

**LANDUSKY MINE SWIFT GULCH
REQUEST FOR QUOTATIONS (RFQ) FOR
INCLINED/VERTICAL CLARIFIER
BENCH SCALE TESTING AND
INCLINED/VERTICAL CLARIFIER
EQUIPMENT**

**REQUESTED BY:
WILLIAM C. MAEHL, P.E.
SPECTRUM ENGINEERING, INC.
1413 4TH AVENUE NORTH
BILLINGS, MONTANA 59101**

**REQUESTED ON BEHALF OF:
MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY
ENVIRONMENTAL MANAGEMENT BUREAU**



DATE POSTED: FEBRUARY 14TH, 2014

RFQ RESPONSE DATE: MARCH 4TH, 2014

LANDUSKY MINE SWIFT GULCH REQUEST FOR CLARIFIER (INCLINED PLATE SETTLER) BENCH SCALE TESTING AND CLARIFIER

The Montana Department of Environmental Quality (DEQ) jointly oversees reclamation of the Zortman and Landusky mines in co-operation with the USDI Bureau of Land Management (BLM) via a Memorandum of Understanding dated August 2, 2004. The DEQ has secured funding for the Landusky Swift Gulch water treatment plant upgrade through a grant from the Montana Department of Natural Resources and Conservation. This grant money is being managed by the DEQ through their contract with Spectrum Engineering, Inc. in Billings, Montana.

Problem History

Pegasus Gold Corporation (PGC), through its subsidiary Zortman Mining, Inc. (ZMI), conducted open pit mining operations at the Zortman and Landusky sites between 1979 and 1996. The Landusky Mine site is located adjacent to the southern boundary of the Fort Belknap Indian Reservation, in Sections 14, 15, 22, and 23 of Township 25 North, Range 24 East, Phillips County, Montana.

Water quality monitoring programs identified the development of acid rock drainage at both mines during 1992. The BLM has now listed the mine sites under their CERCLA authority. DEQ and BLM are currently participating in a Technical Working Group with the Tribes in an effort to resolve remaining reclamation and water quality issues at the mine sites. On July 27, 2011, then Governor Brian Schweitzer toured the Landusky mine with Fort Belknap Indian Community Council President Tracy King and other Tribal officials. Their single biggest complaint and concern was the current treatment of the water in Swift Gulch on the northern side of the Landusky Mine.

DNRC Grant Application

In May 2010, the Montana Department of Environmental Quality submitted a request to the Department of Natural Resources and Conservation for funding for an project entitled "Construction of Clarifier and Sludge Recycling System For Treatment of Residual Wastewater" at the Landusky Mine.

Swift Gulch Clarifier Project

With BLM ARRA stimulus money, the DEQ has been able to erect a water treatment plant (WTP) in Swift Gulch. This plant is equipped with two Rotating Cylinder Treatment Systems. The Rotating Cylinder Treatment System™ (RCTS) was originally developed by Ionic Water Technologies, Inc. (IWT) to treat concentrated acid mine drainage containing ferrous iron concentrations of 4,000 to 7,000 mg/L at the Rio Tinto Mine. Using EPA's formula for oxygen transfer it was found that the RCTS delivered approximately 9 pounds of oxygen per horsepower-hour. Mechanical surface aeration systems provide 3.0-3.5 lbs of oxygen per horsepower-hour, while submerged turbine aerators utilizing dual impeller turbines provide 2.5-3.0 pounds of oxygen per horsepower-hour. The RCTS aeration concept is different from traditional aerations systems. Rather than injection of air into water, the RCTS introduces water to air in a thin film clinging to the rotating perforated cylinder and when the perforations impact the water it is aggressively agitated and bubbles are forced into the water. This unique system of aeration replicates natural aeration and eliminates the need for costly blowers.

In addition to the low energy consumption of this system, the aeration is relatively unaffected by sediment, scaling, and related maintenance issues of alternative aeration technologies. The Swift Gulch WTP is currently equipped with 3 phase 480 power.



