Issue date: August 28, 2019

The Regional District of Okanagan Similkameen

Request for Proposal

Sludge Dewatering Centrifuge Equipment Supply

For the

Okanagan Falls Wastewater Treatment Plant

RDOS-19-PW-23

Optional Site Visit: An optional site visit can be arranged for Thursday, September 5 or Thursday, September 12, 2019 by contacting Laure Nielsen, lnielsen@rdos.bc.ca

Submissions will be received by email and/or hard copy at the Regional District Okanagan Similkameen Office, 101 Martin Street, Penticton, BC V2A 5J9 until:

Closing Time: 2:00 p.m. local time on
Wednesday, September 18, 2019

*** PROPOSALS WILL NOT BE OPENED IN PUBLIC ***

NOTE: Should any Proponent download this Request for Proposal, it is the Proponent's responsibility to check for Addenda which will be posted on the Regional District of Okanagan Similkameen's website at www.rdos.bc.ca/news-events/rdos-news/tenders-and-rfps/ and on the BC Bids website.

DIVISION 0 - CONTRACT REQUIREMENTS

DIVISION 1 – GENERAL REQUIREMENTS

DIVISION 11 – PROCESS

DIVISION 16 – ELECTRICAL

END OF SECTION 00010

PART 1 INVITATION

1.1 Request for Proposal (RFP)

This is an RFP not a tender call, and the submission of any response to the RFP Document does not create a tender process. The RFP Document is not an invitation for an offer to contract, and it is not an offer to contract made by the Regional District of Okanagan Similkameen (RDOS).

Though the RDOS fully intends at this time to proceed through the RFP, in order to select the equipment, the RDOS is under **no obligation** to proceed to the purchase, or any other stage. The receipt by the RDOS of any information (including any submissions, ideas, plans, drawings, models or other materials communicated or exhibited by any intended Proponent, or on its behalf) shall not impose any obligations on the RDOS. There is no guarantee by the RDOS, its officers, employees or managers, that the process initiated by the issuance of the RFP Document will continue, or that this RFP process or any RFP process will result in a Contract with the RDOS for the purchase of the equipment, service, or project.

1.2 Scope of Supply

The RFP Document outlines the overall scope of supply of the Goods, sets out the basic requirements for the Proposal and outlines the basis for awarding the Contract. The Work includes supply and delivery to the Delivery Point of the sludge dewatering equipment, including components, parts, certified shop drawings, installation instructions and supervision, operation and maintenance manuals and start-up and training services.

The Delivery Point shall be the Okanagan Falls Waste Water Treatment Plant in Okanagan Falls, British Columbia.

1.3 Background

The RDOS operates the Okanagan Falls Waste Water Treatment Plant (OKFWWTP), located at 300 Rail Road, Okanagan Falls (BC), and intends to upgrade the sludge management process to include a dewatering centrifuge, and associated sludge pumping and polymer dosing equipment. The dewatering process will be housed in an extension to the existing building. Currently, the OKFWWTP transports the biosolids as a slurry to the City of Penticton Advanced Wastewater Treatment Plant where it is dewatered. The new centrifuge dewatering process at the OKFWWTP will reduce hauling effort and allow the dewatered sludge or cake to be transported directly to the City of Penticton biosolids composting facility, located at the Campbell Mountain Landfill.

Time shall be of the essence for supply of the sludge dewatering centrifuge and the subsequent construction/installation contract (scheduled to be awarded in October, 2019). The supply of the dewatering centrifuge is a critical path activity, therefore the RDOS has elected to procure the equipment in advance of the Construction Contract. It will be a condition of the subsequent Construction Contract that if the General Contractor fails to attain completion by the date specified, Liquidated Damages in the amount of $250 per

day will be assessed for each day (and part thereof) delay in attaining completion. The value of $250 per day for Liquidated Damages is the RDOS' best estimate of actual damages that it will incur.

1.4 Proposal Submission

.1 Proposals must be submitted by email and/or hardcopy until the Closing Time specified. It is the Proponent's sole responsibility to ensure its Proposal is received at the address or email set out above by the Closing Time. If submitting by hardcopy please enclose three (3) hard copies and an electronic copy on a memory stick.

.2 For hard copy submission, the Proposals and their envelopes should be clearly marked with the name and address of the Proponent, the RFP program title, and be addressed to the following:

Regional District of Okanagan Similkameen
101 Martin Street
Penticton, B.C. V2A 5J9
RDOS-19-PW-23 Sludge Dewatering Centrifuge Equipment Supply
Attention: Laure Nielsen, Project Manager

.3 For email submissions, the Proposals must be emailed by the Closing Time to:

Laure Nielsen at Lnielsen@rdos.bc.ca

.4 Proposals must be received at the address or email listed above by the Closing Time of:

Wednesday September 18, 2019 at 2:00 PM local time

.5 Proposals will not be opened publicly.

.6 The Proponent bears all risk associated with delivering its Proposal by electronic submission. The RDOS does not assume any responsibility for failure of any computer, mail servers or electronic equipment. The Proponent is responsible to confirm receipt.

.7 Proponents wishing to make changes to their Proposals after submission but prior to the Closing Time may do so by submitting the revisions by email or hard copy to the address above.

.8 It also is the Proponent's sole responsibility to ensure their revisions were received, at the e-mail or address set out above, prior to the Closing Time.

.9 Proposals received after the Proposal Closing at the Proposal Closing Location will not be considered or evaluated.

.10 The submission of a Proposal constitutes the agreement of the Proponent to be solely responsible for any and all costs and expenses incurred by it in preparing and submitting its Proposal, including any costs incurred by the Proponent after the Proposal Closing.

.11 Unnecessarily elaborate responses beyond that sufficient to present a complete and effective response are not required and unless specifically requested in the solicitation. The inclusion of not relevant elaborate art work, corporate brochures and lengthy narratives is discouraged.

PART 2 RFP DOCUMENTS

2.1 The RFP Document for this Contract include the following:

.1 All documents listed in Section 00301

.2 Addenda, if applicable.

2.2 In the RFP Document, all requirements that utilize the word “shall” or “must” are mandatory and the Proposal must substantially comply or fulfil such requirements or the Proposal may be rejected by the RDOS. All requirements that utilize the word “should” are desired and the Proponent’s response to such requirements will be considered by the RDOS in evaluating the Proposals.

2.3 The RDOS' language in its procurement documents shall be English.

PART 3 PRE-PROPOSAL ENQUIRIES AND ADDENDA

3.1 Technical enquiries should be addressed, in writing, to:

Piero Galvagno
AECOM Canada Ltd.
Email: piero.galvagno@aecom.com

3.2 Any requests for explanations, interpretations or clarifications made by Proponents must be submitted in writing prior to the Proposal Closing Time. Requests received later than 48 hours prior to Proposal Closing Time may remain unanswered.

3.3 Explanations, interpretations, or clarifications may be made in the form of Addenda. Addenda may be issued by the RDOS during the Proposal period and will be posted on the RDOS’ Website at www.rdos.bc.ca/news-events/rdos-news/tenders-and-rfps/ and on the BC Bids website. It is the Proponent’s responsibility to check the websites for updates.

3.4 All Addenda issued by the RDOS shall be incorporated into and become part of the RFP Document.

3.5 If a Proponent finds any errors, omissions or discrepancies in the RFP Document, it shall immediately notify the RDOS in writing.

3.6 Verbal discussion between a Regional District director, officer or employee and a Proponent shall not become a part of the RFP or modify the RFP unless confirmed by

written Addendum. The Regional District shall not be responsible for Proponents adjusting their Proposals based only on oral instructions by any representative of the Regional District.

PART 4 COMPLETION OF REQUEST FOR PROPOSAL DOCUMENT

4.1 The Proponent shall complete the RFP Document in ink or in type.

PART 5 BID RIGGING

5.1 The Proponent's attention is directed to the *Competition Act* which provides that bid-rigging as defined in the Act is an indictable offence punishable upon conviction by a fine or imprisonment or both.

PART 6 SOLICITATION

6.1 If any director, officer, employee, agent or other representative of a Proponent makes any representation or solicitation to any director, officer or employee of the RDOS with respect to the Proposal, whether before or after the submission of the Proposal, the RDOS shall be entitled to reject or not accept the Proposal.

PART 7 ACCEPTANCE AND REJECTION OF PROPOSALS

7.1 Notwithstanding any other provision in the RFP Documents, any practice or custom in the industry, or the procedures and guidelines recommended for use on publicly funded projects, the RDOS, in its sole discretion, shall have the unfettered right to:

.1 Accept any Proposal;

.2 Reject any Proposal;

.3 Reject all Proposals;

.4 Accept a Proposal which is not the lowest cost Proposal;

.5 Reject a Proposal even if it is the only Proposal received by the RDOS; and

.6 Accept all or any part of a Proposal.

7.2 The RDOS will notify the successful Proponent in writing that its Proposal has been accepted.

7.3 The successful Proponent will be required to sign an Agreement with terms similar to the form attached (Section 00400, Sample Contract Terms).

7.4 The Agreement shall be executed by the successful Proponent and delivered to the RDOS within seven (7) days of receipt of same from the RDOS.

7.5 Rejection of a Proposal - Furthermore, the RDOS reserves the right to reject any or all Proposals, without limiting the foregoing, any Proposal which either:

.1 Is incomplete, obscure, irregular or unrealistic;

.2 Has non-authorized (not initialled) erasures or corrections in the Proposal or any schedule thereto;

.3 Omits or fails to include any one or more items in the Proposal for which a price is required by the RFP Document;

.4 Fails to complete the information required by the RFP Document to be furnished with a Proposal or fails to complete the information required whether the same purports to be completed or not.

7.6 Acceptance of a Proposal - The RDOS shall not be obligated in any manner to any Proponent whatsoever until a written Agreement has been duly executed relating to an approved Proposal.

PART 8 CONFIDENTIALITY AND SECURITY

8.1 The following conditions apply:

.1 The RFP Document, or any portion thereof, may not be used for any purpose other than submission of Proposals; and

.2 The successful Proponent must agree not to divulge or release any information that has been given to it or acquired by it on a confidential basis during the course of carrying out the supply of Goods or performing its services;

.3 It is the RDOS' policy to maintain confidentiality with respect to all confidential information related to the Proposal, but the RDOS is subject to the *Freedom of Information and Protection of Privacy Act*. If the Proponent considers that any of its information is confidential, the Proponent shall identify that confidential information and advise the RDOS in its Proposal.

PART 9 DISCLAIMERS/LIMITATIONS OF LIABILITY

9.1 Neither acceptance of a Proposal nor execution of an Agreement shall constitute approval of any activity or development contemplated in any Proposal that requires any approval, permit or license pursuant to any federal, provincial, regional district or municipal statute, regulation or bylaw.

9.2 The RDOS, its directors, officers, servants, employees, agents and consultants expressly disclaim any and all liability for representations, warranties, express or implied or contained in, or for omissions from this Proposal or any written or oral information transmitted or made available at any time to a Proponent by or on behalf of the RDOS. Nothing in the RFP Document is intended to relieve a Proponent from forming their own opinions and conclusions in respect of the RFP Document.

9.3 The Proponent, by submitting a Proposal, agrees that it will not make a claim against the RDOS, for whatever reason, relating to the Proposal, the RFP Document or the competitive Proposal process and, by submitting a Proposal, the Proponent waives any

claim or recovery for loss of profits or any prospective damages whatsoever if no Agreement is entered into with the Proponent.

PART 10 ENVIRONMENTAL PROCUREMENT AWARD CRITERIA

10.1 It is the policy of the RDOS that goods and services be procured which have environmentally beneficial effects. Such considerations may be used in evaluation and comparative review of Proposals and the award of a Contract.

PART 11 MANDATORY REQUIREMENTS

11.1 Section 00200 [Form of Proposal] and Section 00301 [Schedules] of the RFP Document contains mandatory requirements. Proposals not meeting the mandatory requirements may be rejected without further consideration.

PART 12 PROPONENT'S EXPENSES

12.1 Prospective Proponents are solely responsible for their own expenses in preparing a Proposal and in subsequent negotiations with the RDOS.

PART 13 NON-RESIDENT WITHHOLDING TAX

13.1 Regulation 105(1) of the *Canadian Income Tax Act* requires that payments to non-residents for any services performed in Canada are subject to a Non-Resident Withholding Tax of 15%. Exemptions from this withholding tax are available in some circumstances, but the Proponent must apply directly with Canada Customs and Revenue Agency (CCRA), at least 30 days before commencing work. Please call the CCRA at (604) 587-2215 if the Proponent has any questions or to receive a copy of the application form.

PART 14 AGREEMENT TO BOND

17.1 Although a bid bond is **not** required for the Proposal, the RDOS will require a performance bond or letter of irrevocable credit in the amount of fifty percent (50%) of the total contract sum, from the successful Proponent, to be delivered prior to signing the Agreement.

END OF SECTION 00100

PART 1 PART 1 GENERAL

1.1 Form of Proposal

.1 Proposal information must be submitted on the Schedules which are part of the RFP Document (Section 00301, Schedules). The Proponent shall complete all Schedules by filling in all of the blanks indicating where information is required.

.2 The Schedules must be completed in ink or typed. The signature sheet must be properly signed, sealed and included with the Proposal.

.3 Attached to the RFP Document, find the following Schedules, in Section 00301:

- Schedule A – Summary of Proposal
- Schedule D – Variations List
- Schedule F – List of Recommended Spare Parts, Prices, Delivery Time and Storage Location
- Schedule G – Additional Prices
- Schedule H – Equipment Delivery Schedule
- Schedule I – Shipping and Site Storage Requirements
- Schedule J – Special Maintenance Requirements During Storage on Site
- Schedule K – Elements Requiring Re-Assembly
- Schedule L – Drawings, Sketches and Information
- Schedule N – List of References
- Schedule O – Qualifications of Manufacturer's Representative
- Schedule R – Acknowledgement of Addenda
- Schedule T – Consent of Surety Company to Furnish Contract Performance Bond
- Schedule U – Signature Sheet

.4 The Proponent may attach relevant supplemental information labelled with the related schedule identifier.

1.2 Proposal Submission

.1 Proposal Ineligibility

(1) Proposal that is unsigned, improperly signed or sealed, conditional, illegible, obscure, contain unbalanced prices, arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the RDOS, be declared invalid. If so declared, the Proposal will be rejected.

(2) Proposal with Schedules or enclosures which are improperly prepared may, at the discretion of the RDOS, be declared invalid. If so declared, the Proposal will be rejected.

.2 Submissions

(1) Proponent shall be solely responsible for the delivery of the Proposal in the manner and time prescribed.

(2) A complete Proposal submission shall consist of a covering letter and completed schedules from Section 00301 with any attached documentation, and signature sheet.

.3 Proposal Modifications

(1) The onus is on the Proponent to ensure timely receipt of Proposal modifications.

.4 Proposal Withdrawal

(1) Proponent may withdraw their Proposal without prejudice, provided a request, in writing or by fax, signed by the same person or persons who signed the Proposal, is received at the office designated in the Request for Proposal Document on or before the Proposal Closing Time specified in the Request for Proposals. Error on the part of the Proponent in preparing the Proposal infers no right to the withdrawal of the Proposal after it has been opened.

1.3 Proposal Enclosures/Requirements

.1 Cost of Bonds

(1) Include the cost of bonds in the Total Price.

.2 Schedule Requirements

(1) Fill in the Schedules completely.

(2) Fill in prices where indicated in the Schedules.

(3) In the event of a discrepancy between the sum of individual prices and the Total Price, the sum of individual prices will govern and the Engineer (AECOM) will correct the Total Price accordingly.

(4) Include in price(s) supply of all materials except those specified to be supplied by others, all supervision, labour and equipment, and a provision for overhead and profit. Total Price shall represent the entire cost to the RDOS for the supplied equipment and services as specified and shown on the drawings, exclusive of GST payable by the RDOS.

(5) The Proponent, in submitting a Proposal, agrees to complete the Work within the time period specified on the Schedule H, Equipment Delivery Schedule, and deliver the equipment FOB to the Okanagan Falls Wastewater Treatment Plant site on a date and time agreed upon with the General Contractor.

1.4 Proposal Signing

(1) The Proposal Signature Sheet (Schedule U, Section 00301) shall be signed under seal by the Proponent.

(2) Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.

(3) Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word partner under each signature. Affix seal to each signature.

(4) Limited Company: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal.

(5) Joint Venture: Each party of the joint venture shall execute the Proposal under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

1.5 Evaluation Methodology

.1 Proposal evaluation will include two (2) discrete parts. The first part is an economic evaluation and the second part is a non-economic evaluation.

.2 The economic evaluation will include the Total Price (refer to Schedule A – Summary of Proposal, Section 00301).

.3 By submitting its Proposal, the Proponent acknowledges and agrees to the following:

(1) That, as provided for below, the Engineer is required to provide to the RDOS estimates of costs that will be considered by the RDOS in awarding the Contract;

(2) That the RDOS shall be entitled to rely upon such estimates in making its decision in its sole and unfettered discretion;

(3) That the Proponent is not entitled to question the estimates or the manner in which they were made, including whether they contain errors or omissions; and

(4) That the Proponent shall have no claim against the RDOS (or its employees, elected officials, officers or directors or agents) in respect of the preparation of the estimates and the reliance thereon, whether arising in contract, tort or otherwise.

.4 Non-economic evaluation will include references, availability of local / regional support, compliance with schedule and commercial and technical requirements, and past service record. Proponents are required to provide this information in accordance with the Schedules in Section 00301.

.5 The RDOS reserves the right to accept the Proposal which is deemed to be the most qualified and advantageous.

.6 The acceptance of the Proposal will be provided by a Letter of Award signed by a duly authorized representative of the RDOS and copies of the Agreement to be executed.

1.6 Evaluation Criteria

The following table provides how the Proposals will be evaluated:

Non-Economic Evaluation Parameters			
Proponent	Qualifications, experience and availability of local or regional representative for technical support	10	
	Successful Operations at other facilities	15	
	Past Service Performance	5	
Proposal	Compliance with technical terms	15	
	Compliance with commercial terms	10	
	Scheduling	5	
Economic Evaluation Parameter			
Price	Points for Price = (lowest cost Proposal divided by Proposal being evaluated) x (40% weight)	40	
Total Score	Proponent + Proposal + Price Scores	100	

.1 Economic:

(1) Capital Cost fits within the RDOS' budget.

.2 Non-Economic:

(1) Qualifications and Experience. Local/Regional Support: availability and credentials of local/regional technical representative. Are they specialized and qualified in the nature of the project work?

(2) Past Performance of Successful Operation: successful operation of five (5) similar sludge dewatering centrifuges for a minimum of three (3) years (with references provided in Schedule N – List of References, Section 00301). Three (3) of reference installations must be of a similar size to that being proposed. The references must be for municipal waste water applications and readily verifiable by e-mail and telephone. Do reference checks reveal weaknesses? Does the firm consistently complete assignments on time and within budget?

(3) Past Service Record: successful technical support reported from each reference, half points will be allocated to equipment performance and half to Proponent's responsiveness and quality of service.

(4) Scope: are the objectives and prediction of results meeting the general compliance with technical terms? Check with compliance of specifications as outlined in Division 11 - Process.

(5) General Compliance with Commercial Terms: is there sufficient detail to show compliance with the RDOS' Terms and Conditions. Is everything clearly outlined and presented.

(6) Schedule Compliance: ability to meet schedule as outlined in the RFP Document.

1.7 Evaluation

.1 Points for the economic and non-economic evaluation parameters will be awarded as follows:

(1) The economic evaluation for capital cost will be a relative comparison, comparing the Proposals against each other and awarding points according to the criteria outlined below. The Proposal with the lowest capital costs will receive the maximum point allocation (40 points). Each Proposal with a capital cost greater than the lowest capital cost, will have points calculated as follows: Points = (Lowest Cost Proposal) / (Proposal being evaluated) x 40% weight.

(2) Points for the non-economic evaluation will be awarded based on information contained in the Schedules [Section 00301], i.e., full points will be awarded to any or all Proposals meeting the criteria specified.

(a) Qualifications/Experience and Availability of Local / Regional Support:

(i) maximum points will be allocated to the Proposal with a local Proponent Representative (provided on Schedule O),

(ii) half points for Regional Representative and zero points for Representative who is neither local nor regional.

