TO:

Franklin Miller Inc.
60 Okner Parkway
Livingston, NJ 07039

DATE ISSUED:

January 18, 2013

CURRENT REFERENCE NO:

600-13

PRIMARY GRAVITY
THICKENER BUILDING
SLUDGE GRINDERS

CONTRACT TITLE:

THIS IS A NOTICE OF AWARD OF CONTRACT AND NOT AN ORDER. NO WORK IS AUTHORIZED UNTIL THE VENDOR RECEIVES A VALID COUNTY PURCHASE ORDER ENCUMBERING CONTRACT FUNDS.

Your firm is awarded the above referenced contract in accordance with the response submitted by you on December 6, 2012. The contract term covered by this Notice of Award is effective Immediately and expires on December 31, 2014.

The contract documents consist of the terms, conditions, and specifications of Invitation to Bid No. 600-13 and the bid of the Contractor, incorporated herein by reference.

PRICING:

PRICE FIRM UNTIL DECEMBER 31, 2013. POSSIBLE PRICE ADJUSTMENT THEREAFTER BASED ON SEPTEMBER CPI-U.

ATTACHMENTS:

1) BID FORM
2) SPECIFICATION EXCERPT

EMPLOYEES NOT TO BENEFIT:

NO COUNTY EMPLOYEE SHALL RECEIVE ANY SHARE OR BENEFIT OF THIS CONTRACT NOT AVAILABLE TO THE GENERAL PUBLIC.

VENDOR CONTACT: JOSEPH M. MACULA
VENDOR TEL. NO.: 973-533-6457
VENDOR PAYMENT TERMS: NET 30 DAYS
VENDOR FAX. NO.: 973-535-6269
EMAIL ADDRESS: jmacula@franklinmiller.com
COUNTY CONTACT: DENNIS DOBBS
COUNTY TEL. NO.: 703-228-6827

CONTRACT AUTHORIZATION

DISTRIBUTION

Elizabeth Dooley, CPPO, CPPB
Assistant Purchasing Agent

DATE

BID FOLDER: 1
ARLINGTON COUNTY, VIRGINIA
OFFICE OF THE PURCHASING AGENT

INVITATION TO BID NO. 600-13

BID FORM

SUBMIT TWO (2) FULLY-COMPLETED AND SIGNED BID FORMS TO THE OFFICE OF THE BID CLERK, SUITE 511, 2100 CLARENDON BLVD., ARLINGTON, VIRGINIA, 22201 (ONE FORM SHALL CONTAIN AN ORIGINAL LONGHAND SIGNATURE; THE OTHER SHALL BE A PHOTOCOPY OF THE SIGNED ORIGINAL)

BIDS WILL BE OPENED AT 3:00 P.M. ON DECEMBER 6, 2012,

FOR PROVIDING FIVE (5) PRIMARY GRAVITY THICKENER BUILDING SLUDGE GRINDERS WITH 5HP MOTORS AND FOUR (4) REVERSING CONTROLLERS (SUPER SHREDDER SS8000 MANUFACTURED BY FRANKLIN MILLER OR APPROVED EQUAL) PER THE TERMS, CONDITIONS AND SPECIFICATIONS OF THIS SOLICITATION:

<table>
<thead>
<tr>
<th>ITEM DESCRIPTION</th>
<th>BRAND/MODEL NUMBER</th>
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<th>QTY</th>
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<td><strong>TOTAL BID PRICE:</strong></td>
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<td>$90,245.00</td>
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Submit two (2) copies of documentation listed in section 1.03 of the Technical Specifications for Sewage Grinders and section 1.03 of the Technical Specifications for Grinder Controller with the bid. Bids submitted without the documentation will be subject to rejection.

The undersigned understands and acknowledges the following:

The official, true, and complete copy of the solicitation documents, WHICH SHALL INCLUDE ALL AMENDMENTS THERETO, is the electronic copy of the solicitation documents provided at the County Purchasing Agent's website (http://www.arlingtonva.us/purchasing) is subject to an important disclaimer which must be acknowledged online before the documents can be downloaded.

Each bidder is responsible for determining the accuracy and completeness of ALL solicitation documents they receive, including documents obtained from the County, and documents obtained from all other sources.