The two RCTS systems are immediately inside the treatment building through the large overhead garage door shown in the picture above. The one shortcoming of the system is that 100% of the treated water which comes out and the iron precipitate has to settle out in one of three ponds. These settling ponds limit the output capacity. As shown in the pond pictures below, all of the water must percolate through the bottom of the pond (Pond 1 shown) and back into Swift Gulch. In order to dig out the sludges, the individual ponds must be totally dried out and allowed to sit for months prior to excavating the sludge for removal and burial at the Landusky Mine. The goal is that the clarifier, with potentially a floc system, will allow 80+% of the water to go directly back into Swift Gulch and less than 20% of the total water flow will have to pass through the settling ponds prior to reentering Swift Gulch.



This plant has been able to treat 160,459,041 gallons from startup in late 2008 through January 2014 using the RCTS process. Water flows vary with the seasons. The three ponds right now are at maximum capacity at around 150-200 gpm of WTP output. The RCTS units are each capable of discharging around 300 gpm each. For the timeframe of August through March (8 months), the flow is fairly consistent at 71-78 gpm. April, May, and June have recorded flows of

150 to 286 gpm with July dropping back down to 125 gpm. The clarifier will be sized to handle 350 gallons per minute of design flow.

A laboratory analyses of the RCTS discharge shows the following:

- 612 mg/L of total suspended solids
- 596 mg/L Calcium
- 93 mg/L Magnesium
- 18.8 mg/L Aluminum
- 193 mg/L Iron
- 12.6 mg/L Manganese
- pH was already adjusted from 3 input pH to 8.7 (7 to 9 pH average) output pH in the Swift WTP.

Swift Gulch Request For Quotations

Spectrum Engineering, on behalf of the Montana Department of Environmental Quality is requesting quotations for the following level of effort:

Bench Scale Test:

The bench scale testing will establish the need for polymer addition (type and amount), gravity settling rates, clarity of effluent, and solids concentrations of settled slurry. In addition, the flow characteristics of the settled solids will be noted as well as the impact of additional aeration time on settling rates. Recycle of previously settled solids will be evaluated and the impact of agitation on floc formed after adding polymer. This testing can be done either on-site or at the vendor's labs. Spectrum Engineering is anticipating supplying seven 5-gallon buckets (35 U.S. gallons) of effluent and one 5-gallon bucket of pre-treatment influent (if requested) to each vendor for testing purposes. More water is available should this quantity not be adequate.

Each vendor is responsible for their own bench test. Spectrum envisions the bench scale testing to include:

- Initial sample characterization
- Jar testing
- Polymer screening
- In-depth chemical screening and dosage determination
- Aeration of sample (if necessary)
- Multiple sedimentation testing - varying feed concentrations, solids recirculation (if any), with and without polymer, dosages, etc.
- Suspended solids testing (feed slurry, effluent, underflow, etc.)
- Full report of results including spreadsheets, graphs and/or charts used for sizing.

The purpose of the bench scale testing will hopefully determine parameters such as the design rise rate, solids loading rate, settled solids density, solids recirculation rate, project effluent clarity, and required chemical dosage.

Multiple contract awards are anticipated for Bench Scale Testing. Contract Award(s) are anticipated on March 5th. Water will be shipped on March 6th (weather dependent). The results of the Bench Scale Testing will be due on April 1st, 2014.

Initial tests (confidential) indicate that a full scale polymer addition may be required in a tank with an adjustable speed vertical paddle flocculator ahead of the total suspended solids

reduction unit (clarifier). Plus additional aeration of the RCTS discharge may be needed. Bench scale testing may reveal that the inclined plate settler is not the best suited clarifier for the application and that a unit with internal settled solids recirculation and sludge thickening capabilities may be necessary.

