

**GS #323-024 ARPA INFR. – WASTE CENT. TREATMENT
SOUTH MISSISSIPPI CORRECTIONAL INSTITUTION
LEAKESVILLE, MISSISSIPPI**

**ADDENDUM NO. 1
May 10, 2024**

The Contract Documents for GS #323-024 ARPA INFR. –WASTE CENT. TREATMENT South Mississippi Correctional Institution Leakesville, Mississippi, are amended as follows:

1. A Pre-Bid Meeting will be held on Tuesday, May 21, 2024, at 10:00 AM at the South Mississippi Correctional Institution (22689 MS Highway 463 N., Leakesville, MS 39451) in the Superintendent's Conference Room.
2. Replace page iv of the index in toto with the enclosed page iv.
3. Replaced page 14 of Division 0 in toto with the enclosed page 14 of Division 0.
4. Replace paragraph 3.2 UTILITIES in DIVISION 02 – EXISTING CONDITIONS SECTION 02 4100 with the following:

CONTRACTOR shall protect all utilities to remain and shall disconnect all utilities to be removed before commencing any other work under this Section. CONTRACTOR shall coordinate protection and disconnection of utilities with the Maintenance Director for the South Mississippi Correctional Institution and/or utility owner. Special care shall be exercised in disconnecting any utilities which might cause damage or harm to persons or property.

5. The footer of Division 32 – EXTERIOR IMPROVEMENTS SECTION 32 1500 CRUSHED STONE SURFACING is shown as “SECTION 32 1500” shall be replaced with the following:

SECTION 32 1540

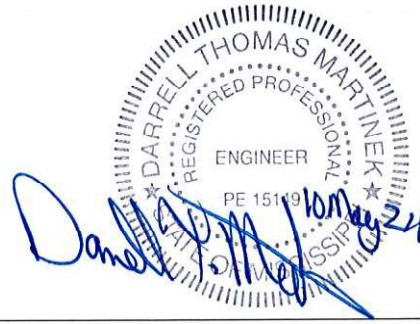
6. Replace SECTION 46 3072 ROTARY POSITIVE DISPLACEMENT BLOWERS in DIVISION 46 WATER AND WASTEWATER EQUIPMENT in toto with the enclosed specification, SECTION 46 3072 ULTRAVIOLET DISINFECTION EQUIPMENT.
7. Add the following to Item 1.7 SPARE PARTS to SECTION 46 5300 BIOLOGICAL TREATMENT SYSTEM:

1.7.1.3 One (1) complete set of match V-belts.

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- 1.7.1.4 One (1) filter element.
8. A minimum of two (2) hard copies along with one (1) electronic copy in pdf file format of the operation and maintenance manual for each piece of equipment shall be provided.



Darrell T. Martinek, P.E., P.S.

SECTION 32 1540	CRUSHED STONE SURFACING (BURLE)
SECTION 32 3113	CHAIN LINK FENCES AND GATES (BURLE)
SECTION 32 9219	EXISTING TURF MAINTENANCE AND NEW TURF ESTABLISHMENT (BURLE)

DIVISION 33 UTILITIES

SECTION 33 0500	FIBERGLASS MANHOLE AND PARSHALL FLUME (BURLE)
SECTION 33 0519	DUCTILE IRON UTILITY PIPE (BURLE)
SECTION 33 1100	WATER UTILITY DISTRIBUTION PIPING (BURLE)
SECTION 33 3100	SANITARY SEWER PIPING (BURLE)
SECTION 33 4000	STORMWATER UTILITIES

DIVISION 40 PROCESS INTEGRATION

SECTION 40 9123.33 FLOW METERING

DIVISION 46 WATER AND WASTEWATER EQUIPMENT

SECTION 46 0085	GEOMEMBRANE LAGOON LINER (BURLE)
SECTION 46 2088	VERTICAL LIFT GATES (BURLE)
SECTION 46 2113	COARSE MECHANICALLY CLEANED BAR SCREENS (BURLE)
SECTION 46 2153	PERFORATED PLATE SCREEN (BURLE)
SECTION 46 2173	SCREENINGS WASHER (BURLE)
SECTION 46 3072	ULTRAVIOLET DISINFECTION EQUIPMENT (BURLE)
SECTION 46 3600	DRY CHEMICAL FEEDER (BURLE)
SECTION 46 5300	BIOLOGICAL TREATMENT SYSTEM (BURLE)
SECTION 46 6100	FILTRATION EQUIPMENT (BURLE)

CERTIFICATE OF INSURANCE

SECTION 00 6216

This certificate of insurance neither affirmatively nor negatively amends, extends, or alters the coverage afforded by the policies below.