(iii) Local is defined as being within the Province of British Columbia. Regional is defined as being within Western Canada or Washington State.

(b) Past performance with successful operation in Required Number of Plants for Required Duration:

(i) for each piece of equipment, a maximum of 15 points will be allocated to each Proposal whose references report no significant operational complaints.

(ii) Up to three (3) points will be deducted for each reference reporting a significant operational issue.

(iii) Up to five (5) points will be deducted for each reference reporting that the original design criteria cannot be met.

(iv) Three (3) references on Schedule N will be contacted.

(c) Past Service Record: for the report from each reference,

(i) half points will be allocated to equipment performance

(ii) half points allocated to Proponent's responsiveness and quality of service.

(iii) The maximum potential points per reference will be 5 divided by the number of references contacted.

(iv) Three (3) or more references on Schedule N [Section 00301] will be contacted.

(d) Scope with General Compliance with Technical Terms in Division 11:

(i) full points awarded for complete compliance with every non-critical technical characteristic.

(ii) Two (2) points deducted for each point of non-compliance.

(e) General Compliance with Commercial Terms:

(i) if no exceptions are taken with General Conditions and Special Conditions of Proposal, the Proponent receives full points.

(ii) Two (2) points will be deducted for each exception taken.

(f) Schedule Compliance: Past record of meeting delivery schedule commitments will be determined by contacting references.

(i) Full points will be awarded for excellent records

(ii) Two (2) points will be deducted for each significant reported failure to meet a delivery schedule.

(iii) Three (3) or more references from Schedule N [Section 00301] will be contacted.

1.8 Equipment Delivery Schedules

.1 For reference purposes only: the Construction/Installation Contract is scheduled to be awarded by October, 2019, and completed no later than June 30, 2020.

.2 The Proponent agrees to submit Shop Drawings and other detailed drawings and descriptive matter for the equipment and materials delivered to the Engineer for review within twenty-eight (28) calendar days from receipt of the Letter of Award from the RDOS.

.3 The Proponent agrees to submit final Shop Drawings and data submission to the Engineer within fourteen (14) days from receipt of the Engineer-reviewed data submission.

.4 The Proponent agrees to have the equipment and materials manufactured and delivered complete, FOB to the Okanagan Falls WWTP site, no later than March 23, 2020. The Proponent shall indicate in Schedule H [Section 00301] the number of weeks required for delivery of equipment to site, after receipt of Notice to Manufacture and Deliver.

.5 The Proponent shall deliver all equipment within the time frame specified above. The specified time frame is based on the Proponent receiving a Notice to Manufacture and Deliver by November 18, 2019.

.6 The equipment to be manufactured or assembled, as the case may require, will be shipped to the project site in adequate time to be incorporated in the Construction/Installation Contract. Shipping to site will be coordinated between the Supply Contractor and the General Contractor.

1.9 Payment Schedule

.1 The payment schedule to be followed by the Supply Contractor or General Contractor, as applicable, will be according to the milestones listed as follows:

Milestone	**Percent Payable**	
	This Milestone	**Cumulative**
1. Engineering Services (including designer modifications and Shop Drawing acceptance by Engineer)	5	5
2. Equipment Delivery to Site (Form 100)	45	50
3. Completion of Satisfactory Installation of All Equipment/Materials (Form 102)	10	60
4. Completion of Process Performance Testing (Form 104)	25	85
5. Completion of Satisfactory Training for all Equipment/Materials. (Form T1 and T2)	10	95
7. End of Warranty Inspection & Final Acceptance Certificate Issued	5	100

.2 Each payment will be based on a claim submitted by the Supply Contractor or General Contractor, as applicable, following the achievement of the specified milestone.

.3 Payments due to the Supply Contractor will be subject to holdbacks and deductions identified in the Contract Agreement. Specifically, payments to the Supply Contractor will be subject to ten percent (10%) holdback under the Builders' Lien Act.

1.10 Contract Agreement

.1 Sample terms for the Contract Agreement form are provided in Section 00400, Contract Agreement. This document illustrates the format for the Contract Agreement that the Proponent must sign with the RDOS.

1.11 Assignment and Novation Agreement

.1 The RDOS shall, at the RDOS' sole discretion, select a Proposal for the supply of the sludge dewatering centrifuge.

.2 The terms for the Contract Agreement are set out in these Request for Proposal Documents. Upon assignment of the Construction/Installation Contract, the Supply Contractor will become a subcontractor to the General Contractor.

.3 It is a requirement of the Contract Agreement that the Supply Contractor provide to General Contractor, upon the assignment taking effect, a Performance Bond and insurance in the same terms as the ones required to be provided to the RDOS originally. At that time, the original bonds will be surrendered by the RDOS to the Supply Contractor.

.4 The RDOS will assign the Contract Agreement arising from acceptance of the Proposal hereunder to a General Contractor for the project when such General Contractor has been selected. The Supply Contractor under the Contract Agreement (Supply Contract) will be required to join in a Novation Agreement in the form set out in Section 00521 [Novation Agreement] as soon as the Construction/Installation Contract between RDOS and General Contractor has been signed.

.5 The Proposal shall be accompanied by a letter of consent from the Proponent's surety confirming that it will issue new bonds and insurances in favor of the General Contractor upon the execution of the Novation Agreement and surrender the original bonds.

.6 The terms of the Contract Agreement (Supply Contract) will be included in the proposed information for the Construction/Installation Contract and the Contract Price for the Construction Contract, as defined therein, will include the price of the Supply Contract.

.7 The General Contractor under the Construction/Installation Contract will be required to provide a Performance and a Labour and Material Payment Bond, both in the sum of fifty percent (50%) of the Contract Price.

END OF SECTION 00200

Schedule A
Summary of Proposal

Date: _____

Proponent: _____

Street Address: _____

City: _____ Province / State: _____ Postal Code: _____

Representative: _____ Phone Number: _____

Fax Number: _____email: _____

For: Equipment Pre-Purchase – Sludge Dewatering Centrifuge

GST Registration Number: _____

Prices should not include GST, except the Total Sum.

Description	Total Amount (Canadian Dollars)
Equipment Supply and Delivery of Centrifuge	$
Total Freight/Shipping Costs to Site (F.O.B. Okanagan Falls, BC)	$
Site Services (Form 100, 101, 102 and 103)	$
Performance Testing (Form 104)	$
Operation and Maintenance Training (Form T1)	$
Total Price	$
GST	$
Total Sum	**$**

Schedule D
Variations List

List optional items that may be added or removed from the Proposal, with the associated costs. Clearly indicate whether the item is an addition or deletion to the Contract Agreement (Section 00400)

The items will be adjustments to the Total Price, presented in Schedule A, and shall include the cost of all labour, materials, tools, equipment, overhead and profit for the complete performance of the items of work, together with all related costs, exclusive of GST.

The RDOS reserves the right to determine which, if any, of the Separate Prices contained in Schedule A shall be applied to and contained within the selected Proposal.

Add sheets as required.

ITEM	**DESCRIPTION**	**TOTAL PRICE ADJUSTMENT (Canadian Dollars)**
1	Provide enhanced armouring beyond the minimum specified to protect against grit erosion and maximize reliability of the centrifuge operation	$
2		
3		
4		

Schedule F

List of Recommended Spare Parts, Prices, Delivery Time and Storage Location

Provide all replacement parts that are expected to be required for one (1) and five (5) years of operation in the following tables with prices current at the time of submission of the Proposal. Include standard delivery time and location of supplier for all equipment that has been proposed. The unit prices shall include all applicable custom duties, shipping charges to site and federal sales tax.

In addition to the required replacement parts, the Proponent may also recommend additional replacement parts.

Recommended Replacement Parts for **SLUDGE DEWATERING CENTRIFUGE** for **ONE (1) YEAR** of operation.

Description	Quantity	Unit Price	Standard Delivery Time	Location
		$		
		$		
		$		
		$		
		$		
		$		
		$		
		$		
		$		
Attach additional sheets as required and label as Schedule F				

Recommended Replacement Parts for **DEWATERING CENTRIFUGE** for **FIVE (5)YEARS** of operation

Description	Quantity	Unit Price	Standard Delivery Time	Location
		$		
		$		
		$		
		$		
		$		
		$		
		$		
		$		
		$		
		$		
Attach additional sheets as required and label as Schedule F				

Schedule G
Additional Prices

The Proponent agrees that the days stipulated in the Specifications for site services are not necessarily concurrent and are at the discretion of the RDOS. If additional or fewer person-days are required for site services, the Total Price will be adjusted upward or downward respectively, in accordance with the following unit rates as applicable:

Technician per 8 hour person-day	$ _____
Expenses per person-day	$ _____
Travel cost per trip	$ _____

The unit rate per 8-hour person-day shall be inclusive of all couriers, subsistence documentation, communication, payroll burden, overhead, profit and other relevant costs.

The costs, if any, for additional person-days required to correct faults in the design or manufacture of equipment and materials must be borne by the Supply Contractor.

Schedule H
Equipment Delivery Schedule

The Proponent shall note the following and provide the information required on delivery period for the equipment.

The Proponent shall submit Shop Drawings within twenty-eight (28) calendar days from the receipt of the Letter of Intent.

The Engineer shall review and return the submission within seven (7) calendar days from the receipt of the initial data submission.

The Proponent shall then return the final Shop Drawings and data submission to the Engineer within fourteen (14) days from receipt of the Engineer-reviewed data submission.

Minimum manufacture and delivery period for equipment to site (stated in weeks from receipt of Notice to Manufacture and Deliver):

_____ weeks (state range)

Note the required schedule for provision of shop drawings as outlined in clause 1.9 of the Instructions to Proponents, Section 00200.

Schedule I
Shipping and Site Storage Requirements

Equipment Required for Unloading: _____

Maximum Unit Dimension, m: _____

Total Shipping Weight, kg: _____

The Proponent shall state the minimum storage requirements for the equipment on site. Such storage requirements shall be provided by the General Contractor if the equipment is delivered according to the equipment delivery schedule noted, or by the RDOS if the equipment is delivered earlier than required.

Schedule J

Special Maintenance Requirements During Storage on Site

State any special maintenance requirements for the equipment whilst in storage on site. Such maintenance shall be provided by the Supply Contractor. The General Contractor's responsibility will be limited to providing storage as specified in this Schedule J, including provision of electrical power for motor space heaters if required by the Supplier or the Engineer.

Schedule K
Elements Requiring Re-Assembly

State which parts of the equipment, if any, will be disassembled for shipping, and will, therefore, require re-assembly by the General Contractor, under the Construction/Installation Contract. Details of the work involved may be submitted with the detailed Shop Drawings after the Letter of Intent is issued.

Schedule L
Drawings, Sketches and Information

Provide a copy of Section 11610 – Dewatering Centrifuge of the specifications, with checks to indicate conformance or acceptance of each clause. Non-conformance shall be indicated by a cross ("X").

Provide the specifications, technical data sheets and adequate sketches showing the overall dimensions of the equipment, in preliminary detail, together with sizes and locations of all connections. Also provide the names of equipment manufacturers for major components provided by third parties. Where several items of equipment make up a unit, provide a dimensional sketch of the assembled unit to enable the Engineer to ascertain where and how it will fit into the structure.

The intent is that sufficient information is provided to allow the Engineer to develop a layout for the sludge dewatering centrifuge. Points may be deducted in the evaluation if information in this regard is lacking from the response to the RFP Document.

List of Drawings, Sketches and Information, all of which are attached to the Proposal in addition to the items listed in the above table:

Schedule N
List of References

Provide a list of at least five (5) municipal waste water references for a dewatering centrifuge with at least five (5) years of successful operating history. At least three (3) of the named references must be of similar capacity, to that proposed under the RFP Document.

Name of WWTP	Centrifuge Solids Loading Capacity (kg/h)	Owner's Contact Name	Telephone No.	E-mail Address	Year Installed

Schedule O
Qualifications of Manufacture's Representative

Provide the name and qualifications of at least two (2) trained, experienced technicians proposed for delivery inspection, installation training, installation witnessing, testing witnessing, and commissioning witnessing of the equipment.

Name 1	
Employer	
Home Base	
Qualifications	
Duration of Employment with Employer	

Name 2	
Employer	
Home Base	
Qualifications	
Duration of Employment with Employer	

Attach additional data if additional space is required.

Provide name and location of nearest Supplier Representative:

Name	Home Base

Schedule R
Acknowledgement of Addenda

Proponent hereby acknowledges receipt of the following addenda:

Addendum No.	Date of Addendum	No. of Pages	Date Addendum Received by Proponent

Schedule T
Consent Of Surety Company To Furnish
Contract Performance Bond

The Surety Company executing this Consent agrees hereby if the Proposal is awarded within one-hundred and twenty (120) days after the date on which Proposals for the Contract are closed to become bound as Surety in a Contract Performance Bond in the Form containing provisions and executed as required by the Contract Documents for fifty (50) per cent of the total consideration and not exceeding the amount of

$ _____

for the fulfilment of the Supply Contract for the work covered by the Contract Documents and for all Sub-Contracts made by the Supply Contract which may be awarded to

_____

at the prices set forth in the attached Proposal. The Surety Company satisfactory to the RDOS' Solicitor and allowed by the laws of the Province of British Columbia to issue Contract Performance Bonds under the laws of the said Province is worth, over and above its present liabilities, the amount of the Bond required by the Contract Documents to be provided by the Proponent.

_____
NAME OF COMPANY

PER _____

PER _____

(Note: Unless the Surety Company issuing this Consent of Surety executes the same under its corporate seal, the Regional District of Okanagan Similkameen may refuse to consider the Proposal to which it refers. The form of CONTRACT PERFORMANCE BOND included in the Contract Documents must be used unless the Surety Company has one in a similar form containing the same conditions and not limited in any way.

The Surety Company issuing this Consent of Surety must have an office in the Province of British Columbia or be represented by an Agent with an office in the Province of British Columbia.

Schedule U
Signature Sheet

This Proposal is executed under seal at

_____

this___ day of _____ 20__.

FOR INDIVIDUAL OR PARTNERSHIP:

SIGNED, SEALED AND DELIVERED by:

(Proponent – please print)	(Signature of Proponent)
In the presence of:	(Signature of Proponent)
(Print Name)	(Signature)

Title: _____

Address: _____

_____

_____

_____

FOR LIMITED COMPANY:

The Corporate Seal of:

_____

(Proponent - please print)

were hereunto affixed by the following duly authorized signing authorities:

(Print Name)	(Signature)

Title: _____

(Print Name)	(Signature)

For Corporate Owner:

The Corporate Seal of

Proponent Corporate Owner (please print full corporate name)
was hereunto affixed in the presence of:

Authorized Signing Officer Title

Authorized Signing Officer Title Seal

Notes: Should the Proponent not execute this Proposal under corporate seal, the signing authorities of the company shall sign the Proposal before a Witness who will then sign as a witness to the left of the authorities' signatures. The Witness will then complete an Affidavit of Execution before a Commissioner for Oaths and the affidavit shall be attached to the completed Proposal.

If the Proponent is not registered to do business in the Province of British Columbia, the Proponent shall also provide with the Proposal evidence that the individuals who signed on behalf of the Company are the proper signing authorities of the Company.

If the Company signs the Proposal without a seal and such Proposal is from outside the Province of British Columbia, then the Affidavit of Execution must be signed before a Notary Public.

If the Proponent is not a limited company but rather a partnership or sole proprietorship, then the individual/s who sign must do so before a Witness in the same format as a company who signs without a corporate seal.

If the Proposal is by a joint venture, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF SECTION 00301

SAMPLE CONTRACT TERMS

THIS AGREEMENT WITNESSES that the Supply Contractor and the RDOS agree as follows:

1. The Supply Contractor shall provide all labour, Supply Contractor's Plant and Equipment and materials required to supply the Goods within the required time, as required by the RFP Document. The Goods shall generally consist of sludge dewatering centrifuge.

2. The RDOS shall pay the Supply Contractor the Contract Price, as required by the RFP Document.

3. The Total Price shall be a lump sum of **$**_____ excluding only Goods and Services Tax. The Contract Price is in Canadian dollars.

4. The Total Price shall be the entire compensation owing to the Supply Contractor by the RDOS for the Goods and shall cover and include necessary costs including but not limited to all supervision, labour, materials, Supply Contractor's Plant and Equipment, overhead, profit, financing costs, duty, shipping charges, fabrication and finishing, conveyance and delivery, packing, crating, freight, cartage, drafting charges, tariffs, provincial sales tax, excise taxes, warranty and all other costs and expenses whatsoever incurred in performing the Contract.

5. The Supply Contractor shall supply all Goods to the Delivery Point, located at 300 Rail Road, Okanagan Falls, British Columbia, no later than March 23, 2020.

6. The RFP Document shall form a part of this Agreement as though recited in full.

7. The Agreement supersedes all prior negotiations, representations or agreements, whether written or oral and is the entire agreement between RDOS and the Supply Contractor with respect to the subject matter of this Agreement.

8. The Supply Contractor shall not assign the Agreement, or any portion of the Agreement, or any payments due or to become due under the Agreement, without the express written consent of the RDOS.

9. No action or failure to act by the RDOS or an authorized representative of the RDOS shall constitute a waiver of any right or duty afforded any of them under the Agreement, or constitutes an approval or acquiescence in any breach there under, except as may be specifically agreed in writing.

10. This Agreement shall ensure to the benefit of and be binding upon the RDOS and the Supply Contractor and their respective heirs, executors, legal representatives, successors and permitted assigns. In the event of more than one person being the Supply Contractor, the grants, covenants, provisos and claims, rights, powers, privileges and liabilities shall be construed and held to be several as well as joint.

11. Time shall be of the essence of this Agreement.

END OF SECTION 00400

Use CCDC standard form 221, an example which follows.

END OF SECTION 00510

Standard Construction Document

PERFORMANCE BOND

CCDC 221 - 2002

No. _____ Bond Amount $_____

_____ as Principal, hereinafter called the Principal, and

_____ a corporation created and existing under the laws

of _____ and duly authorized to transact the business of Suretyship in _____ as Surety, hereinafter called the Surety, are held and firmly bound unto _____ as Obligee, hereinafter called the Obligee, in the amount of _____

_____ Dollars ($ _____) lawful money of Canada, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS, the Principal has entered into a written contract with the Obligee, dated _____ day of _____, in the year _____ for _____

_____

hereinafter referred to as the Contract.

The condition of this obligation is such that if the Principal shall promptly and faithfully perform the Contract then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever the Principal shall be, and declared by the Obligee to be, in default under the Contract, the Obligee having performed the Obligee's obligations thereunder, the Surety shall promptly:

1) remedy the default, or;
2) complete the Contract in accordance with its terms and conditions or;
3) obtain a bid or bids for submission to the Obligee for completing the Contract in accordance with its terms and conditions and upon determination by the Obligee and the Surety of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee and make available as work progresses (even though there should be a default, or a succession of defaults, under the contract or contracts of completion, arranged under this paragraph) sufficient funds to pay to complete the Principal's obligations in accordance with the terms and conditions of the Contract and to pay those expenses incurred by the Obligee as a result of the Principal's default relating directly to the performance of the work under the Contract, less the balance of the Contract price; but not exceeding the Bond Amount. The balance of the Contract price is the total amount payable by the Obligee to the Principal under the Contract, less the amount properly paid by the Obligee to the Principal, or;
4) pay the Obligee the lesser of (1) the Bond Amount or (2) the Obligee's proposed cost of completion, less the balance of Contract price.

It is a condition of this bond that any suit or action must be commenced before the expiration of two (2) years from the earlier of (1) the date of Substantial Performance of the Contract as defined in the lien legislation where the work under the Contract is taking place, or, if no such definition exists, the date when the work is ready for use or is being used for the purpose intended, or (2) the date on which the Principal is declared in default by the Obligee.

The Surety shall not be liable for a greater sum than the Bond Amount.

No right of action shall accrue on this Bond, to or for the use of, any person or corporation other than the Obligee named herein, or the heirs, executors, administrators or successors of the Obligee.

IN WITNESS WHEREOF, the Principal and the Surety have Signed and Sealed this Bond dated _____ day of _____, in the year _____ .

