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SCOPE OF ENGINEERING SERVICES

BASIS OF PROPOSAL:

This scope includes all work necessary to provide a set of construction documents for construction of the machine foundation per the following scope. Construction documents shall include:

- General layout of the foundation and references to existing facilities.
- Complete details for construction of inertia block.
- Complete details for construction of pit wall and pit floor around inertia block (RG-80A, GK block, or spring foundations only).
- Cored hole layout based on machine drawings.
- Recommended forming techniques.
- Detailing of anchoring alignment system.
- Specifications for earthwork
- Specifications for concrete.
- Provisions for isolation system.
- Provisions for anchoring and alignment system.
- On-site technical support for installation of Unisorb products.
- This scope of work is limited to the outside face of the pit walls.
- This scope is limited to the installation of a single machine.

THIS SCOPE SPECIFICALLY INCLUDES:

Vibration Survey:

A vibration survey at the proposed location of the machine is needed in order to determine the isolation system required. This includes one day on site by Unisorb personnel to gather data on the forced vibration spectrum. This proposal reflects the cost for a vibration survey without a written report. Should a written report be required, add \$600 to the proposed amount. A budgetary figure is provided with this proposal. Actual costs will be billed on a per diem basis according to the "Vibration Survey and Field Service Pricing Schedule" enclosed with this proposal.

Finite Element Analysis:

A static and dynamic finite element analysis will be performed on the proposed foundation using the COSMOS Finite Element Computer Program. Foundation alignment under various machine loadings as well as the fundamental foundation modes of vibration will be calculated. Based upon the static and dynamic characteristics of the machine, the foundation dimensions will be determined to assure adequate support at minimal construction cost.

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Field Measuring Services:

The objective is to obtain critical machine information not provided by Owner. Unisorb will survey the machine to gather information required to complete construction documents. This information will include:

- Footprint of machine.
- Contours of existing foundation.
- Location of all anchors determined during initial survey. Accuracy of anchor locations is dependent upon access to the anchors for measurement.
- Type of anchoring system presently used.
- Type of alignment system presently used.
- Parts of anchoring system that must be replaced do to relocation.
- Parts of alignment system that must be replaced do to relocation.
- Location and elevation of utility hook-ups.
- Provisions for power tracks.
- Existing location and size of utility trenches, coolant pits, etc.
- Workpiece elevation.
- Location and footprint of ancillary equipment (filters, hydraulic units, control cabinets, etc.)

Owner to provide clear, clean, safe, and uninhibited access to all portions of the machine. Provisions will be coordinated in advance. These provisions must be in place upon the arrival of Unisorb. Unisorb will bill the Owner for all delays associated with this provision per Unisorb's standard field service pricing schedule.

Engineering Field Visits:

Two engineering field visits have been included in this proposal. These are strictly for budgetary purposes and will be billed according to the guidelines below. The cost per trip is a "not to exceed" figure. It is our experience that approximately two meetings are needed during design phase to effectively coordinate a typically large project. The actual number of field visits used during the design phase is at the customer's discretion. Cost for field trips will be billed as follows:

- Base rate: \$75/hour
Minimum 1 day @ 8 hrs., Monday through Friday. Expenses not included. Over 8 hours or Saturday, 1.5 times base rate. Sunday or Holiday, 2 times base rate.
- Expenses: Billed at cost portal to portal. Typical expenses include mileage, parking, air fare, auto rental, lodging, meals, etc.

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Foundation Design:

Unisorb will coordinate the various aspects required for proper foundation design. This includes:

- Coordinate shape of the foundation for machine support, chip conveyors, coolant troughs, coolant pits, etc. Unisorb will work directly with the Owner and Machine Builder/Rebuilder to set required elevations and table locations for proper alignment with the machine.
- Perform structural design of inertia block
- Perform structural design of pit wall and floors (RG-80A, GK block, or spring foundations only).
- Perform structural design of structural steel and metal fabrications for floor plate (RG-80A, GK block, or spring foundations only).
- Coordinate design with geotechnical survey.
- Coordinate vibration isolation with foundation.
- Design foundation to maximize economy of materials and construction methods.
- Incorporate the understanding of placing, leveling, and grouting of the machine.
- Coordination of interface between machine and foundation.

Construction Drawings:

Unisorb will furnish construction documents to be used for construction of the foundation.