Clarifier Selection:

As seen in the picture of the Swift Gulch water treatment plant, Swift Gulch is a narrow drainage with limited room. The potential selection of a Lamella style, inclined plate clarifier, was initially specified due to the limited physical area (currently estimated at 25-feet by 20-feet). The plate settlers per manufacturer specifications appear to provide faster settling in one tenth the space of conventional clarification equipment. Dependent upon bench scale testing, a high rate vertical thickening clarifier may be required instead of an inclined plate clarifier.

Part two of this quotation is the equipment vendor quoting one or more clarifiers configurations to meet the anticipated needs of the project. Spectrum reserves the right after the Bench Scale Testing is completed to immediately select one of the quoted systems from the quotes supplied herein without going back out for bids. Whether a second round of bids are required or not, it is anticipated that the winning selected system shall be chosen no later than June 1st, 2014.

Example systems reviewed and acceptable to date without the benefit of the Bench Scale Testing include:

- Monroe Environmental VC-1500/55 Vertical Clarifier fabricated from 316 stainless steel
- WesTech PST100 system with 304 stainless steel
- WesTech Contrafast system
- There are obviously others meeting the space requirements.

The ultimately selected system will be placed immediately outside the existing Swift Gulch WTP building next to the small door in the photograph above. It is currently anticipated that this system will be outside but may ultimately be enclosed for year-round operation. The system should be designed to operate 365 days per year.

The site preparation, including leveling of the construction site and pouring the concrete pad would likely be completed using on-site equipment owned by DEQ and on-site labor. This work is scheduled for June 2014.

The next task is installation of the clarifier (with probable floc system). The construction is tentatively scheduled for late August 2014. Construction of the clarifier will be overseen by employees of Spectrum Engineering as part of their existing contract for management of the Zortman and Landusky sites. DEQ and BLM personnel will also inspect the site during construction activities. As part of routine site operations, the chemistry of influent and effluent waters for the Swift Gulch water treatment plant system is regularly monitored. This monitoring will continue during the start-up and operation of the clarifier system, allowing the effectiveness of the treatment to be documented.

Date Advertised: On or before February 14th, 2014

Closing Date: March 4th, 2014 at 2:00 PM MST (RFQ responses may be mailed to the address listed below, emailed, or hand delivered)

Award Basis: Best Value for the State of Montana DEQ

Award Date: March 5th, 2014

Delivery Date: Bench Scale Test Results - April 1st, 2014.
Clarifier Delivery Based on Bench Scale Testing - August 25, 2014
based on an anticipated order date of April 3rd, 2014 (subject to final
discussion at the time of order)

Terms: Contract Bid Price.

Engineering Mgr: Bill Maehl
Telephone: 406-259-2412 ext. 3
Email Address: maehl@spectrum-eng.com
Mailing Address: Spectrum Engineering, 1413 4th Avenue North, Billings, MT 59101

Agency: Montana DEQ
Project Mgr: Wayne Jepson
Telephone: 406-444-0529

Questions: Bidders will be allowed a period of 12 days between February 14 and
February 26, 2014 in which to submit questions via e-mail or by mail.
Spectrum will provide responses to all questions by February 28, 2014.
However, Spectrum shall reserve the sole right to determine the
adequacy of any response and to decline to answer any question.
Spectrum will distribute copies of all questions and responses to all
bidders via email.

Qualifications: The clarifier manufacturer must have prior experience in the type of work
being requested with Best Value points awarded for direct experience
with mining applications or water treatment.

Deliverables: Bench Scale Testing:
Provide a detailed quotation for bench scale testing. Spectrum
reserves the right to negotiate the quantity of samples tested per
manufacturer/vendor should the overall combined testing cost
exceed the budget. Multiple awards are anticipated under this
portion of the contract.

Clarifier:
Should the test results definitively identify a clear winner in terms of
overall type and configuration of clarifier needed for the Swift Gulch
treated waters, Spectrum reserves the right to select from one of
the proposed clarifier units quoted within this solicitation. As such,
Spectrum requests that each manufacturer/vendor supply detailed
design criteria for their anticipated best fit to the problem identified
above. Bidders are encouraged to bid more than one unit if there
are multiple clarifiers within their line of products. Each bid or
submittal should be as complete as possible including drawings or
schematics, if available. A component list for each clarifier
submittal should be as complete as possible including settler tanks,
support structure, plate specifications, nozzles, sludge tank,
launder, reaction tank(s), precipitation tank(s), flocculation tank,
access platform, interconnecting piping, surface preparation,

anchor bolts and assembly fasteners and/or other items or accessories which completes the package product.