SIGNED and SEALED

in the presence of

Principal

_____
Signature

_____
Name of person signing

ATTORNEY IN FACT

Surety

_____
Signature

_____
Name of person signing

(CCDC 221 – 2002 has been approved by the Surety Association of Canada)

BETWEEN: REGIONAL DISTRICT OF OKANAGAN SIMILKAMEEN (OWNER)

AND: (GENERAL CONTRACTOR)

AND: (SUPPLY CONTRACTOR)

WHEREAS:

A. Owner entered into a Contract with Supply Contractor dated _____, for the supply of_____ (Contract), which is annexed hereto as Appendix "A";

B. It is a requirement of the Contract that the Supply Contractor enter into a Novation Agreement with the General Contractor selected by the Owner;

C. Owner entered into a contract with General Contractor dated _____, for _____ (Construction/Installation Contract);

D. It is a requirement of the Construction/Installation Contract that the General Contractor enter into a Novation Agreement with Supply Contractor so that the Supply Contractor becomes a subcontractor to General Contractor;

NOW THEREFORE in consideration of the premises and of the mutual agreements hereinafter contained the parties agree as follows:

1. The General Contractor and Supply Contractor agree to be bound by the terms of the Contract, annexed hereto as Appendix "A", with the General Contractor assuming all the rights and obligations of the Owner as set out therein.

2. Supply Contractor retains all the rights and obligations set out in the Contract and henceforth accepts the General Contractor in place of the Owner.

3. Supply Contractor agrees that henceforth it is a subcontractor to the General Contractor in respect of the Construction/Installation Contract.

4. Supply Contractor hereby releases the Owner from all of the Owner's obligations under the Contract and from all claims of every nature whatsoever arising there from, excepting only those claims, if any, already notified to the Owner in writing, and acknowledges that it will henceforth look only to the General Contractor for the discharge of the Owner's obligations thereunder and that only the General Contractor may exercise the rights of the Owner thereunder.

5. Henceforth, the terms and conditions of the Construction/Installation Contract insofar as they can apply to a subcontract shall govern the relations between the General Contractor and the Supply Contractor; provided nevertheless, that if any term of the Construction/Installation Contract is inconsistent with any payment provision or Special Condition or Special Provision in the Contract such payment provision, Special Condition or Special Provision of the Contract shall prevail.

6. The Owner and Supply Contractor agree that the Contract between them has been terminated.

7. It is agreed that as of the date hereof $ _____ is owing to the Supply Contractor under the Contract.

IN WITNESS WHEREOF the parties have hereunto affixed their hands and seals this _____ day of

_____, 20___.

REGIONAL DISTRICT OF OKANAGAN SIMILKAMEEN

Per: _____

_____

(Title)

Per: _____

_____

(Title)

CONTRACTOR
FOR INDIVIDUAL OR PARTNERSHIP
SIGNED SEALED AND DELIVERED by:

General Contractor (please print)	Signature
In the presence of	
Name	Title
Address	
City/Province/Postal Code	Seal
Occupation	

FOR LIMITED COMPANY:
The Corporate Seal of

General Contractor (please print)
was hereunto affixed in the presence of:

Authorized Signing Officer	Title
Authorized Signing Officer	Title

Seal

NOTE: If the General Contractor is a joint venture, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

SUPPLY CONTRACTOR
FOR INDIVIDUAL OR PARTNERSHIP
SIGNED SEALED AND DELIVERED by:

Supply Contractor (please print)	Signature
In the presence of	
Name	Title
Address	
City/Province/Postal Code	Seal
Occupation	

FOR LIMITED COMPANY:
The Corporate Seal of

Supply Contractor (please print)
was hereunto affixed in the presence of:

Authorized Signing Officer	Title
Authorized Signing Officer	Title

Seal

NOTE: If the Supply Contractor is a joint venture, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF SECTION 00521

PART 1 GENERAL

1.1 DEFINITIONS

The following words and terms, unless the context otherwise requires, in all Contract Documents, shall have the meanings set out below. Words using the male gender include the female gender and either includes the neuter and vice versa and words using the singular number include the plural number and vice versa.

"Accepted Proposal" means the Supply Contractor's proposal which has been accepted by the RDOS and forms part of the Contract Documents;

"Agreement" means the agreement set out in Section 00400;

"Consequential Damages" has the meaning set out in Section 00750 Clause 7.1.3;

"Construction Contract" means the agreement between the RDOS and the General Contractor who will install the Goods supplied by the Supply Contractor under the Contract;

"Contract" means the agreement formed between the RDOS and the Supply Contractor for the supply of the Goods in accordance with the Contract Documents;

"Contract Documents" means the documents identified in Section 00010 and includes the following:

(1) Agreement
(2) Supplementary General Conditions
(3) General Conditions
(4) Specifications
(5) Drawings
(6) Accepted Proposal
(7) All other documents identified in Section 00010;

"Contract Price" has the meaning set out in Section 00400 Clauses 3 and 4;

"day" means calendar day;

"Delivery Date" has the meaning set out in Section 00400 Clause 5;

"Delivery Point" means the location set out in Section 00400 Clause 5;

"Drawings" means that part of the Contract Documents specifically identified as drawings in Section 00010;

"Engineer" means AECOM or any other person duly authorized by the RDOS to be the Engineer;

"General Contractor" means the person who will install the Goods that the Supply Contractor shall supply under the Contract;

"Goods" means the Goods comprising the subject matter of the Contract and are generally described in Section 00400 Clause 1;

“MSDS” means Material Safety Data Sheets;

“person” includes an individual, corporation, partnership and joint venture;

“Proponent” means a party submitting a proposal in response to this RFP.

“Proposal” refers to the Proponent’s submission in response to this RFP.

“Site” means the location or locations where the General Contractor will install the Goods;

"Specifications" means that part of the Contract Documents specifically identified as specifications in Section 00010;

"Submittals” means the information which shall be submitted to the RDOS in accordance with the Specifications;

“Supply Contractor" means the person that has executed the Agreement as the Supply Contractor;

"Supply Contractor's Plant and Equipment" means the equipment, material, supplies and all other items (except labour) brought onto the Delivery Point by the Supply Contractor, but not to be incorporated in the Goods;

"Supply Contractor’s Representative” means the person appointed under Section 00750 Clause 2.2.2;

“RDOS” has the meaning of the Regional District of Okanagan Similkameen with respect to any rights, indemnities, releases and other provisions benefiting the RDOS under this Contract;

“WHMIS” means Workplace Hazardous Materials Information System.

1.2 JOINT VENTURES

If the Supply Contractor is a joint venture of two or more entities, the grants, covenants, provisos and claims, rights, powers, privileges and liabilities of the Supply Contractor shall be joint and several.

1.3 CONTRACT REQUIREMENTS

1.3.1 Successors' Obligations

The Contract shall ensure to the benefit of and be binding upon not only the parties hereto but also their respective successors and permitted assigns.

1.3.2 Assignment of Contract

The Supply Contractor shall not assign the Contract in whole or in part, nor any payments due or to become due under the Contract without the prior written consent of the RDOS. No assignment of the Contract shall relieve the Supply Contractor from any obligation under the Contract or impose any liability on the RDOS. Involuntary assignment of the Contract as a result of, inter alia, bankruptcy, assignment of the Contract for the benefit of creditors or appointment of a receiver, or insolvency shall be deemed default under the Contract entitling the RDOS to terminate the Contract as hereinafter provided.

1.3.3 Waiver of Rights

Except as herein provided, no act or failure to act by the Supply Contractor, the RDOS or the Engineer at any time with respect to the exercise of any right or remedies conferred upon them under this Contract shall be deemed to be a waiver on the part of the Supply Contractor, the RDOS or the Engineer, as the case may be, of any of their rights or remedies. No waiver shall be effective except in writing. No waiver of one right or remedy shall act as a waiver of any other right or remedy or as a subsequent waiver of the same right or remedy.

1.3.4 Amendment of Contract Documents

The Contract Documents shall not be amended except as specifically agreed in writing signed by both the RDOS and the Supply Contractor.

1.4 LAWS, REGULATIONS AND PERMITS

1.4.1 The Contract shall be construed under and according to the laws of the Province of British Columbia and, subject to an agreement to refer a dispute to arbitration under Section 00750, Clause 2.4.7, the parties agree to irrevocably consent to the jurisdiction of the Courts of the Province of British Columbia.

1.4.2 The Supply Contractor shall give all notices required by law and shall comply with all laws, acts, ordinances, rules and regulations relating to or affecting the Goods. If any permits, authorizations, approvals or licences from any government or governmental agencies are necessary or desirable for the prosecution of the work they shall be obtained by the Supply Contractor at its expense, provided that the Supply Contractor shall not make application for any such permit, authorization, approval or licence without first obtaining the written consent of the RDOS.

1.4.3 Patents, Royalties and Copyright

(1) The Supply Contractor shall pay all fees, royalties or claims for any patented invention, article, process or method that may be used upon or in a manner connected with the Goods or with the use of the Goods by the RDOS. Before final payment is made on the account of this Contract, the Supply Contractor shall, if requested by the RDOS, furnish acceptable proof of a proper release from all such fees or claims.

(2) If the Supply Contractor, its agent, employee or any of them is prevented from furnishing or using any invention, article, material or Submittals supplied or required to be supplied or used under this Contract, the Supply Contractor either shall promptly pay such royalties and secure the requisite licences or, subject to written approval by the RDOS, substitute other articles, materials or appliances in lieu thereof which are of equal efficiency, quality, finish, suitability and market value to those planned or required under the Contract.

(3) The Supply Contractor shall submit to the RDOS descriptive information of any proposed substitutions. Approval by the RDOS of any substitutions shall not relieve the Supply Contractor of its responsibility if the substitutions do not function as well as the original specified in the Contract and shall not be deemed an assumption of risk or responsibility by the RDOS. Approval shall only mean the RDOS has no objection to the substitution being utilized at the Supply Contractor's risk. If the RDOS refuses to approve the substitution, the Supply Contractor shall pay such royalties and secure such valid licences as may be requisite for the RDOS, the Engineer, their directors, officers, agents and employees or any of them, to use such invention, article, material or appliance without being disturbed or in any way interfered with by any proceeding in law or equity on account thereof.

1.4.4 All references to money in the Contract Documents shall be interpreted as meaning lawful currency of Canada.

1.5 HEADINGS

Headings to parts, divisions, sections, clauses and forms are inserted for convenience of reference only and shall not affect the interpretation of the Contract Documents.

PART 2 RDOS-SUPPLY CONTRACTOR RELATIONS

2.1 AUTHORITY OF RDOS

2.1.1 Acceptability of Goods

The RDOS shall make the final determination of the acceptability of the Goods.

2.1.2 Appointment and Authority of the Engineer

(1) The RDOS has appointed an Engineer, who shall represent the RDOS. The Engineer shall have the authority set out in the Contract Documents and such other authority as may be delegated in writing by the RDOS, including but not limited to the following:

(a) to make decisions regarding the Goods;

(b) to make decisions regarding the manner of performance and rate of progress of supply of the Goods; and

(c) to make decisions regarding clarifications and interpretation of the Contract Documents.

2.2 RESPONSIBILITIES OF THE SUPPLY CONTRACTOR

2.2.1 Attention to the Goods

The Supply Contractor shall diligently attend to the supply of the Goods so that they are delivered faithfully, expeditiously and in accordance with the Contract Documents.

2.2.2 Authorized Representative

The Supply Contractor shall advise the RDOS and the Engineer in writing of the name of the Supply Contractor's authorized representative.

2.2.3 Off-loading of Goods

The Supply Contractor shall provide all necessary instruction and Delivery Point personnel to ensure satisfactory off-loading, storage, and testing of the Goods.

2.2.4 Shipment

The Supply Contractor shall properly package all Goods for safe shipment to the Delivery Point and a Notice of Shipment shall be sent by the Supply Contractor to the RDOS at least 2 weeks before the Goods are shipped. The

Notice of Shipment shall state the number of the order, the kind of goods, the Supply Contractor's name and the carrier and route by which the shipment is being made. The Notice of Shipment shall indicate appropriate instructions, considerations or other information regarding the proper storage, handling, transfer, off-loading and installation of the Goods.

2.2.5 Acceptable Delivery

The Supply Contractor will arrange to have the Goods delivered to the Delivery Point between 8:00 a.m. and 3:30 p.m. Monday to Friday, statutory holidays excepted. The RDOS shall not be responsible for Goods delivered outside the acceptable time for delivery.

2.2.6 Transportation Costs

If the Contract calls for payment of any transportation cost by the RDOS, the RDOS shall in no event be liable or accountable in excess of the actual costs of transportation. The Supply Contractor shall be accountable for and pay any excess transportation costs arising from Supply Contractor's failure to make delivery to the Delivery Point or to follow shipping instructions furnished by the RDOS.

2.2.7 Employee Safety

The Supply Contractor alone shall at all times be responsible for the safety of its employees, its subcontractors' employees and other persons and equipment lawfully at the Delivery Point in connection with the supply of Goods and shall comply with the standards for the Site, the Workers Compensation Act and regulations thereto and under statutory and common law.

2.3 RDOS - SUPPLY CONTRACTOR CO-ORDINATION

2.3.1 Notice

Any notice, order, directive, request or other communication (the "notice") given by the RDOS or the Engineer to the Supply Contractor shall be deemed to be given to the Supply Contractor if left at any office used by the Supply Contractor or delivered to any of its officers or employees or posted at the Delivery Point or mailed by mail addressed to the Supply Contractor at the address given in the Contract Documents or mailed to the Supply Contractor's last known place of business. Any notice given to a Supply Contractor that is a joint venture or partnership shall be deemed to be given if delivered or mailed to any one of the joint ventures or partners or any of their officers or employees. Any notice to be given by the Supply Contractor to the RDOS shall be deemed to have been given if sent by mail or delivered to the RDOS at the address of the RDOS set out in Section 00400. Any notice sent by mail shall be deemed to have been given two days after the day of mailing.

2.3.2 Co-operation and Entry on Delivery Point

The Supply Contractor shall not have the exclusive right to occupy the Delivery Point and shall permit entry to the Delivery Point by the RDOS, the General Contractor or any other contractors that may be performing work on behalf of the RDOS. The Supply Contractor shall afford to the RDOS, the General Contractor any other contractors and their employees, reasonable facilities and co-operation and shall arrange its work and dispose of its materials in such a manner as to not interfere with the activities of the RDOS, the General Contractor or any other contractors at the Delivery Point. The Supply Contractor shall promptly make good and indemnify the RDOS from any injury or damage to the RDOS, the General Contractor or any other contractors, employees and their agents caused by the Supply Contractor or its employees, subcontractors, suppliers or agents.

2.3.3 The Engineer, if requested by the RDOS, Supply Contractor, General Contractor or any other contractor, shall consider any differences, conflicts or disputes between the Supply Contractor and the General Contractor and any other contractor with regard to the Goods on or near the Delivery Point. The Engineer shall give such directions as it considers desirable to resolve such difference, conflict or dispute and its directions shall be binding on the Supply Contractor and insofar as it may have the authority, on the General Contractor and any other contractor.

2.3.4 Open Work Site Designation

The Delivery Point is open to both union and non-union contractors, and the RDOS' own unionized work force. The Supply Contractor and any subcontractors are required to deliver the Goods to the Delivery Point and access the Site regardless of their labour or union affiliation.

2.4 DISPUTE RESOLUTION

2.4.1 Disputes

A dispute occurs between the RDOS and the Supply Contractor where there is a difference between the parties as to the interpretation, application or administration of the Contract.

2.4.2 Determination by Engineer

Except as otherwise specifically provided, questions regarding interpretation, application or administration of the Contract shall be referred by the Supply Contractor in writing to the Engineer for its decision. The Engineer shall review the matter and respond to the Supply Contractor in writing with the Engineer's decision within 21 days after receipt of written notice from the Supply Contractor.

2.4.3 Dispute of Decision

If the Supply Contractor disputes a decision or instruction of the RDOS or the Engineer (the "Disputed Decision") or considers that the Disputed Decision requires extra work, the Supply Contractor shall give a detailed written notice of the dispute to the RDOS and the Engineer within 21 days of the date that the Supply Contractor received the Disputed Decision. The written notice must set out the nature of the dispute, the circumstances which gave rise to the dispute, the date on which these circumstances arose and the estimated cost of the work.

The Supply Contractor shall be conclusively deemed to have accepted a decision or instruction of the RDOS or the Engineer if the Supply Contractor does not dispute the Disputed Decision by giving the required written notice within the required time and providing the required information.

2.4.4 No Engineer's Review

Notwithstanding Section 00750, Clause 2.4.3, if the Disputed Decision was made by the RDOS pursuant to Section 00750, Part 7, the Engineer shall not review the decision and the matter shall be dealt with as provided under Section 00750, Clause 2.4.7.

2.4.5 Instructions Pending Resolution

If the Disputed Decision is not resolved promptly in the sole discretion of the RDOS, the Engineer shall give any instructions as may be necessary for the supply of the Goods and to prevent delay in delivery of the Goods pending resolution of the dispute. The Supply Contractor shall comply immediately with the Engineer's instructions. If it is subsequently determined that the instructions were contrary to the Contract Documents, the RDOS shall pay the costs incurred by the Supply Contractor in carrying out those instructions beyond what the Contract Documents required.

2.4.6 Notice of Claim

No payment shall be made by the RDOS to the Supply Contractor in addition to the Contract Price on account of any extra expense, loss or damage incurred by or sustained by the Supply Contractor for any reason unless the Supply Contractor has given written notice of a claim to the RDOS and the Engineer within 30 days of the date the Supply Contractor first became aware of the circumstances which gave rise to the claim. The written notice must set out the date on which these circumstances arose and the estimated amount of the claim.

The Supply Contractor shall be conclusively deemed to have waived any right to make a claim for any amount in addition to the Contract Price, if the Supply Contractor does not give the required written notice within the required time and provide the required information.

2.4.7 Dispute/Claim Resolution

(1) All claims, disputes or Disputed Decisions between the RDOS and the Supply Contractor that are not resolved shall be decided by arbitration if the parties agree, or failing agreement, in a Court of competent jurisdiction within the Province of British Columbia.

(2) In the event that the parties agree to arbitration, pursuant to Section 00750, Clause 2.4.7(1), the arbitration shall be governed by the rules of the British Columbia International Commercial Arbitration Centre, except that the arbitrator or arbitrators shall be agreed upon by the parties, and failing agreement by the parties, shall be appointed by a Court of competent jurisdiction within the Province of British Columbia.

(3) In the event that the parties agree to arbitration, the arbitration shall take place in Vancouver, British Columbia and be governed by the laws of British Columbia.

PART 3 SPECIFICATIONS AND DRAWINGS

3.1 INTERPRETATION OF SPECIFICATIONS AND DRAWINGS

3.1.1 General

The Specifications and Drawings are intended to be explanatory of each other. Goods specified on the Drawings and not in the Specifications, or vice versa, shall be executed as if specified in both.

3.1.2 Request for Clarification

If the Supply Contractor requires any clarification concerning the Specifications or Drawings, it shall direct its request in writing for clarification to the Engineer.

3.2 DIVISION OF SPECIFICATIONS AND DRAWINGS

Specifications and Drawings are divided into groups for the convenience of the RDOS and the Engineer. These divisions are not for the purpose of apportioning work or responsibility for work among subcontractors, suppliers and manufacturers.

3.3 CONFLICTING PROVISIONS, ERRORS AND OMISSIONS IN CONTRACT DOCUMENTS

3.3.1 Conflicting Provisions

In case of any inconsistency or conflict between the provisions of the Contract Documents, the provisions of such documents and Addenda thereto will take precedence and govern in the following order:

(1) Agreement
(2) Supplementary General Conditions
(3) General Conditions
(4) Specifications
(5) Drawings
(6) Accepted Proposal, with later documents taking precedence and governing over earlier documents within the Accepted Proposal
(7) All other documents identified in Section 00010.

3.3.2 Errors and Omissions

If the Supply Contractor discovers that there are any errors or omissions in the Contract Documents, it shall immediately notify the RDOS and the Engineer in writing. The RDOS and the Engineer will review the matter and if they conclude that there is an error or omission, they shall determine the corrective actions to be taken and the Engineer will advise the Supply Contractor accordingly. If the corrective work associated with an error or omission increases or decreases the amount of work called for in the Contract, the RDOS and the Engineer shall issue an appropriate change order. After discovery by the Supply Contractor of an error or omission in the Contract Documents any work thereafter performed by the Supply Contractor shall be done at its risk unless otherwise agreed by the RDOS.

