 15

EASTMAN KODAK — ROCHESTER, N.Y.

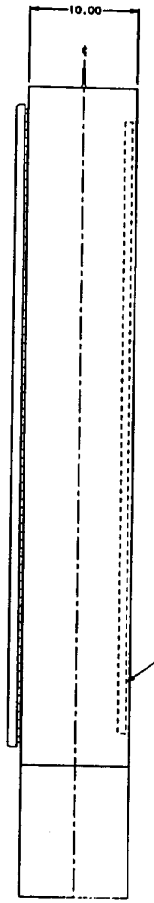
D 9683-044

SCALE 1" = 3/16" — SHEET 1 OF 5

2	1	SHEET
.	.	REV.



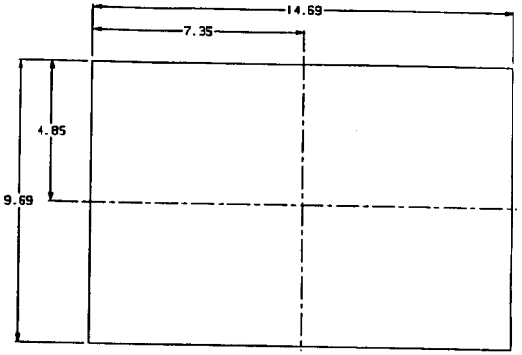
EAST & WEST I/O ENCLOSURE
FRONT VIEW
A-62H48CLP



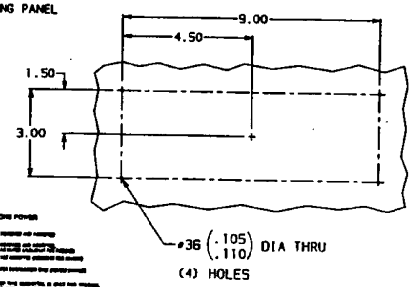
SIDE VIEW

NOTES:

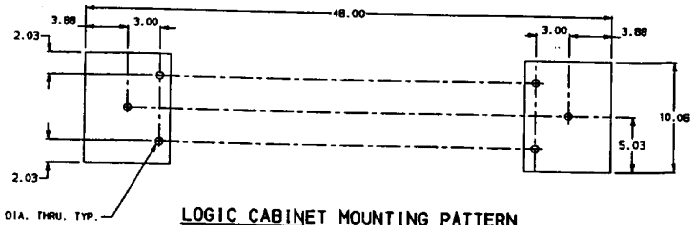
1. BMS LOGIC PANEL IS NEMA 4 HOFFMAN A-62H48CLP CARBON STEEL.
   FINISH: WHITE ENAMEL INSIDE WITH RECOATABLE ANSI 61 GRAY OUTSIDE.
2. FOR WIRING AND WIRE NOTES SEE D-9681-044.
3. FOR SUB-PANEL ARRANGEMENT SEE SHEET 4 & 5 OF THIS DRAWING.



CUTOUT B
SCALE 1/2



DETAIL A
SCALE: 1/2



LOGIC CABINET MOUNTING PATTERN

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UNLESS OTHERWISE NOTED:
1. ALL DIMENSIONS ARE IN INCHES
2. TOLERANCES:
   a. ANGULAR ± .X
   b. LINEAR .X = ± .X
      .XX = ± .03
      .XXX = ± .003

THIRD ANGLE PROJECTION

REV	BY	CHD	APP	DESCRIPTION

DATE: 8-6-96
DRAWN: TK
CHECKED:
APPROVED: RM
APPROVED:
PUBL. NO.:
COEN FILE NO. 300-12870-1
SCHEMATIC DIAGRAM D-9681-044
CUTOUT DWG. D-3730-XXX