Document preparation will include:

- General layout of machine within building. Providing general information such as:
 - Proposed utility locations.
 - Control points.
 - Existing construction (columns, footings, walls, underground utilities, etc.).
 - Identify foundation elements (manways, retaining walls, pits, troughs, etc.).
 - Identify ancillary equipment (filters, control cabinets, etc.)
- Layouts showing:
 - Elevations of the concrete foundation and inertia block.
 - Dimensions of the concrete foundation and inertia block.
 - Location of structural supports for floor plate.
 - Location of stairs, sumps, pits, etc.
- Sections showing:
 - Concrete thickness.
 - Reinforcing.
 - Connections to existing construction.
- Details of floor plate supports.
- Miscellaneous details for waterstops, dowels, inset steel fabrications, etc.
- Isolation details. Detail isolation system and provide installation instructions.
- Construction techniques for use by Contractor.
- Anchoring and alignment hardware details.
 - Detail location, type and quantity of all leveling and alignment hardware for machine.
 - Identify responsible parties for rigging, hardware installation, grouting, leveling, and alignment.
 - Coordinate machine installation sequence.
- Provide cored hole layout based on machine drawings.
- Detailing of miscellaneous metal fabrications for motor mounts, cable trays, grating, floor plates, floor plate supports, hand rails, guard rails, power track supports, etc.
- Professional Engineer's Seal.

Construction Specifications:

- Prepare specifications for earthwork, specifying:
 - Backfill material quality.
 - Backfill procedures and compaction requirements.
 - How to handle unforeseen conditions (rock outcroppings, unknown utilities, etc.).
 - Quality control.

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- Prepare specifications for concrete construction, specifying:
 - Material quality and quantity of concrete components.
 - Concrete design mixes.
 - Concrete admixture quality and usage.
 - Hot/cold weather requirements.
 - Quality control.
 - Concrete finishes.
 - Concrete curing.
 - Concrete insulation.

COORDINATION:

- Prepare construction documents for the project to the extent of obtaining accurate, complete, and competitive bids.
- Prepare one set of documents that can be used by Owner, building contractor, foundation contractor, rigger, and installer for coordination of the construction project.
- Instruct the installer on proper installation techniques for Unisorb products.
- Provide on site support for the installation of all Unisorb products.

THIS PROPOSAL DOES NOT INCLUDE:

- Geotechnical Services.
- Review of OSHA requirements.
- Special foundation considerations are not included in this project (piling, soil stabilization, etc.). It is assumed that existing soil conditions will provide adequate support for a mat type foundation.
- Specifications other than those noted above.
- Bidding Instructions and Contract Documents.
- Rigging or installation of the machine.
- Construction Services.
- Design or detailing of utilities (air, electric, etc.).
- Review of Shop Drawings. If shop drawing review is required for this project, Unisorb will bill the Owner an additional \$75/hr required for shop drawing review.
- Any retrofitting of existing foundations, floors, buildings, etc. required unless specifically included above.

OWNER TO PROVIDE:

- OSHA guidelines: Owner to provide Unisorb with specific OSHA requirements for this machinery installation. Unisorb is not responsible for meeting OSHA requirements.
- Machine drawings and other machine information required for this design.
- Drawings of the existing facility at the location of the machine installation.
- Geotechnical Information.

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PROJECT SCHEDULE FOR PROFESSIONAL ENGINEERING SERVICES

This project is expected to be performed in three stages: Preliminary Documents, Final Review Documents, and Construction Documents.

Preliminary Documents:

These documents will coordinate all items in the Scope of Work into a set of drawings. Drawings will have limited detail. This stage has the specific purpose of ensuring the Scope of Work provides a workable solution to the machinery installation, and ensures the project documents have incorporated all of the Owner's requirements for the project. Owner is provided the opportunity to review the documents to ensure scope of the project is acceptable and that critical dimensions shown are suitable.

Final Review Documents:

After Unisorb receives Owner's approval on Preliminary Documents, the project will extend into the Final Review Document stage. In this stage, Unisorb will thoroughly detail the drawings, and assemble the Specifications. After this work is performed, the Final Review Documents will be submitted to the Owner for review and acceptance.

Construction Documents:

In this last phase Unisorb takes the Owner's mark-ups of approved Final Review Documents, revises drawings accordingly, and reissues the documents as Construction Documents. After the Owner's approval of Construction Documents, the documents are ready for distribution and construction can proceed.

This scope is contingent upon the availability of information required to perform the scope of work. Delays in obtaining information will directly affect this schedule. Once we have the opportunity to discuss a schedule for this work, a formal schedule can be assembled and issued for your review. Design services will commence upon receipt of your purchase order along with items listed under "Owner to Provide". Schedule is subject to revision after 30 days from date of proposal.

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