



Design, manufacture, commissioning and support of equipment and systems for site remediation and industrial pollution control.



QUOTE NUMBER: 200534R1-c

TERRACON CONSULTANTS, INC.

ROCK OIL REMEDIATION SYSTEM

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A.1 *Corporate Profile*

MLEE Equipment is a North American manufacturer and supplier of wastewater treatment equipment, groundwater/site remediation systems, drinking water treatment systems, and PLC based control panels.

Since 1992, MLEE has supplied high quality treatment equipment to the Canadian, United States, and international markets.

With over 50 years of combined technical experience in petroleum/water separation, water treatment and project management, MLEE staff continues to lead in the design and application of innovative new technologies in the environmental business.

MLEE is an exclusive distributor for QED Environmental Systems, Inc. groundwater sampling and remediation pumps, sample filters, interface meters and air strippers.



B.1 *Technical Assumptions / Equipment Summary / Exceptions*

The equipment proposal we have provided in this document is based on our understanding of your requirements. The following sections review the design of the system and detail the individual components. The information provided in this proposal may be modified prior to the construction of the equipment. If no modifications are required, the system will be built as specified, for the price quoted, within the delivery time specified.

Engineering Assumptions:

- 240V three-phase power available
- 120V single-phase power available
- Hazardous CL 1 DIV 2 location for equipment
- Non-hazardous location for control panel
- Site noise constraints: 70 dBA @ 10 feet
- Contaminants: Petroleum Hydrocarbons
- Ambient up to 104 degrees F
- Altitude 2,340 feet

Special Notes:

1. MLEE has included magnehelic vacuum gauges on the SVE manifold legs as requested. These gauges are vulnerable to damage in wet conditions; therefore isolation valves have been included. In order to protect the gauge, the valves should be closed except when taking a reading. If operation with isolation valves is unacceptable the customer should consider capsuhelic gauges instead. A cost adder can be provided for this option upon request.
2. This proposal is for two similar systems – East System and West System as described in the RFQ. Each system includes the modules as described, differences between the systems have been indicated at the start of each module description.
3. MLEE General Terms & Conditions are located at the end of the quote in Section C.1.
4. MLEE Warranty Statement is located at the end of the quote in Section D.1. Please note that shipping and labor are excluded from MLEE's warranty.
5. Obtaining any required site permits (i.e. building) is the responsibility of the customer; MLEE is not responsible for any such items.
6. All required site inspections including but not limited to electrical, building and fire are the responsibility of the customer; MLEE is not responsible for any such items.
7. MLEE Equipment will strive to meet the specified noise level limits by means of silencers, sound foam and strategic placement of louvers to reduce the noise emissions from the remediation enclosure for your system. This method may not achieve the required sound levels for your site; however MLEE has done extensive R & D jointly with an acoustics engineer on noise



emissions from remediation systems and has the ability to guarantee the noise rating on your equipment enclosure. This custom engineered sound enclosure can be quoted upon request.

8. MLEE estimates delivery timeframe of approximately 8 weeks from receipt of a completed ATP form and PO. This delivery schedule assumes that the order will be placed giving MLEE authorization to order components immediately. Parts availability from our vendors varies so system delivery will need to be confirmed at time of shipment. If a specific delivery schedule is desired this should be discussed at time of order, MLEE will do everything possible to accommodate your desired delivery schedule.

Exceptions to request for quote:

1. The vapor liquid separator included has a removable lid and therefore a 6" cleanout port has not been provided.
2. The vacuum rating for the blower in the RFQ is a requirement at the manifold instead of at the blower as originally specified and later clarified through the customer's response to questions.
3. The carbon vessel included in this proposal holds 185 lbs of carbon instead of the 200 lbs specified.
4. The trailer ambient temperature specified range of 50 to 110 F is higher than our standard systems for this geographical area. MLEE has assumed a maximum trailer ambient temperature of 104 F.



B.2 Equipment Description

This proposal is for two similar systems – East System and West System as described in the RFQ. Each system includes the modules as described below; differences between the systems have been indicated at the start of each module description.

Miscellaneous Items to be Supplied Loose:

- Exhaust stack to extend 10' above enclosure roof
 - c/w flapper type rain cap
 - c/w condensate/rain trap with manual drain valve at base of stack
 - Shipped loose for installation at site by others
 - Support bracing to enclosure
 - Guy wired to enclosure roof if required

Vacuum Extraction Manifold Module:

	Number of 2" dia. legs	Number of 4" dia. legs	
East System	4	1	Plate 17492
West System	5	2	Plate 17491

4" Vacuum extraction manifold constructed with legs as described in above table.