3.3.3 Figured dimensions on a Drawing take precedence over measurements scaled from the Drawing, and large-scale Drawings take precedence over those of a smaller scale. Supplementary Drawings and Specifications supersede their antecedents. In case of conflict between figured dimensions on a Drawing and the dimensions of a product specified in the Specifications, the dimensions of the product specified in the Specifications will govern.

PART 4 MATERIAL, EQUIPMENT AND WORKMANSHIP

4.1 GENERAL

The Goods shall be new and of the quality specified. All work related to the Contract Documents shall be done with new materials, articles, equipment and workmanship of the best quality and description and by employment of properly skilled workers and in strict conformity with and as required by the Contract Documents. Materials and equipment shall be the product of suppliers or manufacturers of established good reputation, regularly engaged in the supply or manufacture of such materials or equipment.

4.1.1 All Goods shall bear the Canada Standards Association seal.

4.2 DEMONSTRATION OF COMPLIANCE WITH CONTRACT REQUIREMENTS

4.2.1 Inspection

(1) The RDOS, the Engineer or any inspector or agent appointed by either of them shall have access to the Goods and to the places the Goods are being manufactured, assembled, fabricated, stored or transported or where materials, equipment and machinery are being obtained for the Goods. The Supply Contractor at the Supply Contractor's sole cost shall provide to the Engineer or the RDOS the assistance necessary for obtaining such access, and shall provide all information necessary or desirable in connection with the inspection of the Goods.

(2) The Supply Contractor shall at all times give and cause to be given to the RDOS or the Engineer or any inspector or agent appointed by either of them, free access to inspect and test the Goods, wherever same is being performed or carried out. Such inspections and testing shall not in any way relieve the Supply Contractor from any of its obligations or responsibilities under the Contract Documents, and shall not in any way prejudice or constitute a waiver of any rights or remedies of the RDOS or any guarantees, warranties or covenants in favour of the RDOS, and the RDOS shall be entitled to rely on the expertise and obligations of the Supply Contractor and its subcontractors and their consultants and engineers to the same extent as if such inspections and testing by the RDOS or the Engineer or any inspector or agent had not taken place.

(3) If the Contract Documents, laws, ordinances, or any public regulatory authority require parts of the Goods to be specially inspected, tested or approved, the Supply Contractor agrees that the Goods shall comply.

(4) The Goods are subject to inspection and acceptance by the RDOS, and the Engineer within a reasonable time after receipt. The Engineer will notify the Supply Contractor in writing of the rejection of any of the Goods which are not in accordance with the Contract Documents, and the Goods will be held subject to disposition by the Supply Contractor at the Supply Contractor's risk and subject to all charges accruing as a result of such rejection.

(5) Notwithstanding any prior payment therefore, all Goods are subject to inspection and testing by the RDOS at the Delivery Point or the Site and if the Goods are to be incorporated into an operating facility, the RDOS' inspection and testing of the Goods may be made under operating conditions after the Goods have been installed.

4.2.2 Certification

Where compliance of Goods, materials or equipment with the Contract Documents is not readily determinable through inspection and tests, the RDOS, the Engineer may require that the Supply Contractor provide, at the Supply Contractor's expense, properly authenticated documents, certificates or other satisfactory proof of compliance. These documents, certificates or other proof shall include performance characteristics, materials of construction and the physical or chemical characteristics of materials.

4.2.3 Expenses

Unless otherwise specified in the Contract Documents, the travel, subsistence and labour expenses incurred by the RDOS or the Engineer for inspection and testing shall be paid by the RDOS. If the Supply Contractor requests the RDOS or the Engineer to inspect and test the Goods, materials or equipment at the point of manufacture, then the additional costs to the RDOS for travel, subsistence and labour expenses shall be paid by the Supply Contractor and may be deducted by the RDOS from any payment due to the Supply Contractor under the Contract. After an inspection by the RDOS or the Engineer, if the Goods, materials or equipment require further inspection by the RDOS or the Engineer, then the additional costs to the RDOS for travel, subsistence, and labour expenses shall be paid by the Supply Contractor and may be deducted from any payment due to the Supply Contractor under the Contract.

4.3 DEFECTIVE OR IMPROPER GOODS

4.3.1 Correction of Defective Goods

If upon inspection, testing or otherwise the Goods or any portion thereof are found to be non-conforming, unsatisfactory, defective, or inferior quality or workmanship, or fail to meet any guarantee of operating or other Specifications contained herein, or any other requirements of the Contract Documents, then without prejudice to any other rights or remedies, the RDOS or the Engineer may give notice of its dissatisfaction to the Supply Contractor either verbally or in writing and the Supply Contractor shall immediately upon receipt of such notice do all things that are required to satisfy the RDOS or the Engineer. Any such verbal notice may be confirmed in writing by the RDOS or the Engineer if requested by the Supply Contractor within one working day of the verbal notice. If the Supply Contractor refuses or neglects to do all things that are required to satisfy the RDOS or the Engineer within one week from the receipt of notice, the RDOS may employ some other person to do so and all expenses and costs consequent thereon or incidental thereto shall be charged to the Supply Contractor. The employment of such other person or the doing of the said work by the RDOS itself shall not affect the Supply Contractor's duties and liabilities hereunder or relieve the Supply Contractor from the performance and fulfilment of any or all of the Supply Contractor's warranties, covenants, undertakings, obligations and duties under the Contract.

4.3.2 If upon inspection, testing or otherwise the Goods or any portion thereof are found to be non-conforming, unsatisfactory, defective, or inferior quality or workmanship, or fail to meet any guarantee of operating or other Specifications contained herein, or any other requirements of the Contract Documents, then without prejudice to any other rights or remedies, the RDOS may return the Goods or any part thereof to the Supply Contractor at the Supply Contractor's sole cost and all amounts theretofore paid by the RDOS to the Supply Contractor on account of the Contract Price of such returned Goods, shall be repaid to the RDOS by the Supply Contractor. The Supply Contractor shall advise the RDOS in writing, where to return the Goods, and failing such advice from the Supply Contractor, the Supply Contractor agrees to accept the returned Goods at the Supply Contractor's registered office. Neither the inspection nor failure to make inspection, nor acceptance of Goods shall release the Supply Contractor from any warranties or other provisions of this Contract nor impair the RDOS' right to reject non-conforming Goods. The RDOS reserves the right even after it has paid for and accepted Goods to make a claim against the Supply Contractor on account of any Goods which do not prove to be satisfactory or are defective irrespective of the RDOS' failure to notify the Supply Contractor of a rejection of non-conforming Goods or revocation of acceptance thereof, or to specify with particularity any defect in non-conforming Goods after rejection or acceptance thereof.

4.3.3 Retention of Defective Goods

If in the opinion of the RDOS or the Engineer any portion of the Goods supplied under the Contract is defective or not in accordance with the Contract Documents and if the defect or imperfection in the same is not of sufficient magnitude or importance to make the Goods dangerous or undesirable, or if the removal of such Goods is impracticable, or will create conditions which are dangerous or undesirable, the RDOS shall have the right and authority to retain such Goods instead of requiring the defective or imperfect Goods to be removed and reconstructed, but the RDOS shall be entitled to make such deductions from the payments due or to become due to the Supply Contractor as are just and reasonable.

4.3.4 No Implied Approval

The fact that the RDOS or the Engineer has not disapproved of or rejected any part of the Goods shall not be deemed or be construed to be an acceptance of any such part of the Goods or any such materials.

4.4 WARRANTY AND GUARANTEE

4.4.1 The Supply Contractor agrees that the Goods manufacturer's standard warranty will be to the benefit of the RDOS and that the Goods are free from all defects arising from faulty construction, manufacturing, materials, equipment or workmanship for the warranty period specified in Section 113610 – Dewatering Centrifuge

4.4.2 The Supply Contractor warrants and guarantees that the Goods are free from all defects arising from faulty construction, manufacturing, installation, materials, equipment or workmanship in any part of the Goods for a period of one year commencing from the date of acceptance by the RDOS. The date of acceptance shall be at the end of the start-up, commissioning and training period. During the warranty period, the Supply Contractor, upon the receipt of notice in writing from the RDOS or the Engineer, shall promptly make all repairs arising out of the defects referred to in this Clause 4.4.2. The RDOS shall be entitled to make such repairs, if 5 days after the giving of such notice to the Supply Contractor, the Supply Contractor has failed to make or undertake with due diligence the repairs. In case of an emergency, where, in the opinion of the RDOS or the Engineer, delay could cause serious loss or damage, or inconvenience to the public, repairs may be made without notice being sent to the Supply Contractor. The costs of any repair made by the RDOS in connection with this Clause 4.4.2 shall be charged to the Supply Contractor and the Supply Contractor shall reimburse the RDOS for such costs. All covenants and agreements shall continue to be binding on the Supply Contractor until they have been fulfilled.

4.4.3 The RDOS is relying on Supply Contractor's skill and judgment in selecting and providing the proper Goods and any applicable services for the RDOS' particular use. The Supply Contractor warrants to the RDOS and its successors in interest that the Goods and any services covered hereby will correspond with the description of the same in the Contract Documents, will conform to all applicable Specifications, will be new and of the best quality and, unless otherwise specified, will be fit for the purpose for which they are to be used and will conform in all aspects, both in the manufacture and use thereof, with all applicable safety orders or regulations of the Province of British Columbia. The Supply Contractor also warrants that the Goods are free and clear of all liens and encumbrances whatsoever and that the Supply Contractor has a good and marketable title to the same.

4.4.4 The Supply Contractor warrants and guarantees that the Goods are free from all defects arising at any time from faulty design in any part of the Goods.

4.5 ASSESSMENT OF STIPULATED DAMAGES

4.5.1 If, after operating under the specified service conditions, design loading conditions, and in accordance with the Supply Contractor's instructions, the results of the field performance test indicate that the supplied equipment is not in compliance with the performance and design requirements stipulated in this RFP Document, the Supply Contractor shall undertake all engineering and analysis necessary to determine the cause of such non-compliance. If the Supply Contractor finds, and the General Contractor and the RDOS concur, that the cause of such non-compliance is the failure of the General Contractor or the RDOS to meet the conditions of the warranties, the Supply Contractor shall be reimbursed the cost and expenses incurred in identifying the problem. However, if the cause of such non-compliance is faulty equipment or negligence on the part of the Supply Contractor, the Supply Contractor will be required to make the necessary modifications at no additional cost to the RDOS.

4.5.2 In the event that the Performance Test fails, a timeline shall be established for completing the equipment modifications by the Supply Contractor. If the Supply Contractor fails to meet the mutually agreed timeline or does not pursue the completion of the modifications in a timely fashion the RDOS retains the right to exercise the Performance Bond.

4.5.3 The Supply Contractor is responsible to continue performance testing and modifying the Goods until the Goods are deemed acceptable by the RDOS.

PART 5 INDEMNIFICATION AND INSURANCE

5.1 INDEMNIFICATION AND RELEASE

5.1.1 Indemnification

The Supply Contractor shall save harmless and indemnify the RDOS and the Engineer and their directors, officers, servants, employees and agents (the "Indemnified Parties") from and against all actions, claims, demands, proceedings, suits, losses, damages, costs and expenses of whatsoever kind or nature (including but not limiting the generality of the foregoing, in respect of death, injury, loss or damage to any person or property) arising in any way out of or connected with the Goods under this Contract, including but not limited to their supply, delivery and any related services, except to the proportionate extent that such actions, claims, demands, proceedings, suits, losses, damages, costs and expenses were caused by the Indemnified Parties or any of them.

5.1.2 Release

The Supply Contractor shall release and discharge the RDOS and the Engineer and their directors, officers, servants, employees and agents (the "Released Parties") from and against all actions, claims, demands, proceedings, suits, losses, damages, costs and expenses of whatsoever kind or nature (including but not limiting the generality of the foregoing, in respect of death, injury, loss or damage to any person or property) which the Supply Contractor or its servants or employees might have in any manner arising in any way out of or connected with the Goods under this Contract, including but not limited to their supply, delivery and any related services, except to the proportionate extent that such actions, claims, demands, proceedings, suits, losses, damages, costs and expenses were caused by the Released Parties or any of them.

5.2 INSURANCE

5.2.1 General

The Supply Contractor shall itself obtain and maintain, at its own expense, the insurance set out below until all conditions of the Contract have been fully complied with.

5.2.2 Comprehensive General Liability Insurance

Comprehensive General Liability insurance in the amount of not less than $5,000,000 must be obtained on an occurrence basis affording coverage for public liability and/or death and/or damage to property. NOTE: The Insurer shall acknowledge this Contract as an insured contract under the policy and shall have added as additional insured the Indemnified Parties.

5.2.3 Evidence of Coverage

The Contractor shall file with the RDOS prior to the commencement of work a certificate of insurance covering all policies and endorsements. The Supply Contractor shall also file with the RDOS evidence of the renewal of each policy at least fifteen (15) days prior to the expiry date of the policy.

5.2.4 Indemnity Not Restricted By Insurance

The provisions for insurance shown above shall not in any way limit the indemnity granted by the Supply Contractor to the Indemnified Parties elsewhere in Section 00750.

5.3 PATENT, TRADEMARK OR COPYRIGHT

5.3.1 The Supply Contractor represents that it has fully investigated all documents and Specifications, including any furnished by the RDOS, in connection with the Goods and based on such investigation and its past experience and superior knowledge with respect to such Goods has determined that the production and supply thereof will not infringe any patent, trademark or copyright.

5.3.2 Supply Contractor warrants to the RDOS and it successors in interest that the manufacture, sale or use of the Goods and any services covered by this Contract, whether manufactured in accordance with the Specifications or otherwise, do not and will not infringe upon any patent, trademark or copyright. The Supply Contractor shall save harmless and indemnify the Indemnified Parties from and against all actions, claims, demands, proceedings, suits, losses, damages, costs and expenses of whatsoever kind or nature arising in any way from liability of any nature or kind for or on account of any copyrighted or uncopyrighted composition, secret or other process, patented or unpatented invention, articles or appliances manufactured or used in connection with the Goods, and used or to be used by the RDOS unless otherwise stipulated in this Contract, and if the Supply Contractor shall fail to save harmless and indemnify in manner aforesaid, any money collected from the Indemnified Parties shall be charged to the Supply Contractor.

PART 6 SHIPMENT OF GOODS/DAMAGE TO GOODS

6.1 SHIPMENT OF GOODS

6.1.1 Delivery of Goods

The Supply Contractor shall deliver the Goods to the Delivery Point. Delivery of the Goods to a carrier for transmission to the Delivery Site does not constitute delivery of the Goods to the RDOS. Any such carrier is deemed to be the Supply Contractor's agent and not the RDOS' agent.

6.1.2 Delivery Costs

The Supply Contractor is responsible for all costs and expenses whatsoever in relation to the supply and delivery of the Goods to the Delivery Point, including without limitations, all shipping, carrier, transportation, freight, insurance, storage and handling costs, as well as any customs or excise charges or duties.

6.1.3 Supply Contractor to Bear Risk

The Supply Contractor shall bear all risks and shall assume all responsibility for the Goods, including, without limitation, any loss or damage to the Goods from any cause whatsoever, up to and including the delivery of the Goods at the Delivery Point.

6.1.4 Loss or Damage

If loss or damage to the Goods occurs for which the Supply Contractor is responsible, the Supply Contractor shall immediately effect repairs or replace any property as necessary in order to make good any such loss or damage. If the Supply Contractor refuses or neglects to do so, the RDOS may make good any such loss or damage, either by itself or by employing some other person, and the expense of doing so shall be charged to the Supply Contractor. If any repair or replacement of property is performed on the Goods as a result of loss or damage to the Goods for which the Supply Contractor is responsible the Supply Contractor represents and warrants that the warranty provided in Section 00750 Clause 4.4 shall not be affected or changed to any manner or respect whatsoever.

6.1.5 Acceptance of Goods by RDOS

The RDOS' acceptance or deemed acceptance of the Goods shall not prejudice any rights or remedies the RDOS may have hereunder relating to Goods that are found to be non-conforming, unsatisfactory, defective, of inferior quality or workmanship, or which fail to meet any Specifications or requirements of the Contract Documents.

PART 7 PROGRESS AND COMPLETION

7.1 CONTRACT TIME

7.1.1 Performance by the Supply Contractor

Time shall be of the essence. The Supply Contractor shall supply the Goods in accordance with the Contract Documents. The Supply Contractor acknowledges that the schedule for supply of the Goods as set out in the Contract Documents is reasonable.

7.1.2 Schedule

The Supply Contractor shall provide a schedule and reports for scheduling and coordinating the supply of Goods within the prescribed time. Contract time extensions, if any, shall be incorporated into updated schedules. The failure of the Supply Contractor to comply with this requirement shall entitle the RDOS to terminate the Supply Contractor's right to continue with the supply of Goods or to delay progress payments.

7.1.3 Consequential Damages

The RDOS and the Engineer shall not be liable to the Supply Contractor for, and the Supply Contractor hereby waives recovery from them of, loss of profits or anticipated profits, loss of production, impact costs, overhead, claims of the Supply Contractor's customers, suppliers or contractors, or other indirect or consequential damages arising at any time from any cause whatsoever, whether arising under tort, implied or statutory warranties, strict liability or breach of contract ("Consequential Damages") notwithstanding any right or remedy available to the Supply Contractor at law or in equity to Consequential Damages.

7.2 TERMINATION

7.2.1 Termination for Default

The RDOS may terminate the Contract if the Supply Contractor at any time becomes bankrupt, makes an assignment of his property for the benefit of his creditors, or if a receiver or liquidator should be appointed. Such termination shall be effective upon the RDOS giving notice thereof.

(1) If at any time the RDOS forms the opinion that the Supply Contractor is in default under this Contract because the Supply Contractor:

(a) has breached a fundamental term of the Contract or is in substantial breach of the terms of the Contract;

(b) has failed to supply the Goods, within the time specified in the Contract Documents;

(c) has failed or is failing to furnish or to maintain a detailed schedule;

(d) has become in any way unable to supply the Goods or any part thereof; or

(e) has repeatedly failed to make prompt payments to subcontractors, suppliers or others for labour, materials or equipment;

then the RDOS may give notice in writing to the Supply Contractor of such opinion and require that such default or defaults be remedied forthwith. If, within five days of such notice, such default or defaults are not remedied to the satisfaction of the RDOS, the RDOS may terminate the Contract. Such termination shall be effective immediately.

(2) Upon termination pursuant to Section 00750 Clause 7.2.1(1), the RDOS may take all Goods out of the Supply Contractor's hands and employ such means as the RDOS may see fit. In such case:

(a) the Supply Contractor shall have no claim for any further payment in respect of the Goods;

(b) no objection or claim shall be raised or made by the Supply Contractor by reason of or on account of the ultimate cost of the Goods so taken over for any reason proving greater than, in the opinion of the Supply Contractor, it should have been;

(c) notwithstanding Part 8, all materials and all rights, proprietary or otherwise, licences, powers and privileges, whether relating to or affecting real or personal property, acquired, possessed, or provided by the Supply Contractor for the purposes of supply of the Goods will become or remain and be the property of the RDOS for all purposes incidental to the completion of supply of the Goods and may be used, exercised, and enjoyed by the RDOS as fully to all intents and purposes connected with supply of the Goods as they might theretofore have been used, exercised, and enjoyed by the Supply Contractor; and

(d) the RDOS may assign all rights and privileges granted to the RDOS in this Clause to another supply contractor retained by the RDOS to continue with the supply of the Goods.

(3) If the Supply Contractor's right to supply the Goods is terminated in accordance with the provisions of this Clause 7.2.1, the Supply Contractor shall not be entitled to receive any further payment until the supply of Goods is completed.

7.2.2 Termination for Convenience

The RDOS may terminate the Supply Contractor’s performance of the Contract for its convenience in accordance with this Clause in whole or from time to time in part whenever the RDOS shall elect Such termination shall be

effective upon the RDOS giving notice thereof specifying the extent to which performance under the Agreement is terminated, and the date upon which such termination becomes effective.