COEN COMPANY, INC. COMBUSTION EN

ENCLOSURE DIAGR.
EAST & WEST I/O KODA
PANEL

EASTMAN KODAK

D 9683-0

SCALE 1" = 3/16" SHEET

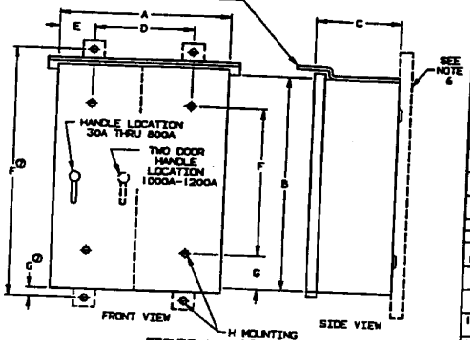
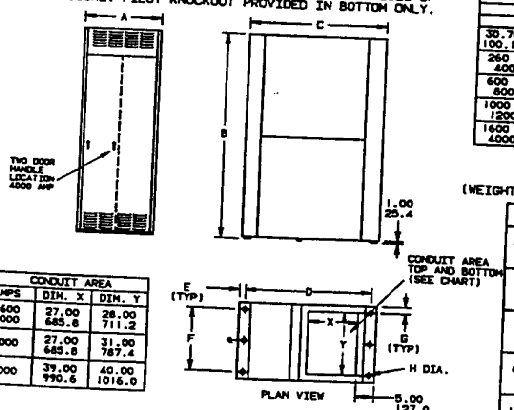


FIGURE 1
NOTES

NOTES - ① ② ③ ④ ⑤ ⑥ TYPE 1
NOTES - ① ② ③ ④ TYPE 2

1. REMOVABLE DOORS. KEY LOCKING HANDLE. SINGLE DOOR HINGED ON RIGHT SIDE WITH SINGLE CENTER LATCH AND CAPTIVE SCREWS ON TOP AND BOTTOM FOR 30 THRU 800 AMPS. TWO DOOR WITH 3 POINT LATCH ON 1000 THRU 1200 AMPS.
2. FULL WIRING GUTTERS AND 0.75-0.50 DIA. Ø19.1-Ø12.7 MM, COMBINATION PILOT KNOCKOUTS PROVIDED TOP AND BOTTOM ONLY.
3. TYPE I CAN BE SUPPLIED WITH GASKETING TO PROVIDE A DUST SEAL.
4. FLUSH MOUNTED TYPES HAVE REMOVABLE FLUSH DOOR AND TRIM. TRIM OVERLAPS 1.00, 25.4 MM, ON ALL SIDES.
5. ADD 3.00, 76.2 MM, FOR FLUSH MOUNTED ENCLOSURES.
6. EXTERNAL MOUNTING CHANNELS WITH MOUNTING HOLES FOR TYPE 2 ENCLOSURES ARE PROVIDED WITH A TOP MOUNTED ZIP SHIELD THAT EXTENDS BEYOND THE FRONT AND SIDES OF THE ENCLOSURE. PILOT KNOCKOUT PROVIDED IN BOTTOM ONLY.



CONDUIT AREA		
AMPS	DIM. X	DIM. Y
1600 2000	27.00 685.8	28.00 711.2
3000	27.00 685.8	31.00 787.4
4000	39.00 990.6	40.00 1016.0

FIGURE 2
NOTES

1. TYPE I FREE STANDING, FLOOR SUPPORTED, FRAME CONSTRUCTION.
2. REMOVEABLE PAN TYPE DOORS, LEVER TYPE KEY LOCKING HANDLE WITH SINGLE CENTER LATCH & CAPTIVE SCREWS ON TOP & BOTTOM. SINGLE DOOR HINGED ON RIGHT FOR 1600-3000 AMP. TWO DOOR FOR 4000 AMP.
3. VENTILATED FRONT AND BACK, VENTS TOP AND BOTTOM.
4. CABLE SUPPORT BRACKETS SUPPLIED WITH ENCLOSURE.

TYPE 1 AND 2 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITHOUT OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	1	17.50 ⑤ 444.5	31.00 ⑤ 787.4	11.62 295.1	14.50 368.3	1.50 38.1	28.00 711.2
260 & 400		18.00 ⑤ 457.2	48.00 ⑤ 1219.2	13.00 330.2	18.00 381.0	1.50 38.1	45.00 1143.0
600 & 800		24.00 609.6	63.00 1600.2	17.50 444.5	21.00 533.4	1.50 38.1	60.00 1524.0
1000 & 1200		34.00 914.4	79.00 2006.6	19.50 495.3	33.25 816.2	1.67 42.5	82.00 ⑥ 2082.8
1600 & 2000	2	34.00 863.6	91.00 2311.4	60.00 1524.0	54.00 1371.6	3.00 76.2	28.00 711.2
3000		37.00 939.8	91.00 2311.4	60.00 1524.0	54.00 1371.6	3.00 76.2	31.00 787.4
4000		46.00 1676.4	91.00 2311.4	72.00 1828.8	66.00 1676.4	3.00 76.2	42.00 1066.8