INSURED: (Contractor's Name & Address) PROJECT: (Number, Name & Location) GS# 323-024 ARPA Infr. - Waste Cent. Treatment South Mississippi Correctional Institution, Leakesville, Mississippi OWNER: Bureau of Building, Grounds & Real Property Management				COMPANIES PROVIDING COVERAGE w/ MID Lic or NAIC #		
				A	#	
				B	#	
				C	#	
				D	#	
				E	#	
				F	#	
				G	#	
				Companies above must be approved by the MS Ins Dept at https://www.mid.ms.gov (or most up-to-date link) per Code & WComp at http://www.mwcc.ms.gov/ (MID mod'd 041615)		
Type Insurance	Co	Policy Number	Policy Period	Coverage and Minimum Amount		
General Liability Commercial General Liability				General Aggregate	\$ 1,000,000	
				Products Comp/Ops (Aggregate)	\$ 1,000,000	
				Personal Injury (Per Occurrence)	\$ 500,000	
				BI & PD (Per Occurrence)	\$ 1,000,000	
				Fire Damage (Per Fire)	\$ 50,000	
				Medical Expense (Per Person)	\$ 5,000	
Owners/Contractors Protective Liability				General Aggregate	\$ 1,000,000	
				Per Occurrence	\$ 500,000	
Automobile Liability				Bodily Injury/Property Damage Combined Single Limit (Per Occurrence)		
				\$ 500,000		
				OR	Bodily Injury (Per Person)	\$ 250,000
				Bodily Injury (Per Accident)	\$ 500,000	
* Excess Liability (Umbrella on projects over \$500,000)				Property Damage (Per Occurrence)		
				\$ 100,000		
MS Workers' Compensation (As required by Statute) Employers' Liability				Aggregate		
				\$ 1,000,000		
Property Insurance (not required when project is demolition ONLY – required for ALL other projects including paving)				Per Occurrence		
				\$ 1,000,000		
Other				Accident (Per Occurrence)		
				\$ 100,000		
Certification: I certify that these policies (subject to their terms, conditions and exclusions) have been (1) issued to the Insured for the coverages and at least the amounts as indicated by companies licensed in Mississippi; (2) countersigned by a Mississippi Licensed Agent; and (3) endorsed to require the company to give thirty (30) days written notice to the Owner prior to cancellation or non-renewal of above.				Disease-Policy Limit		
				\$ 500,000		
Producing Agent: (Name, Address and Telephone)				Disease-Per Employee		
				\$ 100,000		
(Signature) _____ MID Lic # or countersign below (Name and Title of Authorized Representative) (typed) Agent must be approved by the MS Ins Dept or countersign https://www.mid.ms.gov				OR Builders' Risk Installation Floater		
				Must be equal to		
				Value of Work		

☐ Check if Mississippi Licensed Agent
 OR Countersign by Mississippi Licensed Agent

MID Lic # _____

Division 0

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SECTION 46 3072

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DIVISION 46 – WATER AND WASTEWATER EQUIPMENT

SECTION 46 3072

ULTRAVIOLET DISINFECTION EQUIPMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

Furnish all labor, materials, equipment and appurtenances required to provide an open channel, gravity flow, low pressure high intensity ultraviolet lamp (UV) treatment system complete with an automatic mechanical/chemical cleaning system and variable output electronic ballasts. The UV system to be complete and operational with all control equipment and accessories as shown and specified herein. This system will be capable of inactivating effluent to meet the water quality standards listed in this section. The ultraviolet disinfection system shall be a Trojan System UV 3000 Plus or approved equal.