(1) Upon receipt of any such notice, the Supply Contractor shall, unless the notice requires otherwise:

(a) immediately discontinue work on the date and to the extent specified in the notice;

(b) place no further orders for materials other than as may be necessarily required for completion of any portion of the Goods that is not terminated;

(c) promptly make every reasonable effort to either obtain cancellation on terms satisfactory to the RDOS of all orders to subcontractors or assign those orders to the RDOS; and

(d) assist the RDOS upon request in the maintenance, protection, and disposition of property acquired by the RDOS under this Contract.

(2) If requested in writing within 30 days after notice of termination, the RDOS will pay to the Supply Contractor as full compensation:

(a) all amounts due and not previously paid to the Supply Contractor for the Goods completed in accordance with this Contract prior to such notice, and for work thereafter completed as specified in such notice;

(b) a reasonable amount for any Goods then in production; provided that no such adjustment shall be made in favour of the Supply Contractor with respect to any Goods which are the Supply Contractor's standard stock;

(c) reasonable costs of settling and paying claims arising out of the cancelled orders; and

(d) a reasonable profit for costs incurred in the performance of the work terminated; provided, however, that if it appears that the Supply Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included.

(3) The total sum to be paid to the Supply Contractor under this Clause shall not exceed the total Contract Price as reduced by the amount of payments otherwise made and as further reduced by the Contract Price of work not terminated, and will not include any consideration for loss of anticipated profits on the terminated work, all claims for which the Supply Contractor agrees to waive.

6.3 Except as hereinbefore provided, the Supply Contractor shall have no claim against the RDOS for any reason whatsoever by reason of the termination of the Contract.

PART 8 PAYMENT

8.1 PAYMENTS TO SUPPLY CONTRACTOR

8.1.1 Payments to the Supply Contractor will be made on the basis of the Payment Schedule in Section 00200 (Clause 1.10 – Payment Schedule).

8.1.2 Notwithstanding Clause 8.1.1 the RDOS may withhold from payment:

(1) Any deduction the RDOS may be entitled to under the Contract;

(2) Such reasonable amount as the RDOS determines appropriate with respect to any part of the goods otherwise not in compliance with the Contract Documents.

8.1.3 Payments may be withheld until the relevant operating manuals and all operating and maintenance materials together with all warranties have been delivered to the Engineer.

8.1.4 In addition to any other remedy the RDOS may have in the Contract or law, the RDOS may refuse to make payment because of subsequently discovered evidence or test results, and shall be compensated for any payment previously made to the Supply Contractor to such extent as may be necessary to protect the RDOS from loss as a result of:

(1) Defective or damaged Goods;

(2) A deductive change order;

(3) Failure of the Supply Contractor to supply the Goods in accordance with the Contract Documents, including failure to maintain the supply of the Goods in accordance with the schedule;

(4) Disregard by the Supply Contractor of the authority of the Engineer or the laws of any public body having jurisdiction.

The RDOS may refuse to make payment of the full amount because of claims made against the RDOS on account of the Supply Contractor's performance or supply of Goods. In such case, the RDOS shall give the Supply Contractor prompt written notice stating the reasons for each action.

8.1.5 The RDOS may withhold from payment to the Supply Contractor:

(1) Any set-off the RDOS may be entitled to under the Contract; and

(2) The amount of any bona fide builders lien claim asserted against the RDOS or which the RDOS acting reasonably anticipates will be made against the RDOS.

8.1.6 Prior to payment to the Supply Contractor, if requested by the RDOS, the Supply Contractor shall deliver to the RDOS a statutory declaration in form satisfactory to the RDOS declaring that all subcontractors, labour and accounts for material and equipment have been paid and that no persons, firms or any other entities have any lien against the lands comprising the Delivery Point or the Site together with such other documentation as the RDOS, acting reasonably, determines is necessary or desirable.

8.1.7 Builders Liens

The Supply Contractor shall, at its own cost and expense, cause any and all builders liens and other liens for labour, services or materials alleged to have been furnished in connection with the supply of the Goods to the lands comprising the Delivery Point or the Site which may be registered against or otherwise affect the said lands or the supply of Goods, except liens properly filed by the Supply Contractor on its own behalf, to be paid, satisfied, released or vacated forthwith after the RDOS has sent to the Supply Contractor written notice of any claim for any such lien.

In the event of a bona fide dispute of the validity or correctness of any claim for any such lien, the Supply Contractor shall be entitled to defend against the claim for such lien in any proceedings brought in respect thereof after first paying into court the amount claimed or sufficient security therefor and such costs as the court may direct and registering all such documents as may be necessary to cancel such lien, or providing such other reasonable security in respect of such claim as the RDOS may in writing approve. Upon receiving satisfactory security for its costs and an indemnity in writing, the RDOS will authorize the Supply Contractor to apply to the court in the name of the RDOS to have any lien removed upon payment into court or deposit in court of satisfactory security therefor.

PART 9 WHMIS

9.1 The Supply Contractor shall comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to the Labour Code, Canada Health.

9.2 The Supply Contractor shall deliver copies of MSDS data sheets to the RDOS on or before delivery of the Goods to the Delivery Point.

PART 10 PERFORMANCE BOND

10.1 The Supply Contractor, together with a surety company, approved by the RDOS and authorized by law to carry on business in the British Columbia, shall furnish a Performance Bond to the RDOS following the format provided in CCDC 221 – Performance Bond (Section 00510).

10.2 The Performance Bond shall be in the amount of 50% of the Contract Price.

10.3 An acceptable Performance Bond shall be submitted to the RDOS as a condition of the RDOS awarding the Contract to the Supply Contractor.

10.4 The Performance Bond shall remain valid until the end of the warranty period that is stipulated in Clause 4.4.1.

END OF SECTION 00750

PART 1 GENERAL

1.1 The scope of the work shall include the design, supply and delivery of all equipment and appurtenances required for the sludge dewatering centrifuge. The work shall consist of the supply of engineering services, supply of equipment and site services for the equipment and associated appurtenances.

1.2 Engineering Services shall include all supporting technical services and products described in the RFP Document, and that may be reasonably required by the RDOS. Engineering services shall include, but are not necessarily limited to, the following:

.1 Provision of shop drawings for the sludge dewatering centrifuge, and ancillary equipment.

.2 Provision of operating and design process information including control philosophy, standard operating procedures, preventative maintenance schedule, equipment data and reference materials, supplier schedules, loop drawings, I/O exchange tables, etc.

.3 Full and explicit definition of the limits of the Supply Contractor's work with respect to the Contract Agreement and Construction/Installation Contract.

.4 Provision of necessary performance specifications for all related processes, equipment material, etc., required to ensure optimal function of the sludge dewatering centrifuge equipment. Review and comment on the Engineer's requirements for integrating the equipment into the Plant Control System.

1.3 The second portion of the work includes the items listed below:

.1 Completion of required factory testing of the equipment.

.2 Supply of all ancillary equipment and materials required for proper functioning of the supplied equipment.

.3 Delivery of the equipment.

.4 Provision of all necessary instruction and supervision to ensure satisfactory off-loading, storage, and installation of the equipment.

.5 Witnessing of equipment installation.

.6 Assistance in Equipment Performance Testing.

.7 Assistance in Process Performance Testing.

.8 End of warranty inspection.

.9 Operation and Maintenance training.

.10 Modification of all supplied Shop Drawings to reflect "As-Built" conditions following installation and commissioning of the subject equipment.

.11 As required, and at no cost to the RDOS, modification and/or replacement of the equipment to ensure that performance guarantees provided in the Proponent's Proposal are met.

.12 Provision of all technical support for and repair of all defects to the equipment, at no cost to the RDOS, during the warranty period.

.13 Provision of all goods and services defined in the RFP Document, provided for in the Proponent's Proposal, and established in the associated Construction/Installation Contract.

1.4 The supplied equipment shall include all accessories required to ensure the supplied equipment safely and satisfactorily operates as an integral unit.

1.5 Provide any appurtenances or services not specifically mentioned or included in the RFP Document, but which are necessary as part of the Work to ensure that the equipment is fully operational when installed.

1.6 Under direction of the Supply Contractor, the General Contractor's work shall include:

.1 Off-loading.

.2 Taking over responsibility for the equipment.

.3 Equipment storage on site.

.4 Equipment installation.

.5 Equipment performance verification.

.6 Assistance with Process Performance Testing.

1.7 Notify the RDOS immediately upon discovery of discrepancies or omissions in the RFP Document, or of any doubt as to the meaning or intent of any part thereof.

1.8 To proceed with the work when an error is suspected or when there is doubt as to the interpretation of the project requirements constitutes full acceptance of any cost associated with any remedial work that may be required.

PART 2 COORDINATION

2.1 Other parties and/or General Contractors (and their subcontractors) that will be working within and adjacent to the site include, but are not necessarily limited to, the following:

.1 The RDOS and their appointed representatives.

.2 Other contractors.

2.2 The Supply Contractor (Successful Proponent) shall provide, for the times designated in the RFP Document, the services of a trained and experienced technician (hereinafter referred to as the Manufacturer's Representative) for:

.1 Equipment delivery.

.2 Installation training.

.3 Witnessing of equipment installation.

.4 Assistance during Equipment Performance Testing.

.5 Assistance during Process Performance Testing.

.6 Training of RDOS' Designated Staff.

2.3 The General Contractor, upon Novation of the supply contract, shall be responsible for:

.1 Expediting the design, fabrication, supply and delivery.

.2 Receipt of the equipment upon delivery.

.3 Off-loading and storage of the equipment.

.4 Satisfactory equipment installation.

.5 Satisfactory equipment performance testing.

.6 Satisfactory process performance testing.

2.4 The Supply Contractor shall cooperate fully with the General Contractor to ensure that the delivery of the equipment and the provision of Site Services meet and conform to the General Contractor's construction schedule and to the RFP Document.

2.5 The Supply Contractor will be required to certify:

.1 Satisfactory delivery of the equipment.

.2 Satisfactory equipment installation training.

.3 Satisfactory equipment installation check.

.4 Satisfactory equipment performance testing.

.5 Satisfactory process performance testing.

2.6 During the Process Performance Testing for the sludge dewatering centrifuge, the Supply Contractor shall attend coordination meetings as directed by the General Contractor. The Supply Contractor must also take all precautions necessary to ensure that the Supply Contractor does not hinder or delay in any way the progress of these parties or cause damage to the Work.

PART 3 SCHEDULE

3.1 It is the responsibility of the Supply Contractor to schedule delivery of the equipment to the site with the General Contractor and within the time period specified in Schedule H, Section 00301 – Equipment Delivery Schedule.

PART 4 INDEPENDENT INSPECTION/TESTING AGENCIES

4.1 Independent Inspection/Testing Agencies may be retained by the RDOS for the purpose of inspecting and/or testing portions of the Work. All costs of such services will be borne by the RDOS unless otherwise noted.

4.2 Employment of Inspection/Testing Agencies in no way relieves the Supply Contractor of responsibility to perform the Work in accordance with the RFP Document.

4.3 Allow the Inspection/Testing Agencies access to all portions of the Work on site and in manufacturing or fabrication plants, as may be necessary. Provide facilities for such access.

END OF SECTION 01010

PART 1 GENERAL

1.1 General

.1 Submittals are required in accordance with the provisions of this section, to determine whether the specified material and product are furnished and installed in accordance with design intent.

.2 Individual submittals as required are detailed in other sections of the Specifications.

.3 Submit a copy of the marked-up Specification indicating compliance or variations for each piece of equipment/device specified.

.4 Until submissions are reviewed, work involving relevant product or material may not proceed.

.5 Where the phrase "or approved equivalent alternative" occurs in the RFP Documents, do not assume that material, product or methods will be accepted as equal by the RDOS unless the item has been specifically accepted for the Work by the RDOS in writing.

1.2 Identification of Submittals

.1 Identify each submittal and resubmittal by showing at least the following information:

(1) Name, address and telephone number of the submitter, and a name of an individual for contact.

(2) Drawing number and specification number to which the submittal applies.

(3) Whether an original submittal or resubmittal.

(4) Confirmation of prior review by the Supply Contractor.

(5) Date of submittal or resubmittal.

(6) Authorized signature of the Supply Contractor.

1.3 Coordination of Submittals

.1 Prior to submittal for the RDOS' review, coordinate all material:

(1) Determine and verify field dimensions and conditions and conformance with Specifications, including material, catalogue numbers, type numbers and similar data.

(2) Coordinate requirements between trades.

(3) Coordinate with requirements under laws, regulations, etc.

(4) Secure required approvals of public agencies, inspection agencies and standards agencies and show proof of approvals acquisition.

(5) Indicate any deviations from the intent of design as expressed in the RFP Document and request specific review of these deviations.

1.4 Timing of Submittals

.1 Make submittals far enough in advance to allow adequate time for coordination, RDOS' review, revisions and resubmittals, and for supply and delivery in time for the scheduled installation of the sludge dewatering centrifuge.

.2 Allow at least fifteen (15) working days for the RDOS' review after receipt of submittals.

.3 Costs due to delays in making submittals shall be borne solely by the Supply Contractor.

END OF SECTION 01300

PART 1 GENERAL

1.1 Requirements for Shop Drawings and Product Data

.1 Arrange for the preparation of clearly identified Shop Drawings and submit Shop Drawings in the following forms:

(1) A PDF copy of the Shop Drawing.

(2) Product Data shall include but not be limited to:

(a) Product assembly drawings

(b) Materials list

(c) Principal dimensions

(d) Parts and components details

(e) Letters of compliance with recognized standards where required

(f) Operation data

(g) Operation curves

(h) Operation manuals where specified

(i) Product name and model number

.2 Shop Drawings shall be accurately drawn to a scale sufficiently large enough to show all pertinent features of the item, and its method of connection to the Work and shall have sufficient space for the Engineer's review stamp.

.3 Shop Drawings shall be in accordance with the International System of Units (S.I.) metric units.

.4 The Supply Contractor shall submit Shop Drawings to the RDOS and the Engineer for review with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the work of other contractors. If either the Supply Contractor, the Engineer or the RDOS so requests they shall jointly prepare a schedule fixing the dates for submission and return of Shop Drawings.

.5 Notify the RDOS and the Engineer in writing of any deviations in the Shop Drawings from the requirements of the RFP Documents.

.6 Include with the submittals, marked-up copies of the relevant Specifications sections with addenda updates, and with each submission show deviation from requirements of the RFP Document.

.7 The RDOS and the Engineer will review and return Shop Drawings in accordance with a schedule agreed upon, or otherwise with reasonable promptness. The

RDOS' and Engineer's review shall be for conformity to the design concept and for general arrangement only and such review shall not relieve the Supply Contractor of responsibility for errors or omissions in the Shop Drawings or of responsibility for meeting all requirements of the Construction/Installation Contract Documents. A specific deviation on the Shop Drawings from the design concept requested by the Supply Contractor may be approved or rejected in writing by the RDOS or the Engineer.

.8 The Supply Contractor shall make any changes in Shop Drawings which the RDOS or Engineer may require consistent with the RFP Documents and resubmit unless otherwise directed by the RDOS or the Engineer. When resubmitting, the Supply Contractor shall notify the RDOS and the Engineer in writing of any revisions made other than those requested by the RDOS or the Engineer, as part of the review.

.9 Each reviewed Shop Drawing will be stamped by the Engineer (on behalf of the RDOS) with the following form of stamp:

Reviewed	( )
Reviewed as modified	( )
Revise and resubmit	( )
Not reviewed	( )

This review by the Engineer is for the sole purpose of ascertaining conformance with the general design concept. This review shall not constitute approval of the detail design inherent in the Shop Drawings, responsibility for which shall remain with the Supply Contractor submitting same. Review by the RDOS and the Engineer shall not relieve the Supply Contractor of responsibility for errors or omissions in the Shop Drawings or of the Supply Contractor's responsibility for meeting all requirements of the RFP Document. The Supply Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction, for installation, and for co-ordination of the work of all sub-trades.

Engineer _____

By: _____

Date: _____

1.2 Design by the Supply Contractor

.1 When the Supply Contractor is responsible for engineering design of portions of the Work, this shall be clearly and specifically indicated in the Shop Drawings or in the specifications of the RFP Document.

.2 Where the Supply Contractor is required, either by law or regulation or by the RFP Document to provide engineering design, the Supply Contractor shall use the services of a Professional Engineer registered in the area in which the Work is to be performed, and the Supply Contractor shall submit Shop Drawings bearing the seal and signature of that Registered Professional Engineer.

END OF SECTION 01340

PART 1 GENERAL

1.1 Intent

.1 This section describes general requirements for process, hoisting, mechanical, and electrical equipment relating to supply, installation, testing, and commissioning; and the verification thereof.

1.2 Definitions

.1 Supply Contractor: The Supply Contractor is the person, partnership, or corporation responsible for the fabrication of equipment provided to the General Contractor or the RDOS supplied equipment handed over to the Contractor for installation for the completion of the Work.

.2 Manufacturer's Representative: A Manufacturer's Representative is a factory trained person(s) knowledgeable about the equipment and designated by the Manufacturer to provide installation, testing, and commissioning assistance to the General Contractor in the performance of these functions.

.3 Normal Operation: A piece of equipment(s) or system operates in an uninterrupted manner that meets the requirements of the Specifications, and recommended operations and performance requirements of Supply Contractor.

1.3 Expertise and Responsibility

.1 The Engineer recognizes the expertise of the Manufacturer.

.2 Should the Engineer issue an Addendum, Field Order, Change Order, or oral instruction to change the Work which would, in the opinion of the General Contractor, compromise the success or safety of the Work, then it shall be incumbent on the General Contractor to notify in writing the Engineer to this effect within two (2) days.

1.4 Equipment Delivery

.1 The General Contractor shall be responsible for receiving, unloading, and storage of Contractor supplied equipment. The Contractor shall be responsible for loading / unloading and storage of RDOS supplied equipment as required.

.2 The General Contractor shall ensure that all necessary precautions are taken in the loading / unloading of equipment and its subsequent storage.

.3 The General Contractor shall inspect the contents of RDOS supplied equipment and any equipment delivery and be satisfied of the contents thereof and damage which may have occurred during transport.

1.5 Installation Assistance

.1 Before commencing installation of Contractor supplied or RDOS supplied equipment, where indicated in the Specifications, the General Contractor shall arrange for the attendance of the Manufacturer's Representative to provide instructions in the methods, techniques, precautions, and any other information relevant to the successful installation of the equipment.

.2 The General Contractor shall inform the Engineer, in writing, of the attendance at the site of any Manufacturer's Representative for installation training at least fourteen (14) days prior to arrival.

.3 When the Manufacturer's Representative is satisfied that the General Contractor is aware of all installation requirements, the Manufacturer's Representative shall so certify by completing Form 101 that is attached to the Specification.

.4 The completed form shall be delivered to the Engineer prior to departure of the Manufacturer's Representative from the site.

.5 Installation of the equipment shall not commence until the Engineer has advised that the completed Form 101 has been delivered.

1.6 Installation

.1 If necessary, or if so directed by the Engineer during the course of installation, the General Contractor shall contact the Manufacturer to receive clarification of installation procedures, direction, or any other additional information necessary to continue or complete the installation in an appropriate manner.

.2 If it is found necessary, or if so directed by the Engineer, the General Contractor shall arrange for the Manufacturer's Representative to visit the site to provide assistance during installation, all at no additional cost to the RDOS.

.3 Prior to completing installation, the General Contractor shall inform the Manufacturer and arrange for the attendance at the site of the Manufacturer's Representative to verify successful installation.

.4 The General Contractor shall advise the Engineer in writing, at least seven (7) days prior, of the Manufacturer's Representative's scheduled arrival.

.5 The Manufacturer's Representative shall conduct a detailed inspection of the installation including alignment, electrical connections, belt tensions, rotation direction, running clearances, lubrication, workmanship and all other items as required to ensure successful operation of the equipment.

.6 The Manufacturer's Representative shall identify any outstanding deficiencies in the installation.

.7 In the presence of the Manufacturer's Representative, the General Contractor, and the Engineer, the equipment shall then be given a one (1) hour trial run.

.8 If deficiencies noted by the Manufacturer's Representative or which become evident in the trial run prejudice the successful completion of the trial run, the deficiencies will be rectified by the General Contractor and the Manufacturer's Representative will be required to re-inspect the installation, at no additional cost to the RDOS.