AMP SIZE	FIG NO	G	H
30,70, 100,150	1	1.50 38.1	0.37 Ø9.4
260 & 400		1.50 38.1	0.37 Ø9.4
600 & 800		1.50 38.1	0.37 Ø9.4
1000 & 1200		1.50 ⑥ 38.1	0.68 Ø17.3
1600 - 4000	2	3.00 76.2	.625 Ø15.8

TYPE 1 AND 2 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITH OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	1	17.50 ⑤ 444.5	31.00 ⑤ 787.4	11.62 295.1	14.50 368.3	1.50 38.1	28.00 711.2
260 & 400		18.00 ⑤ 457.2	48.00 ⑤ 1219.2	13.00 330.2	15.00 381.0	1.50 38.1	45.00 1143.0
600 & 800		30.00 762.0	63.00 1600.2	17.50 444.5	27.00 685.8	1.50 38.1	60.00 1524.0
1000 & 1200		44.00 1117.6	79.00 2006.6	19.50 495.3	33.75 857.3	5.12 130.0	82.00 ⑥ 2082.8
1600 & 2000	2	34.00 863.6	91.00 2311.4	60.00 1524.0	54.00 1371.6	3.00 76.2	28.00 711.2
3000		37.00 939.8	91.00 2311.4	60.00 1524.0	54.00 1371.6	3.00 76.2	31.00 787.4
4000		46.00 1676.4	91.00 2311.4	72.00 1828.8	66.00 1676.4	3.00 76.2	42.00 1066.8

AMP SIZE	FIG NO	G	H
30,70, 100,150	1	1.50 38.1	0.37 Ø9.4
260 & 400		1.50 38.1	0.37 Ø9.4
600 & 800		1.50 38.1	0.37 Ø9.4
1000 & 1200		1.50 ⑥ 38.1	0.68 Ø17.3
1600 - 4000	2	3.00 76.2	.625 Ø15.8

APPROXIMATE SHIPPING WEIGHT, LBS (KG)
(WEIGHT INCLUDES STANDARD TRANSFER SWITCH & CONTROLS)

AMP SIZE	POLES	WEIGHT TYPES 1 & 2	TYPES 3R, 4 & 12
30, 70 & 100	2	67 (31)	82 (37)
	3	70 (32)	85 (38)
	3 W/ACC.28	73 (33)	88 (40)
150	2	69 (32)	84 (38)
	3	72 (33)	87 (39)
	3 W/ACC.28	75 (34)	90 (41)
260 & 400	2	117 (53)	132 (60)
	3	125 (57)	140 (63)
	3 W/ACC.28	133 (61)	148 (67)
600 & 800	2	250 (114)	250 (114)
	3	260 (118)	260 (118)
	3 W/ACC.28	320 (145)	320 (145)
1000 & 1200	2	630 (286)	630 (286)
	3	650 (295)	650 (295)
	3 W/ACC.28	740 (336)	740 (336)
1600 & 2000	2	1070 (486)	CONSULT FACTORY
	3	1090 (495)	CONSULT FACTORY
	3 W/ACC.28	1115 (506)	CONSULT FACTORY
3000	2	2000 (908)	CONSULT FACTORY
	3	2150 (976)	CONSULT FACTORY
	3 W/ACC.28	2230 (1012)	CONSULT FACTORY
4000	2	2360 (1071)	CONSULT FACTORY
	3	2580 (1171)	CONSULT FACTORY
	3 W/ACC.28	2680 (1217)	CONSULT FACTORY