1.2 EXPERIENCE

A. In order to establish a quality standard for the manufacturer and production of the equipment, all manufacturers shall meet the equivalents listed below:

1. The manufacturer will be regularly engaged in the manufacture of UV systems with a proven track record of at least two hundred (200) operating installations of the proposed UV system.
2. The manufacturer will provide documentation of previous experience with municipal UV systems in wastewater applications with variable output electronic ballasts.
3. The manufacturer shall submit a bioassay evaluation for the proposed reactor. The bioassay will have been completed by an independent third party and have followed protocols described in the NWRI Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse (May 2003/Aug 2012) and/or applicable sections of the US EPA Design Manual – Municipal Wastewater Disinfection (EPA/625/1-86/021). The bioassay must demonstrate that the proposed UV system design and number of lamps will deliver the specified dose using MS2 bacteriophage as the surrogate test organism.

4. Independent certification of fouling factor and lamp aging factor must be submitted if values other than the specified default values are being proposed.
5. Documentation of UV manufacturer's service capabilities including location and experience.
6. Sample UV treatment performance guarantee including scope and duration of guarantee.

B. Design Criteria:

1. Provide equipment that will disinfect effluent with the following characteristics:
 - a) Current Peak Flow: 3.10 MGD
 - b) Total Suspended Solids: 30 mg/l (30 Day Average, grab sample)
 - c) Effluent Temperature Range: 33 to 85°F (1 to 30 °C)
 - d) Ultraviolet Transmittance @ 253.7 nm: 65 %, minimum
 - e) Maximum Mean Particle Size: 30 microns
 - f) Effluent standards to be achieved: 126 Fecal Colonies /100 ml based on a 30 day Geometric Mean of daily samples for the effluent standard as specified in a) through e). Effluent standards will be guaranteed regardless of influent count to UV system.
2. The UV system is to be installed in 1 open channel having the dimensions as shown on the drawings.
3. The effluent depth in the channel will be as per layout drawing.
4. System configuration:
 - a) The UV system must fit within the UV channel as stated without modification.
 - b) The UV system configuration will be as follows:
 - Number of Channels: 1
 - Number of Total Banks per Channel: 3
 - Number of Duty Banks per Channel: 2
 - Number of UV Modules per Bank: 2
 - Number of Lamps per UV Module: 8
 - Total Number of Lamps in the UV System: 48
 - Number of System Controllers: 1
 - Number of UV Detection Systems: 3

- Number of Power Distribution Centers: 3
- Number of Level Controllers: 1
- Number of Hydraulic System Centers 1
- Number of Level Control Panels 1

C. Performance Requirements:

The ultraviolet treatment system shall produce an effluent conforming to the following discharge permit: 126 Fecal Coliform/100 ml, based on a 30 day Geometric Mean. Grab samples will be taken in accordance with the Microbiology Sampling Techniques found in *Standard Methods for the Examination of Water and Wastewater, 19th Ed.*

1. Provide a UV system complete with UV Banks, System Control Center, Power Distribution Center(s), Support Racks(s) and Level Controller(s) as shown on the contract drawings and as herein specified.
2. The UV system shall be designed to deliver a minimum UV dose of 30 mJ/cm² MS2 at peak flow, in effluent with a UV Transmission of 65 % at end of lamp life (EOLL) after reductions for quartz sleeve fouling. The basis for evaluating the UV dose delivered by the UV system will be the independent third party bioassay, without exception. Bioassay validation methodology to follow protocols described in NWRI *Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse* and/or applicable sections of the US EPA Design Manual – Municipal Wastewater Disinfection (EPA/625/1-86/021).
3. The UV Dose shall be adjusted using an end of lamp life factor of 0.5 to compensate for lamp output reduction over the time period corresponding to the manufacturer's lamp warranty. The use of a higher lamp aging factor will be considered only upon review and approval of independent third party verified data that has been collected and analysed in accordance with protocols described in NWRI *Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse*.
4. The UV Dose shall be adjusted using a quartz sleeve fouling factor of 0.8 when sizing the UV system in order to compensate for attenuation of the minimum dose due to sleeve fouling during operation. The use of a higher quartz sleeve fouling factor will be considered only upon review and approval of independently verified data that has been collected and analysed in accordance with protocols described in NWRI *Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse*.
5. Independent Validation for use of higher factors (lamp aging and sleeve fouling) must be submitted to the Professional.

6. The system shall be able to continue providing UV treatment while replacing UV lamps, quartz sleeves, ballasts and while cleaning the UV lamp sleeves.
7. The system shall be designed for complete outdoor installation. Installation of the system indoors shall not affect the operation of the system in any way.