.9 On successful completion of the trial run in the second or subsequent attempt, the Manufacturer's Representative will certify successful installation by completing Form 102 that is attached to the Specification.

.10 The completed Form 102 shall be delivered to the Engineer prior to departure of the Manufacturer's Representative from the site.

.11 Tag the equipment with a 100mm by 200mm blue card stating "Equipment Checked. Do Not Run." stencilled in large black letters. The General Contractor shall sign and date each card.

1.7 Operation and Performance Verification

.1 Both RDOS supplied and General Contractor supplied equipment will be subjected to a demonstration, running test, and performance tests after the installation has been verified and any identified deficiencies have been remedied.

.2 The General Contractor shall inform the Engineer at least fourteen (14) days in advance of conducting the tests and arrange for the attendance of the Manufacturer's Representative. The tests may be concurrent with the inspection of satisfactory installation if mutually agreed by the Contractor and the Engineer.

.3 The Manufacturer's Representative will conduct all necessary checks to the equipment and if necessary, advise the General Contractor of any further checking, flushing, cleaning, or other work needed prior to confirming the equipment is ready to run.

.4 The General Contractor shall then operate the equipment for at least one (1) hour to demonstrate the operation of the equipment and any required ancillary services. Any remedial measures required to ensure satisfactory operation shall be promptly undertaken.

.5 The General Contractor shall then notify the Engineer of the readiness to demonstrate the operation of the equipment. The Engineer shall attend, as expeditiously as possible. The RDOS' representative, also shall attend if deemed appropriate by the RDOS.

.6 With the assistance of the Manufacturer's Representative, the General Contractor will demonstrate that the equipment is properly installed. Alignment, piping connections, electrical connections, etc. will be checked and if appropriate, code certifications provided.

.7 The equipment shall then be run for one (1) hour. Local controls shall be satisfactorily verified by cycling the equipment through several start-stop operations, modulating its output, or some combination. Operating parameters such as

temperature, pressure, voltage, vibration, etc., will be checked to ensure that they are within the specified or Supply Contractor recommended limits, whichever is more stringent.

.8 On satisfactory completion of the one (1) hour demonstration, the equipment will be stopped and critical parameters, such as alignment, will be rechecked.

.9 The equipment will be restarted and run for five (5) days, of which the last forty-eight (48) hours shall be consecutive. During this period, as practicable, conditions will be simulated which represent maximum or most severe, average, and minimum or least severe conditions. These conditions will be mutually agreed to by the General Contractor and Engineer on the basis of the information contained in the Specifications, as well as the methods utilized to create the simulated conditions and the time periods allotted to each.

.10 Performance tests will be conducted either concurrent with or subsequent to the running test, as practicable and agreed between the Engineer and the General Contractor.

.11 Performance tests shall be as dictated in the Specifications for each item of equipment or as reasonably required by the Engineer to prove adherence to the requirements listed in the Specifications.

.12 Results of the performance tests shall be as documented and summarized by the General Contractor in a format acceptable to the Engineer.

.13 All water, chemicals, temporary power, heating, or any other ancillary service required to complete the initial demonstration, running test and performance tests are the responsibility of the General Contractor.

.14 Should the initial demonstration, running test or performance tests reveal any defects, then those defects shall be promptly rectified and the demonstration, running tests, and/or performance tests shall be repeated to the satisfaction of the Engineer. Additional costs incurred by the General Contractor, the Engineer, or the RDOS, due to repeat demonstration, running tests, and/or performance tests shall be the responsibility of the General Contractor.

.15 On successful completion of the demonstration, running test, and performance tests, Form 103 that is attached to the Specification will be signed by the Manufacturer's Representative, General Contractor, and the Engineer.

.16 The General Contractor shall affix to the tested equipment a 100mm by 200mm card reading "Operable Condition - Do Not Operate without Contractor's Permission." stencilled in large black letters.

CERTIFICATE OF EQUIPMENT DELIVERY
FORM 100

We certify that the equipment listed below has been delivered into the care of the RDOS. The equipment has been found to be in satisfactory condition. No defects in the equipment were found.

The RDOS (and later, the General Contractor) will adhere to any requirements by the Supply Contractor outlined in documents included in the appendices regarding warranties and start-up requirements.

PROJECT: Sludge Dewatering Centrifuge Equipment Supply

ITEM OF EQUIPMENT: Sludge Dewatering Centrifuge

TAG NO: CFG-6001

REFERENCE SPECIFICATION: 11365

MANUFACTURER'S REPRESENTATIVE	DATE
OWNER'S REPRESENTATIVE	DATE
ENGINEER	DATE

CERTIFICATE OF READINESS TO INSTALL
FORM 101

The undersigned has familiarized the General Contractor of the specific installation requirements related to the equipment listed below and is satisfied that the General Contractor understands the required procedures.

PROJECT: _____

ITEM OF EQUIPMENT: _____

TAG NO: _____

REFERENCE SPECIFICATION: _____

_____ _____

MANUFACTURER'S REPRESENTATIVE DATE

CERTIFICATE OF SATISFACTORY INSTALLATION
FORM 102

The undersigned has completed a check and inspection of the installation listed below and confirm that it is satisfactory and that defects have been remedied to my satisfaction except any as noted below:

PROJECT: _____

ITEM OF EQUIPMENT: _____

TAG NO: _____

REFERENCE SPECIFICATION: _____

OUTSTANDING DEFECTS: _____

_____ _____

MANUFACTURER'S REPRESENTATIVE DATE

CERTIFICATE OF EQUIPMENT SATISFACTORY PERFORMANCE
FORM 103

The undersigned certify that the equipment listed below has been operated for at least five (5) days of which the last two (2) days are consecutive and that the equipment operates satisfactorily and meets its specified operating criteria. No defects in the equipment were found. The equipment is therefore classed as "conforming".

PROJECT: _____

ITEM OF EQUIPMENT: _____

TAG NO: _____

REFERENCE SPECIFICATION: _____

_____ _____
MANUFACTURER'S REPRESENTATIVE DATE

_____ _____
CONTRACTOR'S REPRESENTATIVE DATE

_____ _____
ENGINEER DATE

END OF SECTION 01650

PART 1 GENERAL

1.1 Description

.1 This Section contains requirements for training the Owner's Designated Operating and Maintenance Staff (O&M Staff), by persons retained by the Supply Contractor specifically for the purpose, in the proper operation and maintenance of the equipment and systems installed under this RFP Document.

.2 For equipment that is specified to include training, arrange for the attendance of the Manufacturer's Representative to provide classroom training session(s) to O&M Staff. Give the Engineer at least thirty (30) days notice of the session(s). At no time schedule the sessions for more than three (3) weeks prior to commissioning.

.3 Coordinate the training session(s) with the General Contractor.

.4 As a minimum, the Supply Contractor is to allow at least eight (8) hours of training for the O&M Staff. Refer to the equipment specifications for specific time periods.

.5 The presentations shall be given during the three (3) week period preceding the start of the seven (7) day operating period required for Form 103.

.6 The intent is that the O&M Staff should receive sufficient training on the equipment system that they are going to operate and maintain. The Engineer shall have the opportunity to review all training material and assess the adequacy of the duration and content of each training session required. The Manufacturer’s Representative shall amend the duration and presentation material as directed by the Engineer.

1.2 Quality Assurance

.1 Where required by the equipment specifications, provide on-the-job training of the O&M Staff. Training sessions will be conducted by qualified, experienced two (2) years minimum, factory-trained Manufacturer Representative. Training includes instruction of O&M Staff in equipment operation and preventive maintenance and instruction on mechanics, electronics, and instrumentation and communications equipment operators (technicians) in normal maintenance up to major repair.

.2 The trainer(s) proposed by the Supply Contractor shall be experienced in "training" operations and maintenance and shall have relevant experience in similar work training staff in the operation and maintenance of sludge dewatering centrifuges.

1.3 Submittals

.1 Submit the following information in accordance with Section 01300. For phased testing and start-up activities, separate submittals can be prepared for equipment items or systems. The material will receive a "NO EXCEPTIONS TAKEN" or "MAKE NOTED CORRECTIONS" status by the Engineer no later than four (4) weeks prior to delivery of the training:

(1) Lesson plans and training manuals, handouts, visual aids, and other reference materials for each training session to be conducted by the Supply Contractor's trainer(s).

(2) Date, time, and subject of each training session.

(3) Training schedule. NOTE: Concurrent classes will not be permitted.

.2 The Supply Contractor and Manufacturers Representative will be responsible to document each training session with a detailed set of minutes and provide five (5) sets of training seminar manuals at the end of the project in similar format to the Operations and Maintenance Manual.

1.4 Location

.1 Where specified, conduct training sessions for the O&M Staff, operation and maintenance personnel, on the operation, care, and maintenance of the equipment and systems installed under this RFP Document. Training will take place at the site of the Work and under the conditions specified herein.

.2 Field training sessions will take place at the site of the equipment. Classroom training to take place in the Training Room in the Administration Building of the Advanced Waste Water Treatment Plant. The Engineer may direct the classroom training to take place at another suitable location.

.3 Inform the Engineer of any requirements for audio-visual aids at least five (5) days before training session.

1.5 Lesson Plans

.1 Prepare formal written lesson plans for each training session and coordinate with the Engineer. Lesson plans to contain an outline of the material to be presented along with a description of visual aids to be utilized during the session. Each plan will contain a time allocation for each subject. Furnish ten (10) copies of necessary training manuals, handouts, visual aids and reference materials at least two (2) weeks prior to each training session.

1.6 Format and Content

.1 Include time in the classroom and at the location of the equipment or system for each training session. Allow thirty (30) minutes at the beginning of the first period for the Engineer to provide a summary of the design intent relating to that equipment. Following the engineering design overview, provide as a minimum, cover the following topics for each item of equipment or system:

(1) Familiarization

(2) Safety

(3) Operation

(4) Troubleshooting

(5) Preventive maintenance

(6) Corrective maintenance

(7) Parts

(8) Local representatives.

1.7 Recording

.1 The Owner may record each training session. After taping, the material may be edited and supplemented with professionally produced graphics to provide a permanent record for the Owner's use.

1.8 Training

.1 General Requirements

(1) Conduct initial training in conjunction with the Equipment Performance Testing periods. Schedule classes such that classroom sessions are interspersed with field instruction in logical sequence. Arrange to have the training conducted on consecutive days, with no more than four (4) hours of classes scheduled consecutively.

(2) Provide final Operating and Maintenance Manuals, as defined in Section 01300-Submittals, for the specific equipment to the Owner at least four (4) weeks prior to the start of any training. Recording may take place concurrently with all training sessions.

.2 Operator Classroom Training

(1) As a minimum, classroom equipment training for operations personnel will include:

(a) The equipment's specific location in the plant and an operational overview. Use slides and drawings to aid discussion.

(b) Purpose and plant function of the equipment.

(c) The operating theory of the equipment.

(d) Start-up, shutdown, normal operation, and emergency operating procedures, including system integration and electrical interlocks, if any.

(e) Safety items and procedures.

(f) Routine preventive maintenance, including specific details on lubrication and maintenance of corrosion protection of the equipment and ancillary components.

(g) Operator detection, without test instruments, of specific equipment trouble symptoms.

(h) Required equipment exercise procedures and intervals.

(i) Routine disassembly and assembly of equipment if applicable for purposes such as operator inspection of equipment.

.3 O&M Staff Hands-On Training

(1) As a minimum, hands-on equipment training for the O&M Staff personnel will include:

(a) Identifying instrumentation: location of primary element; location of instrument readout; discuss purpose, basic operation, and information interpretation.

(b) Discussing, demonstrating, and performing standard operating procedures and daily visual inspection of system operation.

(c) Discussing and performing the preventive maintenance activities.

(d) Discussing and performing start-up and shutdown procedures.

(e) Performing the required equipment exercise procedures.

(f) Performing routine disassembly and assembly of equipment if applicable.

(g) Identifying and reviewing safety items and performing safety procedures, if feasible.

.4 Maintenance Classroom Training

(1) Classroom equipment training for the maintenance and repair personnel will include:

(a) Basic theory of operation.

(b) Description and function of equipment.

(c) Routine start-up and shutdown procedures.

(d) Normal and major repair procedures.

(e) Equipment inspection and troubleshooting procedures including the use of applicable test instruments and the "pass" and "no pass" test instrument readings.

(f) Routine and long-term calibration procedures.

(g) Safety procedures.

(h) Preventive maintenance such as lubrication; normal maintenance such as belt, seal, and bearing replacement; and up to and including major

repairs such as replacement of major equipment part(s) with the use of special tools, bridge cranes, welding jigs, etc.

.5 Maintenance Hands-On Training

(1) Hands-on equipment training for maintenance and repair personnel will include:

(a) Locating and identifying equipment components.

(b) Reviewing the equipment function and theory of operation.

(c) Reviewing normal repair procedures.

(d) Performing routine start-up and shutdown procedures.

(e) Reviewing and performing the safety procedures.

(f) Performing Owner-approved practice maintenance and repair job(s), including mechanical and electrical adjustments and calibration and troubleshooting equipment problems.

(g) Reviewing and using Supply Contractor's manuals in the hands-on training.

1.9 Training Completion Forms

.1 **Form T1**: To be completed for initial training during Equipment Performance Testing.

.2 **Form T2**: To be completed for final training during the Process Performance Testing.

.3 A sample of **Forms T1** and **T2** are attached to this specification section.

.4 One copy of **Forms T1** and **T2** will be required for each major piece of equipment.

CERTIFICATE OF SATISFACTORY TRAINING
FORM T1

We certify that the initial training for the equipment listed below has been provided as per the Specifications.

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

TAG NO: _____

REFERENCE SPECIFICATION: _____

_____ _____

(Authorized Signing Representative of the Owner) Date

FORM T2

CERTIFICATE OF SATISFACTORY TRAINING

We certify that the final training for the equipment listed below has been provided as per the Specifications.

PROJECT: _____

ITEM OF EQUIPMENT: _____

TAG NO: _____

REFERENCE SPECIFICATION: _____

_____ _____

(Authorized Signing Representative of the Owner) Date

END OF SECTION 01664

PART 1 GENERAL

1.1 Intent

.1 This section describes the General Contractor's responsibilities in the commissioning and hand over of the process, electrical, and other systems to be installed as part of the Work.

1.2 Definitions

.1 System: For the purpose of this section, a System shall be defined as the equipment, piping, controls, ancillary devices, electrical power, etc. which together perform a specific function at the facility.

.2 Commissioning: For the purpose of this section, commissioning shall be defined as the successful operation of a System in accordance with its design requirements for a period of twenty-eight (28) days, the last five (5) of which shall be consecutive.

.3 Acceptance: For the purpose of this section, acceptance shall be defined as the formal turnover of a System to the Owner for operation and maintenance and shall occur after the end of commissioning of each System, once the Engineer, the Owner, and the General Contractor have signed the "**Certificate of System Performance" (Form 104).**

1.3 Commissioning Team

.1 The work of commissioning will be conducted by teams comprised of personnel from the General Contractor, the Owner and the Engineer.

.2 The Engineer shall be responsible for the direction of the commissioning work and shall have ultimate authority.

.3 The Owner's O&M Staff shall represent process personnel and operating staff and/or maintenance staff.

.4 The General Contractor shall provide personnel representing the appropriate trades, including control and instrumentation personnel during the commissioning work. These personnel shall be skilled workmen, able to expedite any minor repairs, adjustments, etc. as are required to complete commissioning with as few delays as possible.

1.4 Commissioning Plan

.1 The General Contractor shall develop a detailed methodology for the commissioning of each System at least thirty-five (35) calendar days prior to planned start of commissioning work. The commissioning plan shall be drafted by the General Contractor and include the following:

(1) Detailed schedule of events, including but not limited to the schedule for completion of testing of all component parts of the System in accordance with Section 01650 – Equipment Installation, prior to commissioning of a System.

(2) Method for introducing flow, disposing of partially treated solids, and disposing of any other sludge or residual solids generated during the commissioning process. The Owner will take responsibility for the implementation of these measures.

(3) Planned attendance schedule for Manufacturer's Representatives.

(4) Contingency plans in the event of a process malfunction.

(5) Drawings and sketches as required to illustrate the planned sequence of events.

(6) List and details for all temporary equipment, pumps, and appurtenances required to facilitate commissioning work.

(7) List of all personnel who the General Contractor plans for the commissioning work and hand over with information indicating their qualifications.

.2 The Commissioning Plan shall be reviewed and agreed by the Commissioning Team prior to its implementation. The Engineer shall be the final arbiter.

1.5 Equipment

.1 All process, mechanical, electrical, control and miscellaneous equipment related to a System shall be successfully installed and tested in accordance with Section 01650 – Equipment Installation and any specific requirements noted in the RFP Document. Form 103 (see Section 01650 – Equipment Installation) shall be executed for each item.

.2 Staff training sessions, refer to Section 01664 Training – Form T1, shall be completed during Equipment Performance Testing of the commissioning period.

.3 Staff training sessions, refer to Section 01664 Training – Form T2, shall be completed during the Process Performance Testing of the commissioning period.

.4 Temporary equipment will be installed and tested as necessary to ensure that it functions reliably and consistently through the commissioning period.

1.6 Controls

.1 All controls which are the responsibility of the General Contractor shall be installed and tested prior to commissioning.

.2 The Engineer shall arrange for the simulation of the control sequences. Every effort shall be made to ensure that the Commissioning period provides for the full and

comprehensive operation of the equipment under all anticipated normal and adverse operating conditions.

PART 2 PRODUCTS

2.1 Plant Utility Services

.1 The RDOS shall provide power, chemicals, and other ancillary services as necessary to operate the plant through the Commissioning period. Provision of these services shall be limited to reasonable levels.

2.2 Manpower

.1 General Contractor to supply all staff required during Commissioning as necessary to assist the plant operations staff in the operation of the plant processes on a twenty-four (24) hour basis, as necessary.

.2 General Contractor to supply competent staff capable of maintaining, repairing and adjusting the equipment and controls to achieve the intended design functions during the Commissioning period.

2.3 Operating Descriptions

.1 Operating descriptions have been prepared for the plant Systems. To some degree, the intent of these has been included in the Drawings and Specifications. Other information outlining the operating requirements is available in preliminary form at the office of the Engineer. The General Contractor will review these descriptions and will be familiar with the requirements in order that the General Contractor can undertake Commissioning in an appropriate manner.

2.4 Design Parameters

.1 Design parameters for the System to be commissioned shall be as defined in the Specifications and/or the operating descriptions. The Engineer will identify to the General Contractor which parameters may be modified prior to Commissioning and shall be responsible for any subsequent changes during the Commissioning period.

PART 3 EXECUTION

3.1 Preparation

.1 Each item of equipment included in the System to be commissioned shall be satisfactorily tested and **Form 103** (see Section 01650 – Equipment Installation) completed.

.2 Piping, wiring, and other conduit Systems shall be finished and tested.

.3 Services such as seal water, process drains, process air, instrument air, etc. shall be completed and tested prior to the Commissioning of any Systems which require these services.

.4 Electrical connections shall be completed and inspected to the satisfaction of the governing authorities.

.5 Control Systems shall be completed and the related control software debugged.

.6 Architectural finishes, heating and ventilation, and lighting shall be substantially complete.

3.2 Sequence

.1 The System shall be commissioned in a logical manner. Upstream components shall be commissioned first to the degree possible.

.2 The following sequence of events shall be followed:

(1) Draft Operating and Maintenance Manual shall be available at least one (1) month prior to the performance tests stipulated in Section 01650 – Equipment Installation. Submit final copies before the twenty-eight (28) day test period.

(2) Operating descriptions shall be made available four (4) weeks prior to testing.

(3) Operator training shall be undertaken three (3) weeks prior to Commissioning.

(4) Equipment performance tests shall be conducted successfully (**Form 103**).

(5) Start and run the System in manual mode.

(6) Turn separate items of equipment to automatic in a planned and logical manner. Ensure that the control system is operating the equipment in a manner which precludes damage of the equipment and which is consistent with the process operating requirements.