At the time of order placement and/or delivery all clarifier equipment must be delivered with:

- Installation instructions,
- Operating instructions and/or operator's manual,
- Part numbers for all equipment,
- Recommended service life for all equipment,
- List of replacement / service parts of all known items which will be replaced or serviced within the first five years of continuous operation, and,
- Electrical wiring diagram and description.

CLARIFIER EVALUATION:

General

A. Scope

Vendor shall furnish and install equipment for one (1) acid mine drainage treatment system. The equipment shall include reaction tanks, a flocculation chamber (if proven necessary from bench scale testing), shallow depth sedimentation plates, collection troughs, integral thickener tank, recycle pump, anchor bolts, and all other appurtenances required. The sedimentation equipment specified shall be installed in a stainless steel tank.

B. Design Criteria

Flow rates (GPM):

Influent:

minimum: 75

design: 350

maximum: 350

Influent suspended solids SS (mg/l) design: 612 mg/L

Effluent suspended solids SS (mg/l) anticipated design: 20 mg/L

C. Warranty

A written supplier's warranty shall be provided for the equipment specified in this section. The warranty shall be for a minimum period of one year from start-up or 18 months from time of equipment shipment, whichever comes first. Such warranty shall cover all defects or failures of materials or workmanship which occur as the result of normal operation and service.

D. Bench Scale Laboratory Testing

Prior to preparation of submittal, equipment supplier shall conduct laboratory testing of a representative sample to verify equipment sizing and to determine appropriate chemical dosing. Outside tests by a third party laboratory will be unacceptable. Laboratory tests shall at a minimum consist of:

1. Jar testing
2. Polymer screening
3. Inclined plate sedimentation test

E. Bench Scale Testing Report

The equipment supplier shall prepare a laboratory testing report summarizing the conclusions and recommendations based on the testing performed. Should laboratory testing find the specified equipment unsuitable for this application, equipment manufacturer shall make this known to Spectrum. Vendor shall quote all probable equipment to fit the application to allow for flexibility upon completion of the Bench Scale Testing.

F. Submittals

Copies of all materials required to establish compliance with these specifications shall be submitted for review. Submittals shall include the following:

1. Certified general arrangement drawings showing all important details and materials of construction, dimensions, nozzle sizes, loads on supporting structures, and anchor bolt locations.
2. Descriptive literature, bulletins, and/or catalogs of the equipment.
3. Complete data on motors and speed reducers.
4. Electrical schematics for all control equipment to be furnished.
5. Complete calculations signed by a registered professional engineer verifying the mixer and flocculator velocity gradients, power consumption, detention times, projected plate area, and hydraulic loading rates of the separator.

G. Experience

The equipment supplier shall have at least 20 years experience in the design, application, and supply of water or wastewater treatment equipment.

The equipment supplier shall provide documentation of experience in acid mine drainage treatment process. Equipment supplier shall submit a list of not less than 5 operating installations specifically in AMD treatment.

The equipment supplier shall provide a list of not less than 5 inclined plate settler installations.

Products

A. General Design

1. **Description:** The system shall consist of reaction tanks, flocculation, external recycle, and a stand-alone type inclined plate settler unit with integral thickener. Influent flow discharges into a flocculation chamber to aid in the formation of settleable flocculated particles. The flow shall then move forward for clarification through shallow depth sedimentation in the inclined plate chamber.

The separator shall be designed so that settled solids shall flow downward along the inclined plates, and be collected in an integral thickener tank.

2. **Materials:**

Tank: All steel and structural members shall be constructed of Stainless Steel members in contact with liquids, either continuously or intermittently, shall have a minimum thickness of 3/16 inch.

