SOMERSET INTERNATIONAL

PHOSPHATE

Resource Recovery from Tailings, Dry Tailings Disposal, and Water Supply

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INNOVATION IN RESOURCE AND TAILINGS MANAGEMENT

Somerset International develops and applies innovative technologies to enhance efficiency and sustainability in the mining sector. Specializing in mineral processing and resource recovery, Somerset employs advanced methods to maximize mineral extraction and recovery while minimizing waste and environmental impact. Somerset's world-leading expertise in tailings dewatering and management delivers responsible handling of mining by-products, reducing waste and ecological risks. Somerset enhances operational efficiency, reduces costs, and boosts productivity through tailored, performance-driven solutions. Somerset offers comprehensive services incorporating design, installation, operation, and maintenance delivering long-term value for our valued customers globally.

CLASSIFICATION TECHNOLOGY

Somerset's patent-pending SUB325® classification system significantly enhances mineral processing recovery through precise particle size classification down to < 4 µm. This advanced technology can be utilized to remove unwanted gangue material, thereby enhancing plant beneficiation, and to recover ultra-fine valuable resources and minerals that are typically discarded with tailings.

TAILINGS MANAGEMENT SYSTEM

Somerset's SUB325® Tailings Management System revolutionizes tailings management by maximizing resource recovery and minimizing environmental impact. Somerset's patented solid bowl centrifuge technology enables efficient solid-liquid separation, water recovery, and dry tailings disposal. The system's modular design can be readily applied to meet specific tailings duties across different sites, reducing or removing the need for traditional, environmentally risky wet tailings dams. With ongoing process development, the system is adaptable to a range of minerals, such as coal, phosphate, iron ore, copper, PGMs and gold.

SOMERSET OPERATIONS

Somerset operates and maintains resource recovery and Tailings Management Systems globally with > 95% availability for reliable performance. The modular design allows for cost-effective solutions which can be readily adapted to meet plant requirements and expanded as needed. Somerset's systems, produce low moisture cake with excellent handling properties. Somerset's Tailings Management System provides significant savings in capital expenditure (CAPEX), operational expenditure (OPEX), and footprint compared to conventional dewatering methods. With decades of experience in the mining industry, Somerset's team maintains an exemplary safety record at all locations. Somerset offers innovative and flexible commercial arrangements including investing in, operating, and maintaining systems under performance-based service agreements to meet our customers' requirements.

SUB325®

CHALLENGES IN PHOSPHATE PROCESSING

As global population growth drives an increasing demand for phosphate production, significant challenges have emerged. Water scarcity affects 70% of the regions where major mining sites are located, complicating operations. Additionally, the presence of ultra-fine particles diminishes flotation efficiency, reduces recovery rates, and contributes to greater losses in tailings. The feasibility of storing wet tailings in large dams is also declining due to rising regulatory and community concerns regarding safety, making it increasingly difficult to secure permits for new dams or expand existing facilities.

In response to these challenges, Somerset has developed advanced technology for recovering sub 44 µm ultra-fine phosphate from tailings. This innovative solution facilitates dewatering and produces a tailings product ready for dry stacking, addressing both environmental concerns and operational efficiency.

TECHNICAL SOLUTION

Somerset's advanced SUB325® system efficiently recovers ultra-fine phosphate that was previously lost to tailings, significantly improving sustainability outcomes. This system also retrieves substantial volumes of high-quality water, making it readily available for reuse. The resulting dry cake is suitable for dry stacking, eliminating the need for traditional tailings dams.

CASE STUDY

Somerset International has installed and operated a modular demonstration system for phosphate recovery from tailings and dewatering at a major phosphate operation.

TAILINGS STREAM:

- 1,300 m^3/h slurry
- 500 tph solids,
- 18% P_2O_5,
- 40% passing 10 µm

FULL-SCALE SYSTEM CAPABILITIES:

- 1.0 Mt/year of additional phosphate production
- 5.7 Mm^3/year of water recovery
- $150M/year from recovered phosphate
  (Based on $152/t FOB; water value not included)

- **Improved Flotation:** Rejects clays < 4 µm; 25% of tailings recovered with 32% P_2O_5 and 0.07 minor element ratio.
- **Reduced Costs:** Lower flocculant usage.
- **High Water Recovery:** Over 70% water reclaimed.
- **Dry Stacking Ready:** Cake with < 30% moisture.