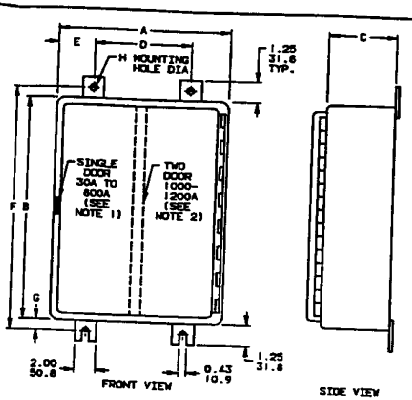


FIGURE 3
NOTES

TYPE 3R TYPE 4 TYPE 12

1. SINGLE DOOR HINGED ON RIGHT SIDE WITH PADLOCK HASP. PLATED DOOR CLAMPS ON THREE (3) SIDES FOR TYPE 4. AND ONE (1) SIDE FOR TYPE 3R & 12. (30A TO 800A)
2. TWO DOOR TYPE 4 ENCLOSURES HAVE REMOVABLE CENTER POST INSTALLED BETWEEN DOORS WITH DOOR CLAMPS ON THREE SIDES OF EACH DOOR. TWO DOOR TYPE 3R & 12 ENCLOSURES HAVE 3-POINT LATCHING WITH KEYLOCKING HANDLE. (1000-1200 A)
3. FULL WIRING GUTTERS PROVIDED TOP AND BOTTOM.
4. NO KNOCKOUTS PROVIDED

GENERAL NOTES
(FIGURES 1, 2, & 3)

1. ENCLOSURES CONSTRUCTED IN ACCORDANCE WITH UL STANDARD 508, OR UL 50.
2. STANDARD FINISH-LIGHT GREY ANSI #61.
3. WIDTH, HEIGHT, AND DEPTH DIMENSIONS ON FIG. 1 ARE INSIDE DIMENSIONS. WIDTH, HEIGHT, AND DEPTH DIMENSIONS ON FIG 2 & 3 ARE OUTSIDE DIMENSIONS.
4. THE TRANSFER SWITCH UNIT IS MOUNTED ON THE INSIDE BACK SURFACE AND THE ACCESSORY CONTROL PANEL MOUNTED ON THE INSIDE DOOR SURFACE. THE CONTROL PANEL IS CONNECTED TO THE TRANSFER SWITCH PANEL BY A WIRE HARNESS WITH A QUICK DISCONNECT PLUG.
5. AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.

TYPE 3R, 4, AND 12 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITHOUT OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	3	17.50 444.5	32.50 825.5	11.62 295.1	11.50 292.1	3.00 76.2	33.75 857.3
260 & 400		18.00 457.2	48.00 1219.2	13.00 330.2	12.00 304.8	3.00 76.2	49.25 1251.0
600 & 800		24.00 609.6	63.00 1600.2	17.50 444.5	18.00 457.2	3.00 76.2	64.25 1632.0
1000 & 1200		34.00 914.4	79.00 2006.6	19.50 495.3	30.00 762.0	3.00 76.2	80.25 2038.4
1600 & 2000		CONSULT FACTORY					
3000 & 4000							

AMP SIZE	FIG NO	G	H
30,70, 100,150	3	0.62 15.7	0.43 Ø10.9
260 & 400		0.62 15.7	0.43 Ø10.9
600 & 800		0.62 15.7	0.43 Ø10.9
1000 & 1200		0.62 15.7	0.43 Ø10.9
1600 & 2000		CONSULT FACTORY	
3000 & 4000			

TYPE 3R, 4, AND 12 ENCLOSURES FOR AUTOMATIC TRANSFER SWITCHES WITH OPTIONAL ACC. 28 OVERLAPPING NEUTRAL TRANSFER CONTACT

AMP SIZE	FIG NO	DIMENSIONS A	B	C	D	E	F
30,70, 100,150	3	17.50 444.5	32.50 825.5	11.62 295.1	11.50 292.1	3.00 76.2	33.75 857.3
260 & 400		18.00 457.2	48.00 1219.2	13.00 330.2	12.00 304.8	3.00 76.2	49.25 1251.0
600 & 800		30.00 762.0	63.00 1600.2	17.50 444.5	24.00 609.6	3.00 76.2	64.25 1632.0
1000 & 1200		44.00 1117.6	79.00 2006.6	19.50 459.3	38.00 965.2	3.00 76.2	80.25 2036.4
1600 & 2000		CONSULT FACTORY					
3000 & 4000							

AMP SIZE	FIG NO	G	H
30,70, 100,150	3	0.62 15.7	0.43 Ø10.9
260 & 400		0.62 15.7	0.43 Ø10.9
600 & 800		0.62 15.7	0.43 Ø10.9
1000 & 1200		0.62 15.7	0.43 Ø10.9
1600 & 2000		CONSULT FACTORY	
3000 & 4000			