BIDDER NAME: FRANKLIN MILLER INC.
TRADE SECRETS OR PROPRIETARY INFORMATION:
Trade secrets or proprietary information submitted by a bidder in connection with a procurement transaction shall not be subject to public disclosure under the Virginia Freedom of Information Act. However, Section 4-111 of the Arlington County Purchasing Resolution states that the bidder must invoke the protection of this section prior to or upon submission of the data or other materials, and must identify the data or other materials to be protected and state the reasons why protection is necessary.

Please mark one:

( ) No, the bid I have submitted does not contain any trade secrets and/or proprietary information.

(✓) Yes, the bid I have submitted does contain trade secrets and/or proprietary information.

If Yes, you must clearly identify below the exact data or other materials to be protected and list all applicable page numbers of the bid containing such data or materials:

The O&M manual is proprietary information. It should not be distributed.

State the specific reason(s) why protection is necessary:

A competitive company could manufacture this machine.

If you fail to identify the data or other materials to be protected and state the reasons why protection is necessary in the space provided above, you will not have invoked the protection of Section 4-111 of the Purchasing Resolution. Accordingly, effective upon the award of contract, the bid will be open for public inspection consistent with applicable law.

CERTIFICATION OF NON-COLLUSION: The undersigned certifies that this bid is not the result of, or affected by, any act of collusion with another person (as defined in the Code of Virginia § 59.1-60.6 et seq.), engaged in the same line of business or commerce; or any act of fraud punishable under the Virginia Governmental Frauds Act (Code of Virginia § 18.2-498.1 et seq.).

BIDDER NAME: Franklin Miller Inc.
EID FORM, PAGE 3 OF 5

CONTACT PERSON AND MAILING ADDRESS FOR DELIVERY OF NOTICES
Provide the name and address of the person designated by the Bidder to receive notices and other communications (Refer to section headed Notices in the Contract Terms and Conditions of this solicitation for further details):

Joseph M Macula  
Franklin Miller Inc.
60 OKree PKwy
Livingston, NJ 07039

THE PROPER AND FULL LEGAL NAME OF THE FIRM OR ENTITY SUBMITTING THIS BID MUST BE WRITTEN IN THE SPACE PROVIDED BELOW. THIS BID FORM, AND ALL OTHER DOCUMENTS REQUIRED BY THE INVITATION TO BID TO BE SUBMITTED WITH THIS BID FORM, INCLUDING, BUT NOT LIMITED TO ALL ISSUED AMENDMENTS, MUST BE FULLY AND ACCURATELY COMPLETED AND SIGNED BELOW BY A PERSON AUTHORIZED TO LEGALLY AND CONTRACTUALLY BIND THE BIDDER, OR THE BID MAY BE REJECTED:

AUTHORIZED SIGNATURE

PRINT NAME AND TITLE
Joseph M Macula  
SALES MANAGER

INDICATE THE NAME AND CONTACT INFORMATION OF THE PERSON WHO CAN RESPOND AUTHORITATIVELY TO ANY QUESTIONS REGARDING THIS BID (I.E. PROJECT MANAGER):

NAME (PRINTED): Joseph M Macula  
TITLE: SALES MANAGER

E-MAIL ADDRESS: MaculaFranklinMillInc.COR. NO.: 973-533-6457

SUBMITTED BY: (LEGAL NAME OF FIRM)
Franklin Miller Inc.
60 OKree PKwy

ADDRESS:

CITY/STATE/ZIP: Livingston NJ 07039

TELEPHONE NO: 973-533-6457  
FACSIMILE NO: 973-535-6269

THIS FIRM IS A:  
☑ CORPORATION, ☐ GENERAL PARTNERSHIP, ☐ LIMITED PARTNERSHIP, ☐ UNINCORPORATED ASSOCIATION, ☐ LIMITED LIABILITY COMPANY, ☐ SOLE PROPRIETORSHIP

IS FIRM AUTHORIZED TO TRANSACT BUSINESS IN THE COMMONWEALTH OF VA? YES

IDENTIFICATION NO. ISSUED TO THE FIRM BY THE SCC:

ANY BIDDER EXEMPT FROM SCC AUTHORIZATION REQUIREMENT SHALL INCLUDE A STATEMENT WITH ITS BID WHY THEY ARE NOT REQUIRED TO BE SO AUTHORIZED

IS YOUR FIRM CURRENTLY DEBARRED FROM SUBMITTING BIDS TO ARLINGTON COUNTY, VIRGINIA, THE FEDERAL GOVERNMENT, OR ANY OTHER STATE OR POLITICAL SUBDIVISION? NO

BIDDER STATUS: MINORITY OWNED: ☐ WOMAN OWNED: ☐ NEITHER: ☑
Rider Clause

PERTAINING TO THE USE OF CONTRACT(S) BY MEMBERS OF THE METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS PURCHASING OFFICERS' COMMITTEE

A. If authorized by the bidder(s), resultant contract(s) will be extended to any or all of the listed members as designated by the bidder to purchase at contract prices in accordance with contract terms.

B. Any member utilizing such contract(s) will place its own order(s) directly with the successful contractor. There shall be no obligation on the part of any participating member to utilize the contract(s).

C. A negative reply will not adversely affect consideration of a bidder's bid/proposal.

D. It is the awarded vendor's responsibility to notify the members shown below of the availability of the Contract(s).

E. Each participating jurisdiction has the option of executing a separate contract with the awardee. Contracts entered into with a participating jurisdiction may contain general terms and conditions unique to that jurisdiction including, by way of illustration and not limitation, clauses covering minority participation, non-discrimination, indemnification, naming the jurisdiction as an additional insured under any required Comprehensive General Liability policies, and venue. If, when preparing such a contract, the general terms and conditions of a jurisdiction are unacceptable to the awardee, the awardee may withdraw its extension of the award to that jurisdiction.

F. The issuing jurisdiction shall not be held liable for any costs or damages incurred by another jurisdiction as a result of any award extended to that jurisdiction by the awardee.

Continued on next page
### BIDDER'S AUTHORIZATION TO EXTEND CONTRACT:

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<td>Maryland-National Capital Park &amp; Planning Comm.</td>
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### BIDDER'S LEGAL NAME:

**Franklin Miller Inc.**

### DATE OF BID:

12/6/12
GENERAL CONDITIONS AND REQUIREMENTS

All units shall be complete new units and come equipped as required to give a complete unit. All units shall be serviced completely by the Contractor before delivery and ready in all respects for use, as specified in the Technical Specifications below.

While the technical specifications described herein establish certain minimum and maximum requirements, and may name a manufacturer and model number which has been determined as acceptable and suited to the county requirements, they are not intended to eliminate from consideration any comparable equipment of equal quality which a manufacturer may have available and which will be suitable to the County needs.

PRICING/Delivery

The bid price shall be exclusive of any Federal and Commonwealth of Virginia taxes.

Price for the equipment shall include delivery, F.O.B. Destination at:

Arlington County Water Pollution Control Plant
2900 South Bade Street
Arlington, Virginia 22202

Off-loading of all equipment at destination shall be by County personnel.

Delivery must be within twelve (12) weeks from the date of an approved Arlington County Purchase Order.

REORDERS

The County intends to purchase such quantities as listed in this solicitation and reserves the right to purchase additional units at the bid price before December 31, 2013.

Any orders placed after December 31, 2013 will be subject to price adjustment in the amount of the percentage of escalation / de-escalation in the U.S. Department of Labor, Consumer Price Index. All Items, Unadjusted, Urban Areas ("CPI-U") for the twelve (12) month period ending in September 2013.

The County reserves the right to exercise the reorder option or issue a new bid, whichever it deems in its best interest at the time of need.

WARRANTY

All equipment furnished under this section shall be warranted for parts and labor by the vendor and the equipment manufacturer for a period of one (1) calendar year after completion of startup or eighteen (18) months after shipment, whichever occurs first.

Contractor shall warrant that the material and workmanship of all components and the operation of the grinders is in accordance with the latest design practices and meets the requirements of this Specification.
PART 1 - GENERAL

1.01 DESCRIPTION

The grinder shall be a SUPER SHREDDER SS8000 manufactured by Franklin Miller, Inc. or approved equal and shall meet the following requirements.