Plates: Inclined plates shall be constructed of Stainless Steel Plates shall be structurally designed to bear the weight of a full sludge load through all plates.

Weirs: Effluent trough weirs shall be stainless steel.

3. **Fabrication:** Shop fabrication of structural members shall be in accordance with the latest edition of the "Structural Welding Code", AWS D1.1, of the American Welding Society. All welded connections shall develop the full strength of the connected elements and all joined or lapped surfaces shall be completely seal welded with a minimum 3/16 inch fillet weld. Intermittent welding on interior surfaces shall not be allowed. All welding shall be done in accordance with the latest edition of the AWS code.
4. **Edge Grinding:** Sharp projections of cut or sheared edges of ferrous metals shall be ground to a radius by multiple passes of a power grinder as required to ensure satisfactory coating adherence.
5. **Shop Surface Preparation/Coating:** All fabricated stainless steel shall be passivated per ASTM A380. The drive units shall be coated with the supplier's standard enamel paint system.
6. **Structural Design:** All steel design shall be in accordance with the AISC Manual of Steel Construction, latest edition, and the Uniform Building Code (UBC), latest edition.

B. Reaction and Flocculation Tanks

1. **Description:** Three (3) tanks with mixers are anticipated. The first two tanks are for reaction, and the third for flocculation. Detention time shall be minimum 10 minutes per tank.

2. **Drive Unit:**

- a. **Design Parameters:** The drive unit shall be capable of continuously turning the mechanism at the design maximum tip speed. Speed adjustment shall be obtained by means a variable frequency speed controller. The drive shall be supported by a rigid steel plate bolted to the bridge.
- b. **Speed Reducers:** The speed reducing unit shall consist of cycloidal or helical gear reducers directly connected to a motor without the use of chains or v-belts. The pinion gear shall be integral with the shaft.

Speed reduction gearing shall be fully enclosed in an oil-tight, cast-iron, or welded steel housing of splash and drip-proof construction suitable for outdoor use.

The main ring gear of cycloidal drives shall be made of high carbon chromium bearing steel and be fixed to the drive casing. An eccentric bearing on the high speed shaft shall roll cycloidal discs of the same material around the internal circumference of this main ring gear. The lobes of the cycloid disc shall engage

successively with pins in the fixed ring gear. The movement of the cycloid discs shall then be transmitted by pins to the low speed shaft.

Helical speed reducer gearing shall be manufactured to AGMA standards. Gears shall be of the helical type made from properly heat-treated alloy steel. They shall be formed with accurate tooth contours and finished in a manner ensuring accurate meshing and quiet running.

The reducers shall be fitted with anti-friction bearings of proper size for all mechanism loads. Reducers shall be built for continuous service 24 hours per day and shall be of ample capacity for transmitting the required power and torque output. Bearings and gearing shall run in a totally submerged oil bath or be grease lubricated. The speed reducers shall have a minimum service factor of 1.25.

- c. **Variable Frequency Speed Controller:** Variable frequency drive (VFD) equipment shall be furnished by the flocculator manufacturer, complete with specified sensors, and shall vary the speed of a 480 volt, 3 phase squirrel cage induction motor.

The equipment shall incorporate circuit protective devices, filters, selector switches, meters, speed setting potentiometers, indicating lights, control transformer, fuses, relays, wiring, terminals, nameplates, and any other required components to provide a satisfactory operating variable frequency speed system. A programmable logic controller is acceptable in the control section. All components shall be enclosed in ventilated steel cabinets with hinged doors and equipped with the required hardware. The ambient temperature range shall be from 32 degrees F to 100 degrees F. The line voltage will be constant at 480 VAC within plus or minus 10 percent. A circuit breaker shall be provided as a protective device or the equipment power supply.

The VFD equipment shall include an operator's control station. The operator's control station shall be included in the control and indication section as specified hereinafter.