SIZES OF UL LISTED SOLDERLESS SCREW TYPE TERMINALS FOR EXTERNAL POWER CONNECTIONS

SWITCH RATING (AMPS)	RANGE OF AL-CU WIRE SIZES
30	ONE #14 TO #6 AWG
70	ONE #14 TO 1/0 AWG
100	ONE #14 TO 2/0 AWG
150	ONE #8 TO 3/0 AWG
260-400	TWO #1/0 AWG TO 250 MCM OR ONE #4 AWG TO 600 MCM
600-800	THREE #2 AWG TO 600 MCM
1000-1200	FOUR #2 AWG TO 600 MCM
1600-4000	SUITABLE FOR BUS BAR

INCHES / MM

THIRD ANGLE PROJECTION

CATALOG NO. _____ CERTIFIED
TO ASCO ® S. G. _____
DATE _____ BY _____

COMPUTER GENERATED DRAWING

Automatic Switch Co.
FLORHAM PARK, NEW JERSEY, 07932
PRINTED IN U.S.A.

	BY	DATE
DRAWN	PDM	11/88
CHECKED	MB	11/88
DFTG APPL	MB	11/88
ENGR APPL	PH	11/88

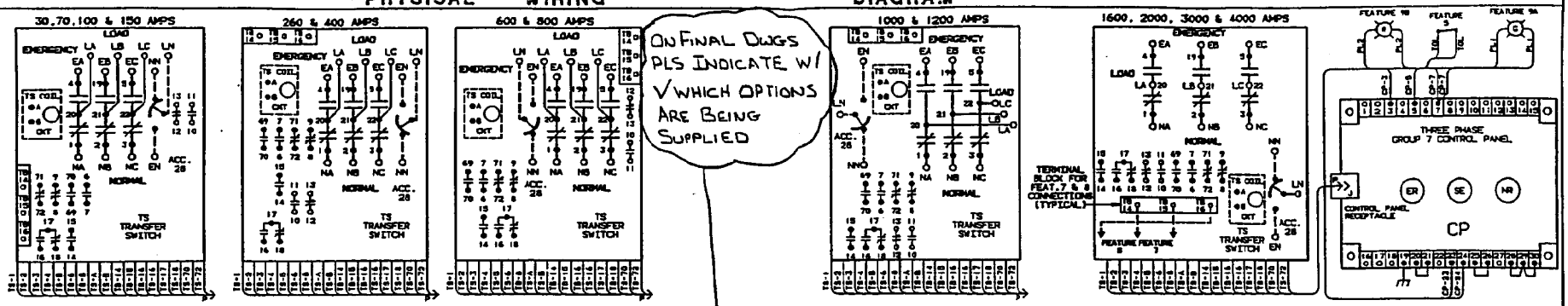
COMPOSITE ENCLOSURE OUTLINE AND MOUNTING DIAGRAM FOR 2 OR 3 POLE 30 THROUGH 4000 AMPERES ASCO ® 940 AUTOMATIC TRANSFER SWITCHES AND 386 NON-AUTOMATIC TRANSFER SWITCHES

122837	SEE ECN	A	9/92	FH
107077	ISSUED	-	11/88	FP
DFT NO	ECN CHKD	CHG	DATE	APPV

JS 401953

CHG LTR A

PHYSICAL WIRING DIAGRAM



ON FINAL DWGS PLS INDICATE W/ √ WHICH OPTIONS ARE BEING SUPPLIED

STANDARD FEATURES

VOLTAGE AND FREQUENCY SENSING

A. CLOSE DIFFERENTIAL VOLTAGE SENSING ON ALL PHASES OF NORMAL SOURCE. PICKUP VOLTAGE IS ADJUSTABLE FROM 85% TO 100% OF NOMINAL AND THE DROPOUT IS ADJUSTABLE FROM 75% TO 98% OF THE PICKUP VALUE. FACTORY SET TO PICKUP AT 90% AND DROPOUT AT 85% OF NOMINAL UNLESS OTHERWISE SPECIFIED. STANDARD FEATURE 4B.

B. SINGLE PHASE VOLTAGE SENSING OF EMERGENCY SOURCE. PICKUP ADJUSTABLE FROM 85% TO 100% OF NOMINAL. FACTORY SET TO PICKUP AT 90% UNLESS OTHERWISE SPECIFIED.

C. FREQUENCY SENSING OF EMERGENCY SOURCE. PICKUP ADJUSTABLE FROM 90% TO 100% OF NOMINAL. FACTORY SET TO PICKUP AT 95% UNLESS OTHERWISE SPECIFIED.

