Quinn Process Equipment Co.

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Re: Quinn Process Equipment Company History and Experience in Flotation and related equipment

Gentlemen:

The following is a summary of Quinn Process Equipment Company's history and experience in the design and manufacture of flotation plants.

Many of these plants also including other equipment such as materials handling, crushing, grinding, classification, agitators, thickeners, filters, etc. So, please, advise of your complete equipment requirements so that we may make our best recommendation.

Flotation Cells

In regards to the flotation cells, the units we are offering are of the Sub "A" design basis. Our former President and Chairman of the Board, James E. Quinn, was with Denver Equipment from 1949 until 1973. Through his years with DECO he was intimately involved in the original development of the DR Flotation Machine. The QPEC T-BR Flotation design is based on the original DECO design with some simple modifications that we feel improve its performance.

The following segment is a short description of our history and experience which details some of our capabilities in the area of mechanical froth flotation cells.

Quinn Process Equipment Company
General Flotation Equipment Information

QPEC manufactures "Sub-A" type flotation cells in both "cell to cell" and "open-flow" design, in sizes from 0.3 cubic feet per cell (#5) to 24 cubic feet per cell (18 Spl.). These cells do not require blower added air as they are self aspirating. QPEC's "cell to cell" design allows for a great deal of "slurry to air" contact in the impeller/diffuser region, and also, with our slurry recycle design, provides much greater control over the air addition to the cell, which can be critical in the efficiency and performance of the actual flotation and also in the ability to suspend the solids within the cell to avoid sanding in the cell.

The above cells are also available as "Open Flow" T-BR units by the simple addition of a recirculation well positioned around the diffuser hood to assist in re-circulating the pulp from the

upper zone of the cell to the lower zone to assist in the suspension of the heavier coarser fraction in the lower part of the cell.

QPEC's larger "T-BR" (Top and Bottom Recirculating) 50, 100 and 180 cubic foot cells require blower added air and are designed to recirculate finer pulp from the upper regions of the cell to the lower region to assist in the suspension of coarser particles. They are also designed to lift and keep suspended the coarser fraction which tends to settle in the cell.

QPEC utilizes all urethane impellers, impeller shaft sleeves, diffuser feed pipes and diffusers for exceptional wearing life. Other materials of construction are available as necessary for the process.

QPEC Flotation Cells have been furnished for a wide range of applications throughout the world. Many of these applications included unique features in either design or materials of construction to suit the needs of extremely abrasive or corrosive processes. Cells have been provided in mild steel, 316SS, 304SS, chlorobutyl lined, natural rubber lined, neoprene lined, polyurethane lined, with covers for sealed atmospheric control, Fiberglass Reinforced Polyester, etc.

QPEC has provided numerous flotation pilot plants, small commercial flotation plants and specialty flotation plants and has used its flexibility and capabilities to design the equipment to suit the particular application.

Installations

QPEC Flotation Cells are in use throughout the world for applications such as the following partial listing of installations:

-- 28 cells, Climax Molybdenum, USA molybdenum producer
-- 18 cells, Henderson Molybdenum, USA molybdenum producer
-- 10 cells, urethane lined T-BR, Sierra Rutile, Ltd., Sierra Leone, Africa
-- 14 cells, chlorobutyl lined T-BR, Sierra Rutile, Ltd. Sierra Leone, Africa
-- 10 cells, 316SS T-BR, Unimin Corp.
-- 10 cells, urethane lined T-BR, Unimin Corp.
-- 10 cells, FRP construction T-BR, P.T. Petrokujang, Indonesia
-- 18 cells, rubber lined, Togolais des Phosphates, Togo, Africa
-- 12 cells, chlorobutyl lined T-BR pilot scale, Unimin Corp.
-- 20 cells, Rosario Dominicana, Dominican Republic
-- 8 cells, American Westmin
-- Numerous cells for AMAX Research and Development
-- Numerous cells for Hazen Research, Inc.
-- Numerous cells for Owens Corning Fiberglass
-- 12 cells, Cominco, Vancouver, BC
-- 8 cells, BHP Minerals Research, Reno, NV
-- 10 cells, 316SS T-BR, Minera Tabacoa, Brazil
-- 12 cells, 316SS with double froth overflows, Celite Corp., California