1.02 QUALITY ASSURANCE

A. REFERENCES

This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
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<tr>
<td>AISI</td>
<td>Grade 304 and 316 Stainless Steel.</td>
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<tr>
<td>AISI 4140</td>
<td>Heat Treated Hexagon Steel</td>
</tr>
<tr>
<td>ASTM A 536-84</td>
<td>Standard Specification for Ductile Iron</td>
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1.03 SUBMITTALS REQUIRED WITH BID

The documents listed below shall be submitted in two (2) copies with the bid for determination of compliance with specifications. BIDS RECEIVED WITHOUT THESE DOCUMENTS WILL BE SUBJECT TO REJECTION.

A. Dimensional drawing
B. Cutaway or exploded view drawing with parts list
C. Performance data
D. O&M manual
E. Electrical/drive details
F. Reference installation list (for thickened sludge as specified) with minimum three (3) contacts and phone numbers.

1.04 SUBMITTALS PRIOR TO SHIPMENT

A. Submittals shall be custom prepared by the Grinder manufacturer for this specific application.

B. All final electronic documentation shall be submitted in Adobe "portable document format" (pdf), or Microsoft Word format, and hardcopy. One electronic copy and five (5) hardcopies shall be submitted in individual binders.

C. All manufacturers' cut sheets shall be annotated with arrows to show the specific model and options purchased under these specifications.

D. The electronic copy must NOT be protected to prevent further copying or extraction for use by the Arlington County, Virginia, Water Pollution Control Bureau maintenance technicians.
E. One electronic copy shall be submitted in Adobe “portable document format” (pdf) or Microsoft Word format and 5 hardcopies in individual binders.

F. Installation, Operation, and Maintenance Manual includes:

1. Recommended preventive maintenance tasks and schedules
2. Complete parts list and cut sheets of components
3. Exploded views annotated with the parts
4. Troubleshooting details
5. Manufacturer's data including materials of construction and equipment weight (component and complete assembly)
6. Predicted performance data
7. A complete list of recommended spare parts, including item descriptions, recommended quantities, and unit costs. The recommended list should be based on a maintenance plan where the owner will remove and replace failed items to the lowest replaceable module/component level.
8. Certified motor data and performance curves for rated capacity including:
   a) Nominal efficiency in accordance with IEEE 112 for three phase motors 1 hp and larger.
   b) Full load power factor and maximum recommended correction capacitor kVA for motors 5 hp and larger.
   c) Complete nameplate data in accordance with NEMA standards
   d) Performance characteristics:
      i. Guaranteed minimum efficiencies at 100%, 75% and 50% of full load.
      ii. Guaranteed minimum power factor at 100%, 75% and 50% of full load.
      iii. Locked Rotor Current.
      iv. Full Load Current.
      v. Starting Torque.
      vi. Full Load Torque.
      vii. Breakdown Torque.

PART 2 - PRODUCTS

2.01 SEWAGE GRINDER

A. GENERAL

1. The grinder shall be designed to reduce solids normally found in a sewage system.

2. The grinder shall consist of a spherical cutting mechanism consisting of two working elements: A single spherical rotor with a center open to flow containing a rack of stainless steel cutters skewed at 10 degrees, and a concave stationary cutting assembly. Units with a multitude of individual cutter discs shall not be acceptable. The rotor teeth shall pass at close clearance through the cutting portion of the stationary cutting assembly intensively shredding over-size solids and
further sweep the slots between curved sizing bars clear of solids. A high percentage of open area shall be maintained to flow throughout the unit. The unit shall have bi-directional cutters. With these cutters, the unit shall operate equally in either direction of rotation to provide enhanced cutter life, without requiring removal from the line.

B. MATERIALS

The cutting elements shall be constructed of Stainless Steel and shall have a Chrome Boride coating with a Rockwell C of 60 or greater for extended life in gritty service. The cutting surface material shall meet an ASTM G65 standard abrasion test for wear of less than 20mm. The machine housing shall be ductile iron or carbon steel. The unit shafting shall be constructed of heat treated 4140. 4130 steel cutters shall not be acceptable. To be considered equivalent, units with cutters hardness of less than Rockwell C of 60 shall be supplied with one full set of spare cutting elements for each four grinders supplied.