(7) Commence Commissioning period of twenty-eight (28) days. The equipment shall operate continuously and normally through the last five (5) days of a Commissioning period. Minor failures shall not void the Commissioning period. A minor failure is defined as one which does not present a safety hazard, does not impact overall process functioning and can be temporarily overcome by the use of available standby equipment. The last five (5) days of the Commissioning period shall be re-started if a critical failure occurs. A critical failure shall be deemed as one which prohibits the process from operating normally successfully for more than an eight (8) hour period or one which creates a safety hazard.

(8) Upon completing the Commissioning period and required documentation, the system shall be granted acceptance by the completion of the "**Certificate of System Performance" (Form 104)**.

3.3 Commissioning

.1 Primary Sludge will be introduced to the System in a manner which precludes the damage of any equipment or structures.

.2 Twice during the Commissioning period, plant component settings will be modified to ensure that the System is subjected to flows and loads as close to design conditions as possible. Where necessary to achieve this, flows to the area being Commissioned will be augmented to exaggerate the naturally occurring flows and loads. Where it is necessary to modify settings outside the limits of this RFP Document, coordinate the changes with plant operations staff.

.3 Assist in the operation of the plant to achieve the process objectives.

.4 All components of the System shall be operated in the automatic / manual and the remote / local modes as required to prove proper operation.

.5 All minor and major alarm conditions will be induced to ensure that the process reacts as intended, the applicable alarms are enunciated.

3.4 Acceptance

.1 The Commissioning of the System shall be considered acceptable when the process has operated in a stable manner, satisfying the design criteria for a period of twenty-eight (28) days, the last five (5) of which shall be consecutive.

.2 When the System has been Commissioned satisfactorily, the System shall be formally accepted for operation and routine maintenance by plant operations staff.

.3 The General Contractor is advised that commencement of the two (2) year Warranty Period is tied to the issuance of the Notice of Acceptance and shall not commence until that milestone is achieved.

.4 An Acceptance Meeting must be held at the end of the twenty-eight (28) day test to confirm the status of the System.

.5 The "**Certificate of System Performance" (Form 104)** will be granted when System has been commissioned and accepted, and all requirements of the RFP Document have been completed.

CERTIFICATE OF SYSTEM PERFORMANCE
FORM 104

We certify that the equipment listed below has been operated and tested as per the Specifications using primary sludge, as intended for normal operation, for at least twenty-eight (28) days and that the equipment meets its Performance Testing Criteria, including fully automatic controls. The equipment is therefore classed as "conforming".

PROJECT: _____

ITEM OF EQUIPMENT: _____

_____

TAG NO: _____

REFERENCE SPECIFICATION: _____

_____ _____
(Authorized Signing Representative of the Supply Contractor) Date

_____ _____
(Authorized Signing Representative of the General Contractor) Date

_____ _____
(Authorized Signing Representative of the Engineer) Date

_____ _____
(Authorized Signing Representative of the RDOS) Date

END OF SECTION 01670

PART 1 GENERAL

1.1 Definitions and Interpretations

.1 Where the term "Provide" is used herein, it shall be understood to include labour, materials, and services necessary to supply items or work referenced.

.2 Where the terms "Instructions" or "As Instructed" or "Where Instructed", are used herein, they shall be understood to mean as instructed by the Engineer including supplementary instruction notices and all comments made regarding submittals of Shop Drawings and samples for review.

.3 Where the term "Listed" is used herein, it shall be understood to mean that the materials or equipment have been tested in accordance with applicable standards and methods, have been approved and listed for the intended use by a testing authority which itself has been approved by the authorities having jurisdiction.

.4 Where the terms "Approved", or "Approval", are used herein, they shall be understood to mean approved by Authorities having jurisdiction as conforming to Codes, Standards, Bylaws, etc.

.5 Where the terms "Acceptable", or "Acceptance", are used herein, they shall be understood to mean acceptable to the Engineer as generally conforming to the requirements of the RFP Document.

.6 Where the term "Submit for Review" is used herein, it shall be understood to mean submit to the Engineer.

.7 Where the term "Subject to Review" etc. is used herein, it shall be understood to mean work shall be laid out for review by the Engineer. No work shall proceed until Instructions have been obtained from the Engineer. Submit further information, Shop Drawings, samples, etc. as specified and/or as may be reasonably requested by the Engineer.

.8 Where the term "Accessible" is used herein, it shall be understood to mean readily approachable by person or tools as required and where obstacles may be removed and replaced without cutting or breaking out materials.

1.2 Shop Drawings

.1 Refer to Section 01340 for the general requirements for Shop Drawings.

.2 In addition to the requirements of Section 01340, submit the following specific information with Shop Drawings:

(1) Assembly drawings showing details of connections and termination of equipment for connection by others.

(2) List of materials of construction, detailing the component parts and reference specifications (ASTM, CSA, ANSI, etc.).

(3) Motor operating data, including motor and insulation ratings, start-up and operating current ratings, operating voltage and amperage tolerances, and description of construction, complete with illustrative drawings.

(4) Gearbox and drive data, including AGMA/ABFMA ratings for components, materials of construction, tolerances and description of construction.

(5) Control schematics, text and wiring diagrams as required to describe control operations.

(6) Required ancillary services including but not limited to electrical, non-potable water and drains.

(7) Installation instructions indicating assembly and mounting requirements, alignment and assembly tolerances and points of connection for ancillary services.

(8) Start-up instructions including lubricant requirements, electrical requirements, etc.

(9) Details of coating systems to be applied.

(10) Details of insulation provided to prevent galvanic corrosion between mating surfaces constructed of dissimilar metals.

(11) A copy of the process and instrumentation diagrams, with addenda updates, that apply to the equipment marked to indicate special changes necessary for the supplied equipment. If no changes are required, mark the drawing(s) "no changes required".

(12) A copy of the related specification section with addenda updates, and all referenced sections with addenda updates, with each paragraph check marked to show specification compliance or marked to show deviations.

1.3 Temporary Usage

.1 Temporary usage by the RDOS of any process device, apparatus, machinery or equipment prior to interim or final inspection is not to be construed as acceptance.

1.4 Design Standards, Acceptable Products and Acceptable Manufacturers

.1 Equipment lists included in the specifications may be in two (2) parts. The first part is the "Design Standard" equipment items. The second part of the list is comprised of "Acceptable Manufacturers" if the equipment of a specific Supply Contractor is specified.

.2 The design has been based on the Design Standard. Quality of workmanship, dimensions, operating protocol, basic materials and ancillary services have been defined on this basis and incorporated in the design.

.3 Where Acceptable Products or Acceptable Manufacturers have been listed after a Design Standard, these products or ranges of products have been accepted by the Engineer as being capable of meeting the basic functional requirements of the equipment, but may not be the same as the Design Standard in detail. Provide all ancillary services, material upgrades, etc. as necessary to satisfy the quality requirements defined by the Design Standard. Make all minor changes in arrangement, piping and / or electrical connections, etc. as necessary to suit the requirements of the Acceptable Products or Acceptable Manufacturers.

.4 Where Acceptable Products or Acceptable Manufacturers have been listed, but no Design Standard is listed, these products or ranges of products have been accepted by the Engineer as being capable of meeting the basic functional requirements of the equipment. Provide all ancillary services and minor modifications to arrangement, piping and/or electrical connections, etc. as necessary to suit the functional requirements of the equipment.

.5 No additional payment will be made for revisions or alterations made to accommodate the equipment supplied.

1.5 Abbreviations

.1 The following abbreviations may be found in the Process Specifications:

BCBC	-	British Columbia Building Code
ABFMA	-	American Bearing Fabrication and Manufacturer's Association
AGMA	-	American Gear Manufacturer's Association
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standards Institute
ASTM	-	American Society for Testing and Materials
AWS	-	American Welding Society
BS	-	British Standard
CEMA	-	Conveyor Equipment Manufacturer's Association
CGSB	-	Canadian Government Standards Board
CSA	-	Canadian Standards Association
DIN	-	Deutsche Industrie Norm
EEMAC	-	Electrical Equipment Manufacturer's Association of Canada
ISA	-	Instrumentation Society of America
MSS	-	Manufacturer's Standardization Society of the Valve and Fittings Industry
NEMA	-	National Electrical Manufacturer's Association
NACE	-	National Association of Corrosion Engineer or Consultants
NFPA	-	Fire Protection in Waste Water Treatment and Collection Facilities
SSPC	-	Structural Steel Painting Council

PART 2 PRODUCTS

2.1 Spare Parts

.1 Any required spare parts shall be identified by the Supply Contractor, with a price list in accordance with Section F of Section 00301, Schedules.

2.2 Flanges and Pipe Threads

.1 Provide flanges on cast iron equipment and appurtenances that conform in dimension and drilling to ANSI B16.1, Class 125 and flanges on steel equipment and appurtenances that conform in dimension and drilling to ANSI B16.5, Class 150 otherwise specified.

.2 Provide pipe threads that conform in dimension and limits of size to ANSI B1.1, coarse thread series, Class 2 fit.

.3 Provide flange assembly bolts that are heavy pattern, hexagonal head, carbon steel machine bolts with heavy pattern, hot pressed, hexagonal nuts conforming to ANSI B18.2.1 and B18.2.2. Provide threads that conform to Unified Screw Threads, Standard Coarse Thread Series, Class 2A and 2B, ANSI B1.1.

2.3 Bearings

.1 Unless otherwise specified, provide oil or grease lubricated, ball or roller type equipment bearings, designed to withstand the stresses of the service specified. Rate each bearing in accordance with ABFMA Methods of Evaluating Load Ratings of Ball and Roller Bearings.

.2 Provide equipment bearings that have a minimum L-10 rating life of 50,000 hour, as determined using the maximum equipment operating speed, unless otherwise specified.

.3 Fit grease lubricated bearings, except those provided factory sealed and lubricated, with easily accessible grease supply, flush, drain, and relief fittings. Use extension tubes where necessary. Provide standard hydraulic alemite type grease supply fittings.

.4 Equip oil-lubricated bearings with either a pressure lubricating system or a separate oil reservoir type system. Provide each oil lubrication system to be of sufficient size to absorb the heat energy generated in the bearing under a maximum ambient temperature of 40°C. Provide a filler pipe and an external level indicator gauge.

2.4 Couplings

.1 For equipment with drives over 0.375 kW and less than 120 kW, and where the driver is directly connected to the driven unit, provide a flexible coupling. Couplings shall accommodate angular misalignment, parallel misalignment, and end float and shall cushion shock loads and dampen torsional vibrations.

.2 For larger couplings, provide continuous sleeve flexible gear type, forged steel couplings.

.3 Size each coupling as recommended by the coupling manufacturer for the specific application, considering applied power, speed of rotation, type of service and other pertinent details.

2.5 Guards

.1 On moving parts, provide sheet steel guards in accordance with workplace safety regulations. Fabricate of 14 gauge steel and galvanize after construction.

.2 Guards shall be removable to facilitate maintenance of moving parts.

END OF SECTION 11005

PART 1 GENERAL

1.1 Work Included

.1 Installation, including the supply of anchor bolts, and testing of equipment supplied under other sections in Division 13.

1.2 Related Requirements

.1 Section 01650 - Equipment Installation

.2 Section 01670 - Commissioning and Hand Over

.3 Section 11005 - Process General Provisions

1.3 Definitions

.1 Testing: In this Division, testing shall be defined as the operation of a specific item of equipment under actual and / or simulated conditions for the purpose of ensuring the equipment satisfies its basic design criteria. Testing for both RDOS supplied equipment and General Contractor supplied equipment shall be conducted by the General Contractor. All materials, labour, power and equipment required to conduct the tests shall be the Contractor's responsibility.

.2 Commissioning: In this Division, Commissioning shall be defined as the operation of equipment systems under actual and / or simulated conditions for the purpose of ensuring the system performs its intended functions.

1.4 Submissions

.1 The Supply Contractor shall check all the Shop Drawings relative to the equipment and materials, dimensions, measurements, size of members, type of materials, controls, list of equipment being supplied, names of manufacturers, and other details and be satisfied that they are correct and conform to the requirements and intent of the RFP Document.

PART 2 PRODUCTS

2.1 Equipment Schedule

.1 RDOS supplied equipment consists of sludge dewatering centrifuge as detailed in Shop Drawings submitted by the Supply Contractor. The General Contractor is responsible for installation, testing, commissioning and hand over.

.2 Determine the extent of equipment to be supplied from the Specifications, list of equipment and materials and Manufacturer’s drawings covering the equipment. All additional materials necessary to complete the installation shall be furnished and installed by the General Contractor.

2.2 Mounting Requirements

.1 Provide all supports, anchorage, and mounting of all equipment in accordance with the Supply Contractor recommendations, the NBC and industry standard requirements, unless otherwise specified.

.2 Provide all elements required to resist the calculated forces described herein.

.3 Design anchorage for all equipment bases, supports, and foundations in accordance with NBC for Seismic Zone 1.

2.3 Anchor Bolts

.1 All anchor bolts for permanently or intermittently submerged services shall be stainless steel.

.2 All other anchor bolts shall be galvanized or cadmium plated.

.3 Anchor bolts shall be sized to suit the equipment Manufacturers' requirements.

.4 The use of drilled expansion anchors for any equipment will not be allowed unless reviewed and accepted by the Engineer.

PART 3 EXECUTION

3.1 Coordination

.1 Coordinate the Work specified under this section with the Work of other sections to produce a complete and workmanlike job.

3.2 Preparation

.1 Before commencing installation of the Work, inspect and take field measurements and ensure that work carried out previously in the area is not prejudicial to the proper installation of the Work.

.2 Refer to the equipment Specifications for assistance in determining the form in which equipment is to be shipped and the extent of field assembly required.

.3 Schedule the visits to the site of the Manufacturer's Representative for the times and periods specified in other sections. Cooperate in supervision of the installation and start-up. Follow all reasonable instructions of the Manufacturer's Representative. Should the General Contractor require the Manufacturer's Representative to attend for longer or more frequent periods, the General Contractor shall arrange this, at no added cost to the RDOS.

3.3 Installation of Equipment

.1 All equipment as supplied by the RDOS, as noted, or shown on the Shop Drawings is to be installed by the General Contractor.

.2 Dimensions shown in the RFP Document for equipment bases, piping connections, and other appurtenances, are approximate and must be corrected by the General Contractor to suit the exact dimensions of the equipment provided for each application. Arrange any necessary modifications to piping connections or to pipework shall be arranged by the General Contractor at no added expense to the RDOS and must be accepted by the Engineer.

.3 Supply all necessary shims, gaskets, and other appurtenances, and all necessary lifting and loading equipment and tools, required to complete the installation.

.4 Where equipment is supplied with a plate steel base, provide access holes in the top of the plate and use a pour grade, non-shrink, non-metallic grout to fill the entire void under the base.

.5 For rotating equipment greater than 37kW and for equipment requiring structural anchoring, set anchor bolts in advance, using set anchor bolts in sleeves to permit minor adjustment during installation. Use machine base templates where shown.

.6 Prepare grout as specified in Division 3 and provide full contact with the equipment bases unless otherwise recommended by the equipment Manufacturer and accepted by the Engineer. The grout shall be neatly bevelled, formed or trimmed.

.7 Submit the proposed sequence of installation to the Engineer with the Shop Drawings.

(1) Demonstrate to the RDOS, Engineer and Supply Contractor the final alignment (hot or cold as applicable), no soft foot, no pipe strain.

(2) Extend any inaccessible lubrication points and lubricant drains to convenient locations. Remove storage lubricant and provide the initial fill of new lubricants for the equipment. Lubricant grade to be as recommended by the Manufacturer.

3.4 Alignment

.1 Set and align all rotating equipment in accordance with the more stringent requirements of either the Manufacturer's requirements or the following:

(1) Level base, use machinists level on all machine bases.

(2) Align couplings to plus/minus 0.05mm.

(3) Check for soft foot, maximum permissible 0.002mm.

(4) Where equipment undergoes a substantial differential temperature rise (30ºC between driver and driven unit), provide precision benchmarks in foundation and on equipment and perform alignment at operating temperatures.

3.5 Vibration Survey

.1 Carry out a vibration survey under normal operating conditions for all equipment with a motor size exceeding 37kW and for smaller units where specified.

.2 Monitor vibration in all three (3) dimensions at the head and tail end of both the driver and driven units, at intermediate bearing points, and at other critical locations which may be specified by the Engineer.

.3 Unless specified otherwise, use unfiltered velocities as the vibration criteria. Unfiltered velocities less than 5mm/s shall be considered acceptable. Undertake corrective action where unfiltered velocities exceed 5mm/s.

3.6 Noise Requirements

.1 The general requirement for any item of equipment shall be that it operates at a noise level less than 85dBA, when measured in free field at 1.0m. Noise requirements may be more stringent in areas where more than one item of process equipment is intended to operate concurrently.

.2 In any process area, the General Contractor shall recommend whatever measures necessary to maintain a composite noise level below 90dBA.

3.7 Quality Assurance Forms

.1 Test all process equipment to ensure it operates in accordance with the basic design criteria in the Specifications. The General Contractor will be required to have a series of forms completed which attest to the proper installation and functioning of the equipment. Refer to Section 01650 – Equipment Installation, for Form 101, Form 102 and Form 103.

END OF SECTION 11020

PART 1 GENERAL

1.1 Work Included

.1 The supply, delivery, installation support, testing and commissioning of one (1) horizontal, solid bowl, continuous feed, scroll type, high solids centrifuges, complete with electric motors, local control panel, auxiliary equipment, and accessories as specified herein.

.2 Provide a dewatering system complete with:

(1) Centrifuge machine

(2) Main drive

(3) Back drive

(4) Vibration isolation and seismic restraint systems

(5) Sludge cake and centrate discharge chutes

(6) Electric motor actuated sludge diverter gate

(7) Sludge cake and centrate sampling ports

(8) Spare parts and special tools

(9) Flexible pipe connection at sludge inlet and dewatered sludge outlet

(10) Local control panels complete with but not limited to variable frequency drives, disconnect switches, line and load reactors, PLC control, alarm horn and status indication light, E-Stop push button, Ethernet switches, 24 VDC power supply and local operator interface terminal (OIT).

(11) Sludge flow meter and spool piece sized to suit

(12) Foul-air connection port(s)

(13) All other components and ancillary devices required for a complete and operable installation

1.2 Design and Regulatory Requirements

.1 All supplied equipment shall be CSA approved.

1.3 Submittals

.1 Submit shop drawings, including electrical power and control schematics, instrumentation loop drawings and panel layouts in accordance with Sections 01300 and 01340.

.2 Provide a list of components and materials which will be shipped pre-assembled, and parts list for the other components and materials. Weights and physical dimensions shall be indicated for each part, assembly, and/or package to be shipped.

.3 Provide descriptive literature for all ancillary items of equipment including the following:

(1) Drawings showing connection points for feed sludge, flushing water and cooling water, foul-air, sampling and required field routing of piping to connection points indicated.

(2) Details of the vibration isolation and seismic restraint systems demonstrating compliance with Clause 2.5.9

(3) Empty and operating weights.

(4) Location and height of centres of gravity for all components mounted on separate bases.

(5) Certification that the centrifuge vibration isolation system meets the performance requirements of Clause 2.5.9

(6) Parts list with recommended list of spare parts.

(7) Factory test results.

(8) Control schematics showing interfacing to controls and motor control centre equipment.

(9) Electrical Motors

(10) Engineered Shop Drawings for all Local Control Panels

(11) VFDs

(12) PLC components

(13) Operator Interface Terminal

(14) Line and Load Reactors

(15) 24 VDC Power Supplies

(16) Terminals, Relays, Circuit Breakers and Fuses

(17) Ethernet Switches

1.4 Coordination

.1 Coordinate with other Divisions to ensure there are no conflicts in the work.

1.5 Shipment, Protection and Storage

.1 Ship all equipment pre-assembled, to the degree practical.

.2 Provide complete storage instructions indicating specific requirements necessary to prevent any weathering, corrosion, contamination, mechanical damage, freezing, or any other deterioration of components.

PART 2 PRODUCTS

2.1 Description

.1 Provide one (1) centrifuge to dewater sludges from the Okanagan Falls WWTP. The centrifuges are to dewater wastewater sludge derived from fermented primary sludge and thickened waste activated sludge. Primary sludge is gravity thickened in an activated primary clarifier, and WAS is thickened in a Dissolved Air Flotation (DAF) thickener. The WWTP does not include a grit removal process and typical municipal grit is expected in the fermented primary sludge. Dewatered cake from the centrifuge will drop directly into a sludge bin located below without the use of a conveyor.