-- 8 cells, PVC specials, Cominco Engineering Services, British Columbia
-- 8 cells, Fallon Mining, Nevada
-- 3 cells, Stillwater Mining, Montana
-- Unit cell, Newmont Mining
-- 8 cells T-BR Quadra Mining, Nevada
-- 8 cells #100 T-BR Stillwater Mining, Montana
-- 22 cells, #5,7,8 and 15 T-BR, confidential client, Jordan
-- 15 cells #180 T-BR Flotation Cells, Formation Capital, Idaho
-- 41 cells #180 T-BR and #18 Specials, Gold Resources Corp.
-- 6 cells #7, DSM Co. Ltd., South Korea
-- 4 cells #15 T-BR, 316SS construction SNC Lavalin
-- 10 cells, #5 and #7, Greenleaf Corp., Pennsylvania
-- Numerous #5, #7 and #8 QPEC Pilot plant flotation machines in plants throughout the world on all continents, for a wide range of minerals and applications

The dollar range of our orders for complete items of equipment over the past 5 years has ranged from $3500.00 for a single pump to over $750,000.00 for a complete plant including classifiers, scrubbers, flotation cells, agitators, thickeners, grinding mills, etc..

Our equipment has been used in a wide range of mineral recovery including precious metals, high grade quartz, rare earths, clays, environmental applications such as ink removal from recycled paper, molybdenum, phosphates, etc. etc.

Note: The above listed installations are the names of the clients at the time of sale. If any specific information is requested, we can attempt to determine the current operator's information for your reference. As is the nature of this industry, many plants have a limited life and the operation may have changed hands or have ceased production due to limited resources to be worked.

We look forward to working with you on this project and welcome any questions regarding our offering. If it would be of assistance, we would be pleased to meet with you at your location as necessary during the evaluation process.

Regards,

Rick Quinn
President

Quinn Process Equipment Company
Quality Assurance and Control

We at Quinn Process Equipment Company have been designing and manufacturing a wide range of process equipment since 1974. The company is engaged in the business of manufacturing a wide range of process equipment to suit a wide range of applications for a wide range of mineral extraction processes.

Each project that the company undertakes is different from the last, and due to this, each piece of equipment, although considered part of the company's standard product line, is frequently different from the last as the equipment's sizing, materials of construction and configuration is designed to suit the individual application.

Therefore, each order processed by QPEC is unique. This uniqueness requires extra care and attention by those involved in the development, design and manufacturing of the item of equipment.

Basically, all orders of QPEC equipment are customized to suit the application, therefore, we could be considered a custom shop.

QPEC's personnel take extra care to ensure that the finished product meets the specifications of the order and is a quality piece of manufactured equipment. Virtually all items produced by QPEC are built from scratch by hand.

The following steps are undertaken with each order to ensure that the final product is of top quality and meets the specifications of the order:

1-- All materials are inspected upon receipt to be sure they meet the specifications of the purchase order. Any detected flaws are immediately brought to the attention of the supplier and the material either corrected or replaced as necessary and notations made on the file copy of the purchase order.

2-- All material is tagged and stored until it is needed. Material certifications are acquired as requested and kept in the files with copies sent to the client. Material not meeting the specifications is immediately rejected and replaced.

3-- All buyouts of components are checked upon receipt for correctness in dimension, form and materials of construction. In the case of electric motors, the electrical configuration and enclosures are verified as to meeting the specifications prior to warehousing.

4-- Steel work is done as per shop drawings. All pieces are cut to drawing dimensions and tack welded or bolted together. Supervisors randomly inspect weld preparation and welding to ensure quality, proper weld configuration and appearance. Dimensions are checked first by the fabricator and again by the Production Manager with final checks by engineers as necessary.

5-- All machine work is performed to specified tolerances and checked and double checked for correct fit, interference or slip, as required for the machine.

6-- Pieces are painted as per the attached paint specification, unless the order calls for other specifications.

7-- Units are assembled with care, with each step checked for correct fit and finish. Unacceptable appearance, fit or dimension problems are disassembled and corrected, either by re-working the part or by replacing the defective part.

8-- Completely assembled units are again checked by Producion Manager and also the Manager of Order Processing and the engineer for correct components, fit, finish and dimensions prior to shipment.

9-- Unit is packed as per the order specifications and shipped.

QPEC makes every effort to ensure the quality product meets the specifications of the job.