C. CONFIGURATION

The unit shall have a straight-through, ultra-compact configuration, a removable cylindrical interior, and 125/150# ANSI input and output flanges. The connected pipeline orientation shall be horizontal.

D. BEARING & SEAL CARTRIDGE

Two cartridges shall be used each containing a three stage seal system, a tapered roller bearing and unit shafting. Each cartridge shall be removable as one piece with the shaft for easy seal or bearing replacement. The seal system shall consist of: a labyrinth seal, a severe duty mechanical seal, and a separately sealed bearing chamber.

1. LABYRINTH RINGS - The contact-less labyrinth rings shall be supplied to further protect from coarse and fine granular contaminants.

2. MECHANICAL SEALS - The mechanical seals shall feature elastomeric members which operate as opposing disk springs when compressed and at the same time keeping the faces of the two metallic rings together insuring positive sealing. No metal springs shall be used.

3. OIL SEAL - The oil seal shall be used to further isolate the bearing chamber from contaminants

a) Cartridge lubricant shall be non-soluble Teflon grease. No angular contact bearings shall be employed.

E. REDUCER

1. The speed reducer shall be a grease-filled planetary or cycloidal type reducer with "Heavy-Shock" load classification. The high-speed shaft of the grinder shall be directly coupled with the reducer via a coupling.

2. The two-piece, three-lobed coupling shall have jaws that intermesh by at least 3/4" for dependable torque transmission.

F. MOTOR

1. Motor - Non-Submersible

a) The motor shall be: (TEFC) (Explosion Proof) design, 5 HP, 460 Volt, 3-phase, 60 Hz. Motor service factor shall be
1.15, the efficiency factor not less than 87.5% at full load and the power factor not less than 82% at full load.

G. PAINTING AND PROTECTIVE COATINGS

1. Steel and cast iron surfaces are to be cleaned, primed and painted with one prime and one finish coat, 3 to 5 mils per coat, Theneec Series 66 Hi-Build Epoxoline (Epoxy Polyamide), Blue Color, Satin finish.

2.02 CONTROL PANEL, ELECTRICAL COMPONENTS & ACCESSORIES

(See TECHNICAL SPECIFICATIONS - PRIMARY GRAVITY THICKENER GRINDER REVERSING CONTROLLER below for detailed specifications)

A. A Model S-250 Automatic Reversing Controller, manufactured by Franklin Miller, Inc. or approved equal, shall be supplied with oil tight controls and overload heater protection. The contents of the controller shall be encased in a NEMA 4X stainless steel enclosure.

PART 3 - EXECUTION

3.01 FACTORY TEST

Each grinder and controller shall be factory tested to ensure satisfactory operation.

TECHNICAL SPECIFICATIONS - PRIMARY GRAVITY THICKENER BUILDING GRINDER REVERSING CONTROLLER

PART 1 - GENERAL

1.01 THE EQUIPMENT

A. The equipment covered by this Specification is intended to be standard equipment of proven performance. Equipment shall be designed and constructed in accordance with the best practices of the trade, and shall operate satisfactorily.

B. The grinder shall be an S250 SUPER SHREDDER CONTROLLER manufactured by Franklin Miller, Inc. or approved equal and shall meet the following requirements.

1.02 QUALITY ASSURANCE

A. The entire Reversing Controller system shall be factory assembled and system tested by the grinder manufacturer, or equal, to assure a properly coordinated system.

B. REFERENCES

1. Provide equipment in full accordance with the latest applicable rules, regulations, and standards of:

   a) Local Laws and Ordinances
   b) State and Federal Laws
   c) National Electric Code (NEC)
   d) Underwriters Laboratories (UL)
   e) American National Standards Institute (ANSI)
   f) National Electrical Manufacturers Association (NEMA)
   g) Institute of Electrical and Electronics Engineers (IEEE)
1.03 SUBMITTALS REQUIRED WITH BID

The documents listed below shall be submitted in two (2) copies with the bid for determination of compliance with specifications. **BIDS RECEIVED WITHOUT THESE DOCUMENTS WILL BE SUBJECT TO REJECTION.**

A. Dimensional drawing
B. Cutaway or exploded view drawing with parts list
C. O&M manual
D. Reference installation list (controller for thickened sludge grinder as specified) with minimum three (3) contacts and phone numbers.