1.3 SUBMITTALS

- A. Submit for review, shop drawings showing the following:
 1. Experience information outlined in Item 1.2 A of this section.
 2. Complete description in sufficient detail to permit an item comparison with the specification.
 3. Dimensions and installation requirements.
 4. Descriptive information including catalogue cuts and manufacturers' specifications for major components.
 5. Electrical schematics and layouts.
 6. Hydraulic calculations demonstrating compliance with the required hydraulic characteristics.
 7. Independent bioassay validation and dosage calculations demonstrating compliance with the specified dose requirements.
 8. UV treatment performance guarantee.

1.4 GUARANTEE

- A. Equipment:

The equipment furnished under this section will be free of defects in material and workmanship, including damages that may be incurred during shipping for a period of 12 months from date of start-up.

- B. UV Lamps:

The UV lamps to be warranted for a minimum of 12,000 hours when operated in automatic mode, prorated after 9,000 hours. On/off cycles are limited to ten (10) per day.

- C. Ballasts to be warranted for 5 years, prorated after 1 year.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. The physical layout of the system shown on the contract drawings and the equipment specified herein are based upon the UV3000Plus™ System, as manufactured by Trojan Technologies, London, Ontario, Canada.
- B. If other equipment is proposed, the Contractor shall demonstrate to the Professional and the Owner that all requirements of materials, performance, and workmanship have been met or exceeded by the equipment proposed. Contractors proposing alternate manufacturers will be responsible for all costs associated with system evaluation and redesign including all electrical, mechanical and civil aspects of the installation.

2.2 DESIGN, CONSTRUCTION AND MATERIALS

A. General:

- 1. All module welded metal components in contact with effluent shall be Type 316 stainless steel.
- 2. All metal components above the effluent shall be Type 304 stainless steel with the exception of the ballast enclosure, which is constructed of anodised aluminium.
- 3. All wiring exposed directly to UV light shall be Teflon™ coated.
- 4. All wires connecting the lamps to the ballasts shall be enclosed inside the frame of the UV Module and not exposed to the effluent. To be considered as an alternate, wires that are exposed to the effluent shall be warranted for 15 years and will be Teflon™ coated to prevent degradation under constant exposure to UV light.

B. Lamp Array Configuration:

- 1. The lamp array configuration shall be the uniform array with all lamps parallel to each other and to the flow.
- 2. The system shall be designed for complete immersion of the UV lamps including both electrodes and the full length of the lamp tube in the effluent.

C. UV Module:

1. Each UV module shall consist of UV lamps with an electronic ballast enclosure mounted on a Type 316 stainless steel frame. To be considered as an alternate, ballasts housed in a separate enclosure located external to the channel will be equipped with a suitable air conditioning system, supplied by the UV manufacturer, to maintain internal enclosure temperatures below 80°F (26°C). No forced air ventilation will be allowed.
2. Each lamp assembly shall be enclosed in its individual quartz sleeve, one end of which will be closed and the other end sealed by an integrated lamp connector.
3. The closed end of the quartz sleeve shall be held in place by means of a retaining O-ring. The quartz sleeve will not come in contact with any steel in the frame.
4. The ends of the lamp sleeve shall not protrude beyond the stainless steel frame of the UV Module.
5. Lamp wires shall terminate in the electronic ballast enclosure located at the top of the UV Module.
6. All lamp to ballast connections shall be made by and tested by the UV Manufacturer.
7. The electronic ballast enclosure shall contain the electronic ballasts and addressable lamp status monitoring systems.
8. Each UV Module shall be connected to a receptacle on the Power Distribution Center.
9. At the point of exit from the UV Module frame, the multi conductor cable shall pass through a waterproof strain relief.
10. Each UV module will have a rating of Type 6P.

D. Integrated Lamp Assembly:

1. Each integrated lamp assembly shall be water-proof and shall comprise of a UV Lamp, quartz sleeve and integrated connector.
2. The integrated lamp assembly shall use an O-ring to seal the open end of the quartz sleeve against the integrated connector.