Motor: The motor shall be an 1800 RPM, squirrel cage, induction type, TEFC, ball bearing heavy duty unit of ample power for starting and operating the mechanism without overload, with a service factor of 1.15. A motor canopy shall be provided.

Power supply to the equipment shall be 480/240 volt, 60 hertz, 3 phase.

3. **Torque Shaft:** The rotating torque shaft shall be rigidly connected to the output shaft of the drive unit. The lower end of the shaft shall be unsupported. The shaft shall be hollow or solid steel and shall be designed to not exceed 6,000 psi unit stress under combined loading.
4. **Electrical:** The equipment supplier shall furnish all electrical items specifically called for in this specification section. The contractor shall supply all other electrical items required to place the equipment into service.

The installing contractor shall supply and install all field wiring required including but not limited to proper size wire, conduit, fittings, and supports.

C. **Inclined Plates Description**

Each plate shall be supported vertically on its upper end at the sides of the plates. Horizontal support shall be furnished at its lower end. The plates shall be formed to minimize short circuiting of flow between plates. Plates shall be reinforced vertically to provide proper rigidity and to form flow channels.

D. **Effluent Removal**

1. **Collection Troughs:** Rectangular effluent collection troughs shall be provided over the plate pack section of the tank. The troughs shall be constructed of stainless steel.
2. **Weir:** An adjustable weir shall be provided on the collection troughs at the water surface for removal of clarified effluent. The weir shall consist of 3/16 inch thick x 6 inches deep stainless steel and shall be a submerged orifice design. The weir sections shall be flat and fastened to the collection trough wall to allow vertical leveling adjustments and prevent interference of plate removal.

E. **Sludge Collection and Removal**

Integral Sludge Thickener: Thickener tank shall be constructed as part of the overall tank design. The thickener mechanism shall include pickets and scraper arms to enhance concentration of the sludge and to transport the concentrated sludge to the sludge draw-off point located at the center of the tank.

F. **Recycle Pump**

One (1) centrifugal pump shall be provided to recycle the underflow from the settler back to the beginning of the treatment train.

G. **Tank**

The tank shall include flanged nozzle connections for inlet, clarifier outlet, and sludge removal. Sample taps shall be 1 inch national pipe thread (npt) female connections.

H. **Platform/Walkway**

A walkway will be provided to allow access to the mixer drives, thickener scraper drive, and plates for maintenance and cleaning. A minimum 36" wide walkway shall consist of 1-1/4" x 1/8" HDG steel grating, with double row handrails of 1-1/4" pipe and 4" x 1/4" toe plate. Handrail shall be painted steel. One (1) ladder will provide access to the platform/walkway.

I. **Electrical**

Equipment vendor shall provide a local control panel with door mounted run and fault lights, H/O/A switch, and potentiometers. The panel shall contain a VFD with line reactor for the flocculation mixer and motor starter for the reaction mixers and thickener rake drive.

The motor control panel will be in a NEMA 4, painted mild steel enclosure with a wall mount foot kit and a painted steel back panel.

The control panel shall be wired to accept a single 480 VAC, 3 phase, 60 hertz power feed from the customer. A 3 pole molded case circuit breaker with pad-lockable disconnect handle is provided for short circuit protection. All wiring for field connections

will be brought to a terminal strip. All interconnecting wiring is to be completed by Spectrum Engineering or Big Flat Electric.

Installation

A. General

The equipment shall be installed properly to provide a complete working system. Installation shall follow the vendor's recommendations.

B. Manuals

The equipment vendor shall furnish 3 copies of operation and maintenance manuals which will be retained at the installation site to assist plant operators. The manual shall include the vendor's erection and assembly recommendations and a complete list of recommended spare parts.

C. Field Service

The equipment supplier shall provide the service of a qualified representative for two (2) trips and four (4) days to inspect the mechanism installation, assist in start-up, and instruct plant personnel in the proper operation and maintenance of the mechanism.