1.04 SUBMITTALS PRIOR TO SHIPMENT

A. All final electronic documentation shall be submitted in Adobe "portable document format" (pdf), Microsoft Word format, and hardcopy. One electronic copy and 5 hardcopies shall be submitted in individual binders.
B. Submittals shall be custom prepared by the grinder manufacturer for this specific application.
C. All manufacturers’ cut sheets shall be annotated with arrows to show the specific model and options purchased under these specifications.
D. The electronic copy must **NOT** be protected to prevent further copying or extraction for use by the Arlington County, Virginia, Water Pollution Control Bureau maintenance technicians.
E. Installation, Operation, and Maintenance Manual includes:
   1. Complete drawing of controller with bill of materials
   2. Electrical schematic
   3. Catalog cuts of major components.
   4. Recommended preventive maintenance tasks and schedules
   5. Troubleshooting details
   6. A complete list of recommended spare parts, including item descriptions, recommended quantities, and unit costs.

PART 2 - PRODUCTS

2.01 REVERSING CONTROLLER

A. This specification describes a reversing motor controller, which includes the design, fabrication, testing, and support requirements for control systems for 3-phase, squirrel cage rotor, induction motors driving a variable torque spherical grinder.

B. **Controller:** The controller shall completely sequence the operation of the Franklin Miller Super Shredder SS8000.

C. **Enclosure type:** The enclosure shall be **NEMA 4X Stainless Steel**. A provision shall be made within the enclosure for connection of a grounding cable.
D. Features:

1. Disconnect: A disconnect means will be provided adjacent to the controller (by WPCB). Terminal blocks only shall be provided for the primary feeder cables entering the controller enclosure. Controller supplied with a disconnect switch installed within the enclosure, supplied with an external operating handle and lockout means.

2. Motor Starter: A reversing starter shall be provided for the motor indicated in the job specifications. The size of the starter shall be based on IEC requirements for the motor horsepower.

A motor overload relay shall be furnished as part of the starting equipment. Tripping of the relay shall stop the motor and flash the trip light. Resetting the relay shall allow the motor to restart.

Output terminals shall be provided for connection of the motor leads exiting the enclosure.

3. Control Circuit:

Voltage: Nominally 120V with other levels determined by the requirements of the PLC and other control items supplied as part of the controller. If DC voltage is required, an adequately sized source of DC power must be provided within the controller.

Transformer: Ungrounded primary and secondary side leads shall be fuse protected. The control transformer shall be sized to carry the control-circuit load plus a minimum of 20% spare capacity for future load growth.

PLC: An Allen Bradley programmable logic controller, Micrologix, shall be provided within the controller.

4. Operator Control:

A three-position "HAND-OFF/RESET-AUTO" selector switch shall be provided in the front cover. Its function is as follows:

Hand: When in this position, the motor starter is energized and the motor runs under the control of the PLC as described in "Operation."

Off-Reset: When in this position, the motor shall be prevented from starting in both the forward and reverse direction; the signal from the remote-start dry contact shall be disabled; and if established, the Alarm Condition circuitry is reset.

Auto: In this position, when a remote Run signal is received, the motor shall cycle under the control of the PLC. The cycle shall be terminated if the run signal is interrupted, or the selector switch is placed in the Off/Reset position, or if the equipment experiences an Alarm Condition shutdown.

5. Indicating Lights:

The following LED indicators shall be provided:

A *white* "POWER ON" indicating light shall be illuminated when power is available in the control circuit.

A *red* "RUN" indicating light shall be illuminated when the selector switch is in the Hand or Auto position with the equipment
motor running in the forward or reverse direction; and during motor reversal pauses.

A red "TRIP" indicating light shall be illuminated steadily when the selector switch is in the Hand or Auto position and the equipment has experienced an Alarm Condition stoppage.

The red "TRIP" indicating light shall flash when the motor overload relay trips.

The red "TRIP" indicating light shall "double flash" when the motor winding temperature causes the embedded thermostats to open (standard feature for explosion-proof motor).