3. The integrated connector seals against the lamp socket with an O-ring and against the module leg sleeve cup with a face seal by means of a sleeve nut which threads onto a sleeve cup.
4. The sleeve nut shall have a knurled surface to allow a handgrip for tightening.
5. The sleeve nut shall not require any tools for removal.
6. UV Lamps:
 - The UV lamp forms part of the complete integrated lamp assembly.
 - Lamps shall be high intensity low pressure amalgam design. The lamp shall be preheated to promote longevity. Lamps that are not amalgam or that are based on driving a low pressure lamp at amperages greater than 500 milliamps will not be allowed.
 - The filament shall be of the clamped design, significantly rugged to withstand shock and vibration.
 - Electrical connections shall be at one end of the lamp and have four pins, dielectrically tested for 2,000 Vrms. Lamps that do not have 4 pins will be considered instant start. To be considered as an alternate, instant start lamp systems shall supply replacement spare lamps equal to 50% of the total number of lamps in the system.
 - Lamps shall be operated by electronic ballasts with variable output settings.
7. UV Lamp Quartz Sleeves:
 - The UV quartz sleeve forms part of the complete integrated lamp assembly.
 - Type 214 clear fused quartz circular tubing as manufactured by General Electric or equal.
 - Lamp sleeves shall be domed at one end.
 - The nominal wall thickness shall be 1.5 mm.
8. Lamp Socket:
 - The lamp socket shall be sealed against the module leg sleeve cup by means of an O-ring.
 - The O-ring seal around the lamp socket shall isolate and seal the lamp assembly from the module frame and all other lamps in the module.
 - In the event of a quartz sleeve fracture, the integrated connector of the lamp assembly shall prevent moisture from entering electrical contacts of the lamp socket, lamp module frame and the electrical connections to the other lamps in the module.

E. UV Module Support Rack:

1. The UV module support rack shall be minimum Type 304 stainless steel and be mounted above the effluent in the channel allowing adjustment to the precise height of the channel.

F. Effluent Level Controller:

1. Level Control Weir
 - Located at the discharge end of the UV channel.
 - Designed to maintain a minimum channel effluent level as required to keep lamps submerged.
 - Constructed of Type 304 stainless steel.

G. Low Water Level Sensor:

1. One low water level sensor shall be provided by the UV Manufacturer for each UV channel.
2. During manual, automatic and remote modes of system operation, the water level sensor shall ensure that lamps extinguish automatically if the water level in the channel drops below an acceptable level.
3. The low water level sensor shall be powered by the Level Control Panel.

H. Electrical:

1. Each UV module within a bank shall be powered from the bank's dedicated Power Distribution Center.
2. UV manufacturer to supply all cabling and conduit between lamps and ballasts.
3. UV manufacturer to perform all terminations between lamps and ballasts.
4. Each electronic ballast within a UV module will operate two lamps.
5. Power factor will not be less than 98% leading or lagging.
6. Electrical supply to each Power Distribution Center shall be 480/277V 60Hz, 4.10 kVA.
7. Electrical supply to the Hydraulic System Center shall be 480V 60Hz, .5 kVA.

8. Electrical supply for the Level Control Panel shall be provided by the PDC(s) and be 24 Volt DC.
9. Electrical supply to the System Control Center shall be 120V 1 Ph, 2 Wire + Gnd, 60 Hz, 0.15 VA.

I. Power Distribution Center:

1. Power distribution shall be through environmentally sealed receptacles on the PDC(s) to allow for local connection of UV modules.
2. Data concentration shall be through integrated circuit boards located inside the Power Distribution Center.
3. PDC enclosure material shall be Type 304 Stainless Steel - Type 4X (IP66).
4. All internal components shall be sealed from the environment.
5. All Power Distribution Centers shall be cULus listed listed to Canadian and USA safety standards, with a rating of Type 4X.
6. One separate sealed Power Distribution Center shall be provided per bank of lamps.

To be considered as an alternative, systems that have ballasts mounted in cabinets, the UV manufacturer shall provide one complete cabinet for each bank of lamps, to ensure that each bank is electrically isolated for safety during maintenance and to provide redundancy under average flow conditions.