D. Field Operation Testing

The mechanism shall be operated in a dry tank for a minimum of 4 continuous hours before flow is allowed to enter the system. There shall be no binding, jerky, or unusual motion exhibited during this run in period. Motor amperage shall be checked at least hourly for any unusual or higher than normal figures. After the unit has successfully passed this initial test, flow shall be introduced into the tank and the same 4 hour observation test run. If the unit should fail under any of these conditions, the test shall be halted and the problem corrected. If, after several attempts, the unit does not successfully pass the field test, the faulty portion of the equipment shall be replaced and the test re-run.

Should one or more of the proposed configurations not fall into a standard inclined or vertical plate clarifier specification, then the appropriate specifications should be so stated.

The following quotation sheets Part A - Bench Scale Testing and Part B - Clarifier Equipment Proposed (separate sheets per each different clarifier proposed, if more than one is offered) must be returned with your submittal in order to be eligible for award consideration. Spectrum Engineering reserves the right to select the Proposal which, in their opinion, offers the Best Value to the State of Montana. Part A - Bench Scale Testing will be awarded and completed by April 1, 2014 with more than one vendor likely to be accepted to provide this service. Part B - Clarifier Equipment may or may not be selected directly from this submittal depending on Bench Scale Testing results. Equipment vendors should make their "best and final" offer for each clarifier proposed with the prices good from March 4th through April 30th, 2014. Spectrum hopes to make the clarifier selection directly from this initial offer without rebidding.

SWIFT GULCH BENCH SCALE TESTING QUOTATION

Return Proposal/Qualifications to: William C. Maehl, P.E. Spectrum Engineering 1413 4th Avenue North Billings, Montana 59101	Clarifier (Inclined Plate Settler) Bench Scale Testing Quotation and Clarifier(s) Quotation RFQ Response Due Date: MARCH 4TH, 2014
Offeror Name/Address	Authorized Offeror Signatory:
Phone Number: _____	Email: _____

PART A - BENCH SCALE TESTING QUOTATION

Item	\$/Sample	# of Samples	Total Cost
Screening/Sedimentation Testing Per the Procedures and Parameters as Outlined in the RFQ. This quote include all internal laboratory testing.			
External (outside) laboratory testing for verification of internal results.			
TOTAL BENCH SCALE TESTING COST			\$
Describe in words your proposed bench scale testing program and how it will accomplish the needs outlined in the RFQ (separate pages can be attached and referenced).			

Spectrum reserves the right to terminate all work at the completion of the bench scale testing and to rebid the clarifier component of this bid.

**SWIFT GULCH PROPOSED CLARIFIER (INCLINED PLATE SETTLER
OR OTHER SUITABLE CLARIFIER CONFIGURATION)**

Return Proposal/Qualifications to: William C. Maehl, P.E. Spectrum Engineering 1413 4th Avenue North Billings, Montana 59101	Clarifier (Inclined Plate Settler) Bench Scale Testing Quotation and Clarifier(s) Quotation RFQ Response Due Date: MARCH 4TH, 2014
Offeror Name/Address	Authorized Offeror Signatory:
Phone Number: _____	Email: _____

PART B - CLARIFIER EQUIPMENT PROPOSED (duplicate as necessary)

Item	Total Cost
Clarifier Proposed (more than one can be specified, one per sheet) _____	\$
Shipping from Factory to Landusky Mine Site, Swift Gulch.	\$
Field Service - include up to two visits and four days of inspection, testing, startup, and training of water treatment plant personnel	\$
TOTAL INSTALLED CLARIFIER AND ASSOCIATED EQUIPMENT COST INCLUDING A FLOC SYSTEM (ASSUMED)	\$
Optional Equipment (specify)	\$
Optional Equipment (specify)	\$

Describe in words your proposed clarifier and how it will accomplish the needs outlined in the RFQ (separate pages are anticipated to be attached and referenced). Description should be in enough detail to make a final selection upon completion of the bench scale testing without rebidding.

Warranty for the Proposed Clarifier (separate page can be attached and referenced):

Spectrum reserves the right to terminate all work at the completion of the bench scale testing and to rebid the clarifier component of this bid.