6. Remote I/Os: The following inputs and outputs shall be supplied. Wiring shall be complete from the PLC to terminal blocks.

- Run status: A normally open dry-contact output shall close when the equipment motor is running (and during motor reversal pauses). It shall open when the equipment is stopped, trips on an Alarm Condition, or power to the controller is disconnected.

- Trip status: A normally open dry-contact output shall close when the equipment experiences an Alarm Condition stoppage. It shall open when the Alarm Condition lockout circuit has been reset. The contact shall also close and remain closed (no pulsing) when the motor overload relay trips. It shall open when the relay is reset.

- Remote E-stop: Provision shall be made for a maintained-contact pushbutton (by others) that shall disconnect control voltage within the enclosure. These terminals shall be jumpered (to be removed if an E-stop is installed).

- Remote start: Provision shall be made to accept a remote contact closure input (by others) that starts the cycle when the selector switch is in the Auto position.

7. Instrumentation: The following items shall be included as part of the controls of the subject equipment.

- Power Monitor: A power monitor shall be connected to the power supply. It continuously monitors the three-phases for low voltage, phase loss, phase reversal, and voltage unbalance. If any of these conditions occur, the grinder shall stop and the "power on" light shall flash. When the condition returns to normal, the grinder shall run.

- Current sensor: One phase shall be monitored for a high current condition with a current sensor and current relay. If the phase current reaches an adjustable set point (factory set at approximately 80% of locked-rotor current), the motor starter shall be de-energized and after a two-second delay (adjustable), an "Auto-Clear" sequence as described below shall be initiated.

Only during initial starting, the current sensor C/S signal to the PLC shall be blocked by a time-delay relay (adjustable) during the motor inrush current period.

8. Operation: The mode of operation shall be S250 (reversing grinder that will normally operate in either direction). The mode, as well as timer settings and reversals, shall be accessible to allow change to meet field conditions.

When the selector switch is turned to the Hand or Auto position (only after receiving a remote Run signal if in Auto), the equipment shall start and run in the direction opposite from the
direction it was running when it was last stopped. If the 
equipment runs for more than two hours without experiencing an 
Alarm Condition, the motor starter shall be de-energized. After a 
two second delay (adjustable) to allow the equipment to coast to a 
stop, the grinder shall run in the opposite direction.

The automatic reversals shall continue until the cycle is stopped 
by interrupting the remote-run signal, or by moving the selector 
switch to the Off/Reset position, or if a Jam occurs. This 
periodic rotation direction change aids in cleaning the equipment.

9. Auto-Clear Cycle: If the phase current reaches an adjustable set 
point (factory set) at any time within the 2-hr cycle, the motor 
starter shall be de-energized. After a two second delay 
(adjustable), the equipment shall automatically restart in the 
opposite direction of rotation in an attempt to clear the Jam.

This auto-clear cycle shall be repeated a total of four times 
(adjustable). If at any time the equipment runs for more than 30 
seconds in the forward direction during the four attempts, the 
reversal counter shall be reset.

10. Alarm Condition: If after four tries, however, the Jam 
condition still exists, the forward starter shall be de-energized, 
and after a 2-sec delay, the reverse starter coil shall be 
energized for 1-sec then be de-energized. An Alarm Condition 
lockout circuit shall be established and remain in the alarm state 
(even if power is lost) until it is reset.

The lockout circuit shall disable the automatic cycle; cause the 
Trip pilot light to be illuminated, the Trip Status contact to 
close, the Running pilot light to be extinguished, and the Run 
Status contact to open. Once the obstruction has been cleared, the 
Alarm Condition lockout circuit can be reset by moving the 
selector switch to the Off/Reset position.

NOTE: Before manually clearing an obstruction, the disconnect 
switch ahead of the controller must be opened and locked out.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The grinder controllers shall be installed as specified and in 
accordance with manufacturer's written recommendations by ACWPCB 
personnel. The installation and initial operation of all 
components shall be certified by an authorized representative of 
the grinder controller manufacturer.

3.02 TESTING

A. Each grinder controller shall be factory tested to ensure 
satisfactory operation.

B. After completion of installation, the grinder controllers 
shall be completely tested by ACWPCB personnel to demonstrate 
compliance with operating requirements as specified.