J. Control and Instrumentation:

1. System Control Center (SCC)
 - The operation of the disinfection system shall be managed at the SCC by a PLC (2022) (1-2 Channels) based controller which continuously monitors and controls the system functions.
 - The operator interface display screen shall be menu driven with automatic fault message windows appearing upon alarm conditions. Operator Interface will be PLC (2022) HMI -Beijer -Type 4X (12").
 - Alarms shall be provided to indicate to plant operators that maintenance attention is required or to indicate an extreme alarm condition in which the UV treatment performance may be jeopardized. The alarms shall include but not be limited to:
 - Lamp Failure
 - Multiple Lamp Failure

- Low UV Intensity
- Module Communication Alarm
- The 100 most recent alarms shall be recorded in an alarm history register and displayed when prompted.
- Bank status shall be capable of being placed either in Manual, Off or Auto mode.
- Elapsed time of each lamp shall be recorded and displayed on the display screen when prompted.
- Digital I/O modules shall be provided to remotely indicate status and alarms such as:
 - Alarm conditions (critical, major, minor)
 - Bank Status (one for each UV bank supplied)
- Data connection component installed within the UV systems control to enable plant staff to receive enhanced over-the-phone and online UV product support from OEM. OEM-provided app to enable UV system monitoring, product troubleshooting, and alarm notifications with cybersecurity verified by third-party and that is consistent with FCC”.

K. UV Intensity Sensor:

1. A submersible UV sensor shall continuously monitor the UV intensity produced in each bank of UV lamps.
2. The sensor shall measure only the germicidal portion of the light emitted by the UV lamps. The intensity sensor shall be factory calibrated. Intensity sensors that can be field calibrated will not be permitted.
3. The UV intensity sensor must adhere to the criteria outlined in the USEPA UV Disinfection Guidance Manual (UVDGM) for intensity sensors including germicidal response, accuracy and NIST traceability.

L. Dose-Pacing:

1. A dose-pacing system shall be supplied to modulate the lamp UV output in relationship to a 4-20 mA DC signal from the Parshall flume.
2. The system to be dose-paced such that as the flow and effluent quality change, the design UV dose is delivered while conserving power.
3. The dose-pacing system shall allow the operator to vary the design dose setting. Logic and time delays shall be provided to regulate UV bank ON/OFF cycling.

M. Hydraulic System Center (HSC):

1. One (1) HSC will be supplied to house all components required to operate the automatic cleaning system.
2. Enclosure material of construction will be 304 Stainless Steel - Type 4X (IP66).

N. Cleaning System:

1. An automatic cleaning system shall be provided to clean the quartz sleeves using both mechanical and chemical methods. Wiping sequence will be automatically initiated with capability for manual override.
2. The cleaning system shall be fully operational while UV lamps and modules are submerged in the effluent channel and energized.
3. Cleaning cycle intervals shall be field adjustable.
4. Remote Manual and Remote Auto cleaning control options shall be provided.
5. The cleaning system shall be provided with the required solutions necessary for initial equipment testing, for equipment start-up and twelve (12) months of operation.

To be considered as an alternate, systems that use only mechanical wiping must have the ability to periodically be cleaned out of channel using a chemical bath. Out of channel cleaning shall include lifting slings, removable banks, cleaning tanks, agitation system and air compressors, as required. The UV manufacturer shall be responsible for supplying all equipment including any equipment not specifically listed required to perform out of channel chemical cleaning. Contactor will be responsible for installation.

O. Module Lifting Device:

1. One (1) lifting sling shall be supplied to assist in removing individual modules from the effluent channel.

P. Spare Parts:

The following spare parts and safety equipment to be supplied.

1. 8 UV Lamp/Sleeve Assembly
2. 2 UV Ballast

3. 20 Wiper Seal Kit
4. 2 Operators kits including face shield, gloves and cleaning solution.

To be considered as an alternate, systems that require more lamps than specified, the UV manufacturer shall provide spares in the amount equal to the quantities listed plus an additional quantity equal to the percentage of lamps required over and above the number of lamps specified.

PART 3 EXECUTION

3.1 INSTALLATION

All equipment shall be installed in accordance with contract drawings, manufacturers' shop drawings, manufacturer's written installation instructions and installation checklist.

3.2 STARTUP/TRAINING/FIELD QUALITY CONTROL

The initial startup of equipment shall be performed by an authorized manufacturer's representative. The representative shall verify the proper installation of all equipment. The representative shall also provide a minimum of two (2) full eight (8) hour days on site training for plant personnel.

3.3 OPERATION AND MAINTENANCE MANUAL

Two (2) hard copies and one (1) electronic copy in pdf file format, of the operation and maintenance manual shall be provided.

- End Section -