Header to contain:

- 1/2" port with 1/2" ball valve for future connection of air compressor fitting (by customer) to blow water out of buried SVE lines
- Butterfly valve
- Magnehelic vacuum gauge
 - Isolation valves to protect gauge from moisture during regular operation and from pressure during compressed air blow back operation

Each Leg:

- On/off control valve
 - Ball valve for 2" legs
 - Butterfly valve for 4" legs
- Magnehelic vacuum gauge
 - Isolation valves to protect gauge from moisture during regular operation and from pressure during compressed air blow back operation
- Sample port
- Termination outside of enclosure

Vapor Liquid Separator Module:

MLEE model VLD-400, 55 G vapor liquid separator with:

- Exterior to be painted with urethane gloss enamel (MLEE Blue)
- Interior to be epoxy coated
- Demisting element
- Sight glass with stem float column level switch assembly – mounted with isolation valves and unions for easy removal (wire installed in flexible conduit):

- High level alarm switch
- High level pump control switch
- Low level pump control switch
- Manual drain plumbed to exterior of enclosure
- Inlet to VLS to contain:
 - Vacuum transmitter

Goolds NPE model **1ST** centrifugal transfer pump with ½ HP 230/460V/3P motor:

- Performance: 10 GPM at 55' TDH actual (5 GPM requested)
- Motor: TEFC (Suitable for CL 1 DIV 2)
- Mounted with vibration isolators

Water inlet piping to pump to contain the following components:

- Ball valve
- Flexible hose connection between VLS and pump
- Union

Water discharge piping to contain the following components:

- Union
- Pressure gauge (SS, liquid filled, mounted vertically)
- Sample port
- Gate valve
- Check valve
- Totalizing water flow meter
- PVC piping

Soil Vapor Extraction Blower Module:

	Model #	HP	Flowrate (acfm/scfm)	Vacuum at Manifold Inlet ("WC)	Estimated System Losses ("WC)	Vacuum Required at Blower Inlet ("WC)
East System	EN656M72XL	3	175/160	17	15	32
West System	EN757F72XL	5	260/237	18.5	15	33.5

Plate 17492

~~Plate 17491~~

Rotron regenerative blower with a 230/460V/3P motor:

- Motor: EXP (Suitable for CL 1 DIV 1)
- Performance at inlet of blower: As described in above table
- Expected inlet pressure losses through MLEE system: As described in table above.
- Discharge temperature: 145 F at an inlet of 68 F
- Noise rating: ~83 dBA
- Mounted with vibration isolators
- Installed with flexible connections and unions on inlet and discharge for easy removal

Inlet piping to blower to contain the following components:

- Solberg inlet filter/silencer
- Magnehelic differential pressure gauge
- 2" dilution line to contain:
 - Solberg filter/silencer
 - Ball valve
 - Mounted inside enclosure close to intake louver
- Magnehelic-type vacuum gauge
- Vacuum relief valve
- PVC piping

Discharge piping from blower to contain:

- Sample port
- Pressure gauge
- Temperature gauge
- MLEE PFLOW pitot tube flow indicator
 - Calibration curve provided to translate to flowrate based on operating conditions
- Steel piping

Liquid Phase Carbon Filtration Module:

One (1) MLEE model DIS90WP contactor vessel with:

- Dimensions – 24” diameter x 38” high
- Disposable vessel
- Pressure rating – 15 PSI
- 185 lbs of virgin, granular liquid phase carbon
- Pressure gauges
- Sample ports
- Anti-siphon safety valve
- Two (2) flex hoses (each 10’ in length) with cam lock fittings

Air Sparge Compressor Module:

Busch model MM 1144 BP rotary claw compressor with 7.5 HP 230/460V/3P motor:

- Motor: TEFC (Suitable for CL 1 DIV 2)
- Performance: 50 SCFM at 16.5 PSI
- Discharge temperature: 230F at an ambient of 100 F
- Noise rating: 73 dBA
- Integral pressure relief valve
- Integral inlet silencer
- Mounted with vibration isolators

Air inlet piping to compressor to contain:

- Solberg inlet filter/silencer
- PVC piping

Air discharge piping from compressor to contain:

- Check valve
- Pressure gauge (SS, liquid filled)
- Temperature gauge
- Steel piping

Note: MLE's experience with these compressors indicates that the manufacturer's motor recommendation is based on ideal conditions and in reality a 5 HP motor in this application will end up operating within the motor service factor leading to over amping and eventual motor failure. A 7.5 HP motor will allow the compressor to obtain the desired performance without damage to the motor. Additionally, the 7.5 HP motor will not draw more energy than the 5 HP, the blower will use what it needs regardless of the motor size, since the compressor HP requirement is somewhere in between the two motor sizes it will “overwork” the smaller motor and under utilize the larger motor.