TIME DELAYS

TIME DELAY TO OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES TO DELAY ALL TRANSFER SWITCH AND ENGINE STARTING SIGNALS. ADJUSTABLE FROM 0 TO 6 SECONDS. FACTORY SET AT 1 SECOND UNLESS OTHERWISE SPECIFIED. STANDARD FEATURE 1.

E. RETRANSFER TO NORMAL TIME DELAY. TIME DELAY IS AUTOMATICALLY BYPASSED IF EMERGENCY SOURCE FAILS AND NORMAL SOURCE IS AVAILABLE. ADJUSTABLE FROM 0 TO 30 MINUTES. FACTORY SET AT 30 MINUTES UNLESS OTHERWISE SPECIFIED. STANDARD FEATURE 3A.

F. UNLOADED RUNNING TIME DELAY FOR EMERGENCY ENGINE GENERATOR COOLDOWN. ADJUSTABLE FROM 0 TO 60 MINUTES. FACTORY SET AT 5 MINUTES UNLESS OTHERWISE SPECIFIED. STANDARD FEATURE 2E.

G. TRANSFER TO EMERGENCY TIME DELAY. ADJUSTABLE FROM 0 TO 5 MINUTES. FACTORY SET AT 0 MINUTES UNLESS OTHERWISE SPECIFIED. STANDARD FEATURE 2B.

MANUAL CONTROLS

H. MOMENTARY TYPE TEST SWITCH (TGL) TO SIMULATE NORMAL SOURCE FAILURE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE. STANDARD FEATURE 5.

REMOTE AUTOMATIC TRANSFER SWITCH CIRCUITS

J. TERMINAL PROVISIONS FOR REMOTE CUSTOMER CONTACT WHICH OPENS TO SIGNAL A.T.S. TO TRANSFER TO EMERGENCY. REFER TO OPERATOR'S MANUAL TO ACTIVATE. STANDARD FEATURE 17. (SEE NOTE 9)

ENGINE CONTROL CONTACTS

K. ONE SET OF CONTACTS CONSISTING OF: ONE CONTACT THAT CLOSES WHEN NORMAL SOURCE FAILS AND ONE CONTACT THAT OPENS WHEN NORMAL SOURCE FAILS. CONTACTS ARE GOLD FLASHED FOR LOW VOLTAGE ENGINE START SIGNALS OR OTHER CUSTOMER USE. RATED 10 AMPS. 32 VOLTS DC. STANDARD FEATURE 7/8.

INDICATORS

L. ONE SET OF AUXILIARY CONTACTS CONSISTING OF: ONE CONTACT CLOSED WHEN A.T.S. IS CONNECTED TO NORMAL AND ONE CONTACT CLOSED WHEN A.T.S. IS CONNECTED TO EMERGENCY. (ADDITIONAL SETS OF AUXILIARY CONTACTS ARE AVAILABLE AS OPTIONS - SEE BELOW). STANDARD FEATURE 14A/14B.

M. ONE SET OF SIGNAL LIGHTS CONSISTING OF: ONE SIGNAL LIGHT (GREEN) TO INDICATE WHEN A.T.S. IS CONNECTED TO NORMAL SOURCE AND ONE SIGNAL LIGHT (RED) TO INDICATE WHEN A.T.S. IS CONNECTED TO EMERGENCY SOURCE. LIGHTS ARE INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE. STANDARD FEATURE 9A/9B.

TRANSFER INHIBIT

N. TERMINAL PROVISIONS FOR REMOTE CUSTOMER CONTACT(S) TO INHIBIT A.T.S. TRANSFER TO NORMAL AND/OR EMERGENCY SOURCE. CLOSING CONTACT OPENS CIRCUIT TO INHIBIT TRANSFER. REFER TO OPERATOR'S MANUAL TO ACTIVATE. STANDARD FEATURE 34A/34B. (SEE NOTE 9)

COMMIT/NO COMMIT ON TRANSFER

P. UPON FEATURE 1 TIMING OUT (DUE TO A TEST OR NORMAL SOURCE FAILURE) THE A.T.S. IS COMMITTED TO TRANSFER TO EMERGENCY, EVEN IF THE NORMAL SOURCE IS RESTORED BEFORE THE TRANSFER TAKES PLACE. THIS "COMMIT ON TRANSFER" FEATURE CAN BE OVERRIDDEN BY OPERATING A SWITCH IN THE CONTROL PANEL. REFER TO OPERATOR'S MANUAL.