Heat Exchanger Module:

American Industrial Heat Transfer heat exchanger model ACA-3182-3EXP with ¼ HP 230/460V3P motor:

- Motor: EXP
- Mounted with vibration isolators
- Air flow: 50 SCFM
- Air pressure: 16.5 PSI
- Ambient air temperature: 100 F
- Inlet temperature: 230 F
- Discharge temperature: 140 F
- Pressure drop: < .5 PSI

Air discharge piping from heat exchanger to contain:

- Pressure gauge (SS, liquid filled)
- Temperature gauge
- High temperature switch
- Air bleed valve with Solberg filter/silencer
- Pressure transmitter
- Moisture trap
- Steel piping

Air Sparge Manifold Module:

1" Air sparge discharge manifold constructed with five 1" legs

Each leg to contain:

- Ball valve
- Gate valve
- Rotameter style flow indicator
- Pressure gauge
- Termination outside of enclosure

Remediation Enclosure:

MET US certified cMET certified, built to NEC Class 1 Div 2 standards, all wiring intrinsically safe and all equipment pre-piped factory tested and mounted in enclosure

8' x 12' enclosed cargo trailer with the following standard features:

- 6.5' standard interior height
- Tandem 3500 lbs axles
- 4500 lbs payload capacity
- Platform stand on tongue for accessing the control panel
- DOT compliant coupler with locking anti-tow away device
- Aluminum siding (white)
- Independent suspension
- Electric brakes
- Break away kit
- Safety chain
- One drop leg type tongue jack and two rear mounted drop leg or scissor type leveling jacks (mounted one on each rear corner)
- Interior painted plywood



- Insulated walls and ceiling
- Barn-style rear double doors
- Control panel mounted to exterior

Interior to contain the following:

- Vacuum extraction system
- Liquid phase carbon
- Air sparge system
- Lighting (2 lights minimum)
- Ventilation fan with thermostat and sound attenuating hood
- Heater (3600 W) with thermostat
- Passive vent louvers with sound attenuating hood
- One (1) 10 lbs ABC rated fire extinguisher – wall mounted near exit
- Sump with high level alarm switch
 - 1.5" lip sealed around trailer floor to redirect liquid to the sump
- All influent, effluent, and drain lines plumbed to outside of building

Control System Module:

PLC Series Direct Logic PLC based control panel with the following standard features:

- UL certification
- AIC rating of 5000
- NEMA 4 lockable panel enclosure
- Inner swing panel
- Primary circuit protection using fused main disconnect
- Surge and lightning protection for control system
- Main power block
- Branch circuit protection with circuit breakers for motors
- Motor starters with overload protection
- Branch circuit protection with circuit breakers for powered devices
- Direct Logic PLC control system
- 24 VDC IS power supply
- Intrinsically safe barriers
- UPS for PLC and modem to allow for power failure alarm
- Duplex 15 Amp GFI receptacle
- Wired and installed
- Factory tested prior to shipping

Outside cover of inner swing panel to contain the following:

- HOA switches with green run lights
- Red alarm indicator light
- User interface display screen
- Alarm reset button
- Hour meters
- Emergency stop button

Telemetry Module:

MLEE model SL-WP Wireless remote access system for PLC based control systems:

- P & ID user interface will display status of all inputs, outputs and alarms
- P & ID user interface will allow for Hand/Off/Auto control of all motors, valves or other auxiliary outputs



- Remote reset of alarms
 - Remote shutdown and restart
 - Accessible from any PC with access to the Internet
 - Requires installation of software on PC
 - Requires SL-Server for Mac applications
 - Datalogging capabilities
 - Alarm history including data and time for each event
 - Motor run times
 - Main Datalog to record a maximum of 5 daily totalized data points and up to 7 analogue or digital values in 680 records with user selectable time interval
 - Initial setup up by MLEE
 - Hardware included
- MLEE model SL-EMonitor, Daily email status report
- Hardware included

Operation And Maintenance Manual (Three Copies):

- Operating instructions for all treatment system components
- Copy of operating manual for each piece of equipment
- Summary of system components
- Summary of system operation principles
- Summary of operation controls and failsafes
- Summary of maintenance requirements for each piece of equipment

MLE Parts Web Store:

The MLE parts web store is available for your system operation and maintenance needs. Please visit our web store and sign up for your account to begin using the various available services. The web store address is <http://store.mleequipment.com/>.