FREQUENCY SELECTION

R. OPERATING FREQUENCIES OF 50HZ. OR 60HZ. MAY BE SELECTED BY A SWITCH IN THE CONTROL PANEL. FACTORY SET AT SPECIFIED FREQUENCY. REFER TO OPERATORS'S MANUAL.

SHOW WIRING OF OPTIONS ON FINAL DWGS.

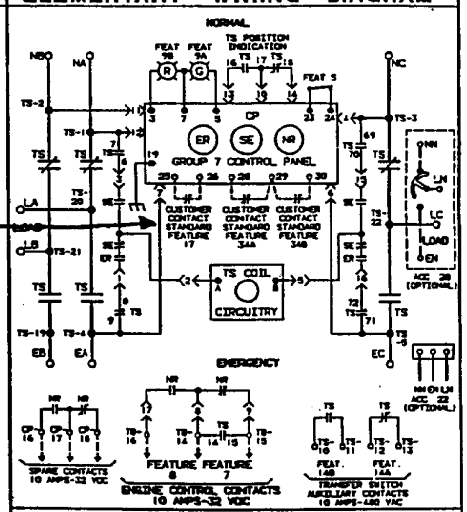
THREE PHASE/SINGLE PHASE SELECTION

S. THREE PHASE CONTROL MAY BE OPERATED ON SINGLE PHASE SOURCES BY OPERATING A SWITCH IN THE CONTROL PANEL. THE SINGLE PHASE SOURCES MUST BE CONNECTED TO POWER TERMINALS NA/NC AND EA/EC. REFER TO OPERATORS' MANUAL.

GENERAL NOTES

1. SWITCH SHOWN DE-ENERGIZED AND CONNECTED TO NORMAL SOURCE.
2. DEVICE SYMBOLS AND DESIGNATIONS ARE IN ACCORDANCE WITH NEMA PUB.ICS 1-1983, PART 1-101A.
3. WIRES: #20 AWG ON 30-150 AMPS AND #16 AWG ON 260-4000 AMPS, STRANDED COPPER.
4. ○ INDICATES CUSTOMER CONNECTION POINTS.
5. ● INDICATES FACTORY CONNECTION POINTS.
6. CONNECTION POINTS THAT HAVE BOTH CUSTOMER CONNECTIONS AND FACTORY CONNECTIONS ARE SHOWN OPEN AS CUSTOMER CONNECTION POINTS.
7. ON ENCLOSED TYPE SWITCHES THE TRANSFER UNIT IS MOUNTED ON THE BACK INSIDE SURFACE AND THE CONTROL PANEL ON THE INSIDE DOOR SURFACE. WHEN AN ADDITIONAL ACCESSORY MOUNTING PANEL IS REQUIRED TO MOUNT OPTIONAL ACCESSORIES, IT IS LOCATED DIRECTLY BELOW THE CONTROL PANEL.
8. ALL FEATURES AND OPTIONS SHOWN ARE UL RECOGNIZED.
9. CUSTOMER REMOTE CONTACTS THAT ARE CONNECTED TO A.T.S. CONTROLS SHOULD BE SUITABLE FOR LOW ENERGY CIRCUITS.
10. REFER TO OPERATOR'S MANUAL FOR WIRING OF OPTIONAL ACCESSORIES SHOWN BELOW.
11. ADJUSTMENTS FOR PICKUP AND DROPOUT SETTINGS ARE IN INCREMENTS OF 1%. TIME DELAY ADJUSTMENTS ARE IN DISCRETE INCREMENTS.
12. ON OPEN TYPE SWITCHES, CONTROL PANEL (CP) TERMINAL 19 MUST BE CONNECTED TO GROUND POTENTIAL. A TAGGED WIRE IS PROVIDED PRE-CONNECTED TO CP TERMINAL 19 FOR THIS PURPOSE.
13. AN OPERATORS MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH

ELEMENTARY WIRING DIAGRAM



OPTIONAL ACCESSORIES

MANUAL CONTROLS

☐ 4B. MOMENTARY OVERRIDE SWITCH TO MANUALLY BYPASS TIME DELAY ON RETRANSFER TO NORMAL. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

☐ 6C. MOMENTARY RESET SWITCH FOR MANUAL RETRANSFER OF THE A.T.S TO THE NORMAL SOURCE ONLY AFTER TIME DELAY FEATURE 3A EXPIRES WITH INSTANTANEOUS AUTOMATIC RETRANSFER IN THE EVENT OF EMERGENCY SOURCE FAILURE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

INDICATORS

☐ 14A/14B. ADDITIONAL AUXILIARY CONTACT SETS. ONE SET IS SUPPLIED AS STANDARD. SPECIFY TOTAL QUANTITY WHEN MORE THAN ONE SET IS REQUIRED. TOTAL QUANTITY_____

INDICATORS (CONT'D.)

☐ 9C/9D : ONE SET OF SIGNAL LIGHTS CONSISTING OF: ONE SIGNAL LIGHT (GREEN) TO INDICATE NORMAL SOURCE AVAILABLE AND ONE SIGNAL LIGHT (RED) TO INDICATE EMERGENCY SOURCE AVAILABLE. INSTALLED ON DOOR OF ENCLOSED TYPE. SHIPPED LOOSE FOR OPEN TYPE.

PLANT EXERCISER

☐ 11C: ENGINE GENERATOR EXERCISING TIMER WITH "LOAD" OR "NO-LOAD" OPERATING MODES. ADJUSTABLE FROM 1 MINUTE TO 24 HOURS IN 1 MINUTE INCREMENTS. FACTORY SET FOR 20 MINUTES MINIMUM EACH WEEK UNLESS OTHERWISE SPECIFIED. REFER TO OPERATOR'S MANUAL FOR MODE SELECTION.

MOTOR LOAD TRANSFER

☐ 27: INPHASE MONITOR CONTROL FOR TRANSFER AND RETRANSFER OF MOTOR LOADS, SO THAT INRUSH CURRENTS DO NOT EXCEED NORMAL STARTING CURRENTS. TO AVOID NUISANCE TRIPPING OF CIRCUIT BREAKERS AND POSSIBLE MECHANICAL DAMAGE TO MOTOR COUPLINGS.

TRANSFER SWITCH OPTIONS

☐ 22. SOLID NEUTRAL, WITH FULL RATED TERMINALS. AL-CU. UL LISTED. SHIPPED LOOSE FOR OPEN TYPE.

☐ 23. OVERLAPPING NEUTRAL TRANSFER CONTACTS. ASSURES PROPER GROUND FAULT SENSING AND AVOIDS POSSIBLE PHASE OVERVOLTAGES DURING TRANSFER OF NEUTRAL BETWEEN NORMAL AND EMERGENCY. NOTE: NORMAL AND EMERGENCY CONTACTS, ON ACC. 28 POLE ARE REVERSED ON 30-150 AMP AND 1600-4000 AMP SWITCHES. (SEE ABOVE DIAGRAMS).

☐ SEE ATTACHED SHEET FOR ADDITIONAL ACCESSORIES.

COMPUTER GENERATED DRAWING

BASIC CATALOG NUMBERS	POLES	AMPS	VOLT CODE	STD ACC. CODE	OPT. ACC. CODE	ENCLOSURE CODE
940	3	30	4	7	C	TYPE 1
		100	6			TYPE 2
		150	9			TYPE 3R
		260	8			TYPE 4
		400	X			TYPE 7
		600				TYPE 12
		800				
		1000				
		1200				
		1600				
		2000				
		3000				
		4000				

OPEN TYPE NO SUFFIX REQ'D.

VOLTAGE CODE DESCRIPTION OPERATING FREQ. 50-60 HZ

4	208Y/120V, 190 TO 208Y
6	240/139V TURNED DELTA
8	220 TO 240V
9	440Y/277V, 440Y/254V
X	440 TO 480V
	600Y/347V
	380 TO 400V
	OTHER VOLTAGES

CATALOG NUMBER CERTIFIED TO ASCO S.O. _____ DATE _____ BY _____

COMPOSITE 3 PHASE WIRING DIAGRAM FOR ASCO 940 AUTOMATIC TRANSFER SWITCHES WITH MICROPROCESSOR BASED GROUP 7 CONTROLS

ASCO Switch GL ©

JS 465935

SIZE A