.2 Provide PLC based control system to allow fully automatic unsupervised control of centrifuge and all ancillary components. The control system must be capable of interfacing with remote located pump controls and Plant Control System (PCS) based on hardwired signals and Modbus TCP Ethernet protocol. Coordinate with the Plant Control System Integrator and create a communication data map for the PCS Ethernet (Modbus TCP) data communication. The data map shall include but not be limited to all variables depicted in this document and ensure that all status indication parameters and alarms, set point and measured parameters and alarms as indicated in the Clause 2.6. The data map shall contain all commands, status feedback and setpoints to start and stop associated feed pumps and conveyors.

.3 Provide the latest version of the centrifuge PLC and OIT application files in electronic format on a memory stick and a print copy.

.4 Supply products modified as necessary by the manufacturer to provide the specified features and to meet specified operating conditions.

.5 Provide centrifuges capable of dewatering the feed sludge as described in 2.3.1.

.6 Provide centrifuges with scroll with adequate hydraulic and solids loading capacity to accommodate the sludge characteristics described in 2.3.1.

.7 The unit is to dewater continuously, or intermittently, without spillage of sludge or water beyond the machine envelope.

2.2 Acceptable Manufacturers

.1 Alfa Laval

.2 Andritz

.3 Pieralisi

.4 Haus

2.3 Capacities and performance

.1 Provide centrifuge equipment capable of optimum performance within the following:

Number of Units		One (1)
Operating Period	h/d	8
	d/wk	5
	h/wk	40
Design Conditions		
Solids Feed Rate	kg/h	102
Maximum Volumetric Feed Rate:		
Sludge	m^3/h	2.29
Dilute Polymer Solution	m^3/h	0.49
TOTAL	m^3/h	2.78
Ratio of (Thickened, Fermented Primary Sludge): (Thickened Waste Activated Sludge) (by weight)		25:75 (minimum) 34:66 (typical)
Thickened, Fermented Primary Sludge - % VSS/TSS (by weight) **		85
Thickened Waste Activated Sludge - % VSS/TSS (by weight) ***		80
Stabilization Prior to Dewatering		None
Chemical Precipitation		None
Performance Requirements		
Minimum Hydraulic Retention Time in Cylindrical Section of Bowl (*excluding conical section, based on maximum sludge feed rate only*)	seconds	21
Maximum Weir Depth		60% of bowl diameter
Minimum L:D		3
Minimum Solids Capture at peak solids loading and/or peak flow, each		95%
Minimum Cake solids by weight		20%
Maximum dry polymer usage at peak solids loading and/or	kg/T DS	12

Number of Units		One (1)
maximum flow, each		

**From gravity fermenter/thickener which is expected to include grit (no grit removal upstream).

*** From dissolved air flotation (DAF) thickener.

.2 For the purpose of this specification, solids capture is defined as:

C(F - E)/F(C - E) x 100

Where: C = percent dewatered cake solids (TS)
F = percent feed solids (TSS)
E = percent centrate solids (TSS)

.3 For the purpose of this specification, solids loading rate is defined as the peak solids production fed to a single centrifuge over an 8.5 hour period.

2.4 Materials

.1 All wetted parts unless otherwise specified: AISI Type 316 stainless steel.

.2 Bowl shell: AISI Type 316, 317 or 2205 stainless steel.

.3 Scroll: AISI Type 304 stainless steel with sprayed tungsten carbide, as a minimum.

.4 Feed and discharge compartment walls: Flame sprayed tungsten carbide.

.5 All bolts, nuts, washers: AISI Type 316 stainless steel.

2.5 Equipment Components

.1 General

(1) Provide centrifuge as a completely integrated unit designed for continuous and intermittent operation.

(2) Centrifuges shall be counter-current design.

(3) Polymer, in diluted form, will be pumped into the centrifuge feed sludge by variable speed positive displacement pumps.

(4) Dynamically balance each centrifuge prior to shipment.

.2 Bowl

(1) Provide solid bowl type centrifuges.

(2) The centrifuge bowl is a solid horizontal cylinder with a conical beach extension into which a scroll conveyor fits concentrically.

(3) Design the bowl to withstand all centrifugal forces encountered at the maximum bowl speed, with an adequate safety factor.

(4) Inspect all centrifugally cast components for cracks, shrinkage, porosity, or other defects by means of a liquid penetrant test.

(5) Certify that liquid penetrant tests were performed and the castings free of defects.

(6) Configure the centrifuge such that the pool depth is readily adjustable through the use of weir plates located at the large diameter end of the bowl.

(7) Design the weir plates to be readily accessible without the need to remove the centrifuge case top.

(8) Protect the bowl from wear by means of either a replaceable ribbed liner or longitudinal bowl strips.

.3 Main Bearings

(1) Design the centrifuge to be supported by two main bearings.

(2) Main bearings to be spherical or cylindrical roller bearings.

(3) Main bearings to be grease or oil lubricated.

(4) Design main bearings for an ABFMA L-10 rating life of at least 100,000 hours.

(5) House main bearings in one-piece or split-type pillow blocks.

(6) Bearings shall be complete with 0.25% accuracy 100 ohm platinum RTDs.

.4 Conveyor

(1) Independently mount scroll conveyor concentrically within the centrifuge bowl.

(2) Equip the scroll conveyor with helical flights protected from abrasion by the following:

(a) Protect the edge and face of the conveyor against abrasion from the solids discharge end of the conveyor through the feed port area.

(b) Provide sprayed on tungsten carbide on edges of scroll over a width of 30mm.

(c) Design abrasion protection for the conveyor flights for a minimum of 15,000 hours of operation before refurbishment or replacement is required.

(3) Design the scroll conveyor to rotate at a slight differential speed to the bowl.

(4) Support the scroll conveyor by grease lubricated ball or roller bearings.

(5) Design the scroll conveyor bearings for an AFBMA L-10 rating life of at least 100,000 hours.

.5 Conveyor Backdrive

(1) Drive the scroll conveyor by a squirrel cage induction motor operated by a variable frequency controller rated for constant-torque operation through a gear reducer.

(2) Mount the backdrive system on a base separate from the centrifuge base or mounted in-line below the gearbox/speed reducer.

.6 Backdrive: Constant-Torque Rated Variable Frequency Drive Controller Operated Squirrel Cage Induction Motor Backdrive Unit

(1) The backdrive system is to consist of a squirrel cage induction motor EEMAC torque rated for the load requirements, gear reducer, integral machine controls, and all appurtenances required to provide a complete, mechanical system.

(2) Gear Reducer

(a) Equip each centrifuge with a two-stage planetary gear / cyclo speed reducer that controls the differential speed between the centrifuge bowl and the scroll conveyor.

(b) Design the gear/speed reducer units with a torque capacity required to meet the specified service conditions with an adequate factor of safety.

(c) Select appropriate gear reduction ratio as required to perform under the specified service conditions.

(d) Design gears in accordance with AGMA Class 10 and Class 11 quality requirements.

(e) Case harden and grind the sun and planetary gears.

(f) Provide self contained gear lubrication using high performance gear oil.

(g) Balance the gear box/speed reducer independently of the centrifuge.

(h) Provide the gear reducer with independent protection from high torque overload.

(i) A thermal overload protection system on the drive motor does not provide sufficient protection and is not acceptable for independent protection of the gear reducer.

(3) Design the backdrive system to provide infinite speed variation between the scroll conveyor and the bowl of the centrifuge.

(4) Allow for operation of the backdrive system in conjunction with the operation of the centrifuge in either a manual or automatic control mode.

(5) Provide monitoring of the backdrive torque loading and initiate shutdown of the centrifuge feed pumps upon detection of excessive torque, allowing a flushing and/or clearing of the internal solids inventory.

(6) The centrifuge feed pumps are manually restarted after a flushing cycle. Controls to allow feed pump to start automatically after a flushing cycle, and initiate a shut-down sequence if flushing cycle occurs 4 times within a 60 minute period.

(7) In the event torque continues to increase, provide for centrifuge and feed system shutdown. Apply a brake to the pinion shaft to increase the conveyor's differential speed to a maximum to scroll the excess solids from the centrifuge as it coasts down.

(8) Mount the backdrive system controls in the centrifuge Main Motor Control Panel.

(9) Backdrive system controls consist of the pinion speed and torque indicators, speed adjustment potentiometers, and a forward/reverse direction selection switch.

(10) Design the backdrive control system to be capable of full four-quadrant control and operation, and rapid switching between modes to maintain the specified speed requirements.

(11) Backdrive Motor

(a) Provide TEFC energy efficient, horizontal, severe service duty backdrive motor rated for continuous operation at 600 VAC, 3 phase, 60 Hz.

(b) Motor rated for Supplier's standard speed at an altitude of 350m at 40°C ambient.

(c) Provide a non-contact RPM transducer (optical), or as normally provided by the Supplier compatible with the PLC input requirements.

(d) Provide motors with grease lubricated anti-friction ball bearings with a minimum AFBMA L-10 rating life of 60,000 hours.

(e) Connect backdrive motor to the pinion shaft of the differential gearbox through a V-belt drive or a cog belt.

(f) Backdrive shall be started by means of a variable frequency drive.

.7 Main Drive Motor

(1) Provide TEFC energy efficient, horizontal, main drive motor rated for continuous operation at 600 VAC, 3 phase, 60Hz.

(2) Main Drive Motor will be started by means of a variable frequency drive.

(3) Equip the Main Drive Motor stator windings with a minimum of three thermistors (one in each phase).

(4) Motor rated for Supplier's standard speed at an altitude of 350 m at 40°C.

.8 V-Belt Drive

(1) Configure the centrifuge main drive to be V-belt driven.

(2) Design the V-belt drive to allow for relative movements caused by the vibration isolation of the main drive base and the centrifuge base if separate equipment bases are used.

.9 Vibration Isolation

(a) Provide each centrifuge decanter and main drive with vibration isolators.

(b) Centrifuge decanter and main drive can be mounted on a common base and provided with vibration isolation, or mounted on separate bases and isolators. Common base configuration is preferred.

(c) Provide 95% isolation efficiency.

(d) Provide vibration isolation equipment and devices by a single manufacturer with the exception of vibration isolators that are factory installed and standard equipment with the machinery.

(e) Size isolators at the manufacturer's optimum recommended loading. Do not load isolators above the limit specified in the manufacturer's literature.

(f) Provide a balanced set of isolators for each piece of equipment. Select all isolators in accordance with equipment weight distribution to provide the minimum static deflections stated above.

(g) Meet the minimum static deflection specified in the final installation, with each isolator having no less than 80% of the static deflection specified.

(h) Mark code numbers and colours on shop drawings, on each isolator, and on each base to ensure proper placement. Clearly tag all springs to show undeflected height and static deflection.

(i) If more than one type of neoprene element is used, clearly identify the durometer of each.

(j) Provide spring mounts complete with levelling devices, minimum 6mm thick neoprene sound pads, and zinc chromate plated hardware.

(k) Size neoprene sound pads for a minimum deflection of 1mm. Use dynamic stiffness for sizing elastomers and do not exceed 50 durometer.

(l) Maintain a nominal 50mm clearance below the equipment and the bases.

(m) Provide flexible piping connectors meeting the operating requirements, including nature of material, temperature, and pressure conditions, as well as the following requirements for vibration isolation:

(i) Provide flexible piping connectors as per manufacturer's standard for the intended service.

(ii) Mould and cure flexible piping connectors in hydraulic rubber presses.

(iii) No steel wires or rings are allowed as pressure reinforcement.

(iv) Provide straight connectors with two spheres. Neoprene elbows manufactured with a single sphere forming the corner of the joint itself.

(v) Provide specification data and shop drawings for proposed alternate connectors for approval, if the requirements of this clause cannot be met due to the nature of the material conveyed.

2.6 Controls and Control Panel

.1 General

(1) Provide the dewatering centrifuge system with one Local Control Panels (LCP), NEMA12 – Electrical Panel and NEMA 4X (stainless steel) – OIT Panel rated, including a programmable logic controller (PLC) and operator interface terminal (OIT).

(2) The centrifuge PLC shall have an Ethernet communications port and use the Modbus TCP protocol. The PCS will control the Ethernet communication with the centrifuge PLC. Both systems must have a hartbeat bits to confirm the communication. The critical signals START/STOP, conditions and general alarm status can be hard-wired to the PCS system. Same for the external flow pacing signal from/to centrifuge panel (analog 4-20mA).

(3) Control of the centrifuge and ancillary equipment shall be accomplished using a local vendor-supplied PLC located in the centrifuge LCP. The use of separate controllers or processors for drive control operation is not acceptable.

(4) The PLC shall be the latest versions of the Schneider Modicon M340 series hardware:

(a) CPU module: BMXP342020

(b) Digital Input module: BMXDAI1614

(c) Digital Output module (relay): BMXDRA0805

(d) Analog Input Module: BMXAMI0410

(e) Analog Output Module: BMXAMO0210

(f) Ethernet module: BMXNC040

(g) All I/O modules to be provided with the associated terminal strips and M340 20 Pin Std. screw IO module connector (BMXFTB2010)

(5) The Operator Interface Terminal (OIT) shall be minimum , Schneider Magelis XBT GT6330 12.1" Colour TFT Touch screen with 800x600 resolution, built-in Ethernet port (Modbus TCP communication protocol), USB port, 1GB compact flash disk capable to log and historically trend process data..

(6) The Ethernet switch shall be N-TRON with minimum of 4 RJ45 ports.

(7) PLC and OIT TCP/IP addresseswill be provided to the supplier with the approved shop drawing package.

(8) PLC program shall be stored within an EEPROM or similar technology memory device on board the PLC. In the event of a failure or loss of memory of the PLC the control program shall be automatically restored from the memory module on power up of the PLC.

(9) PLC software shall be developed by Schneider Unity Pro programming software. Original copies of the PLC program code are to be provided on with a memory stick with a hard copy of the PLC programs and mapping of the memory registers.

(10) Design the control panel to provide control and monitoring functions for all related ancillary equipment for the dewatering process including but not limited to solenoid flush valves. Control of sludge feed pumps, polymer feed pumps, will be provided by the Plant Control System (PCS) in response to remote requests from the centrifuge PLC.

(11) Variable Frequency drives for three (2) sludge feed pumps and one (1) polymer feed pump (supplied by others) shall be located inside the plant MCC. Isolated dry contacts for the start and stop of the sludge feed pumps and polymer feed pump (i.e. "feed permissive" contacts) shall be provided in the LCP.

.2 Electrical Control Panel

(1) The centrifuge control panel shall be an EEMAC 12 freestanding enclosure. The panel shall include a through the door operated main disconnect that can be locked in the off position. Main power components shall consist of variable frequency drive controllers with short-circuit and overload protection for bowl and scroll motors. It shall include a common DC Bus to utilize regenerated energy from the scroll motor for powering the bowl motor. The panel shall operate from a 600V AC, 3 phase, 60 Hz service and shall also include a control power transformer for auxiliary components. Main control components shall consist of: programmable logic controller, control relays, and terminal points for interconnection with ancillary equipment. An Industrial RAS Server, N-Tron 102RAS shall be included in the panel and connected to the Ethernet Switch for remote diagnostics, data transfer and online analysis. Door mounted

components shall consist of illuminated selector switches and mushroom head maintained emergency stop.

(2) VFDs shall be Schneider Altivar series or engineer approved alternate with equal performance.

(3) Provide phase loss and lightning/voltage surge protection device for the panel.

(4) Control voltage shall be 120V AC.

(5) Provide selector switches, pilot lights, pushbuttons, potentiometers and similar pilot devices for ease of operation and trouble shooting.

(6) Provide a local mushroom head maintained emergency stop for the centrifuge on the field OIT panel wired in series with the main LCP panel emergency stop.

(7) The panel shall be constructed to CSA and UL 508 requirements, designed and built to provide the necessary components to safely run and control the centrifuge, two sets of sludge feed pumps (each set in a duty/standby arrangement) and one polymer pump.

(8) An elapsed time meter shall be supplied and will be of six (6) digit, non-reset, register type with the last digit reading in tenths of an hour for the main motor and scroll motor suitable for LCP panel door mounting.

(9) Provide all motor controllers for AC induction motors with integral thermal overload protection and motor circuit protection.

(10) All components in the control panel will be completely factory wired. All external control connection points will terminate on a terminal strip. There will be a minimum of 10% spare terminal connections supplied.

(11) Pushbuttons and pilot lights will be watertight, corrosion resistant.

(12) Provide the panel with fault monitoring and alarm annunciation system complete with interlocks to related systems for system shutdown and run enable functions.

(13) Pilot lights will be supplied with appropriate coloured lens caps.

(14) Control wire shall be #14 AWG minimum: will conform to cU.L. standards 600VAC rated and shall be type THW or MTW. Power wiring will sized as required, minimum #12 AWG and 1000VAC rated.

(15) A ground lug will be supplied on the panel.

(16) Each wire segment will be numbered at each end.

(17) Nameplates will agree with the wiring diagram.

.3 Operator Interface Control Panel

(1) The centrifuge operator interface control panel shall be an NEMA 4X (Stainless steel) wall mount enclosure. The panel shall operate from a 120V AC, single phase, 60 Hz service. Main control components shall consist of: operator interface terminal, alarm horn, alarm strobe, E-Stop push button and control relays, and terminal points for interconnection with ancillary equipment. Door mounted components shall consist of illuminated selector switches, mushroom head maintained emergency stop, and operator interface terminal (OIT).

(2) Provide selector switches, pilot lights, pushbuttons, potentiometers and similar pilot devices for ease of operation and trouble shooting.

(3) Provide a local mushroom head maintained emergency stop

(4) Control wire shall be #14 AWG minimum: will conform to cU.L. standards 600VAC rated and shall be type THW or MTW. Power wiring will sized as required, minimum #12 AWG and 1000VAC rated.

(5) Pushbuttons and pilot lights will be watertight, corrosion resistant.

(6) Provide the panel with fault monitoring and alarm annunciation system complete with interlocks to related systems for system shutdown and run enable functions.

(7) Pilot lights will be supplied with appropriate coloured lens caps.

(8) A ground lug will be supplied on the panel.

(9) Alarm horn and LED alarm flashing beacon

(10) Each wire segment will be numbered at each end.

(11) Nameplates will agree with the wiring diagram.

.4 Control System Operation

The operational procedure of the centrifuge shall be engineered such that minimal operator interaction is required. Each function shall be initiated with the push of its own button at the OIT. Under alarm or "emergency stop" conditions, the shut down sequence shall be automatically triggered. The following is a step-by-step description of the sequence of operations.

(1) The centrifuge will be enabled / disabled by the PCS via Ethernet communication and/or a dry contact closure signal (relay form C or through PLC).

(2) The centrifuge will be started from the centrifuge OIT by depressing the centrifuge “START” button, thereby flashing the centrifuge "starting/running" light. The polymer and feed systems will be interlocked with the centrifuge controls to prevent their operation at this time.

(3) During start-up, the back-drive will be automatically set to a minimum speed to provide maximum scrolling of residual solids from the bowl. After a preset, timed interval, during which the bowl has reached full operating speed, the "starting/running" light will stop flashing and come on solid. The system checks the bowl speed and indicates that it is ready for operation assuming that no fault conditions exist.

(4) “Feed permissive” signal (relay and through PCS Ethernet) signals will be provided to permit the Operator to initiate sludge and polymer feed to the centrifuge through the PCS. As process requirements vary, the backdrive speed will be infinitely adjustable via the touch pad on the "Operator Interface Terminal (OIT)" unit, which will maintain the set speed utilizing a closed loop under differential speed feedback system.

(5) The centrifuge PLC monitors the operation of the centrifuge and provides a digital display of bowl speed, scroll speed, differential speed and torque, as well as other operational parameters on the OIT. The differential speed will be controlled either by a differential speed set point or a torque set point. While operating with a torque set point, the differential speed is automatically adjusted to maintain a constant torque; thereby, compensating for varying feed characteristics while optimizing residence time and separation. Set points for the differential speed and torque are entered via a numeric key pad/touch screen. In the fixed differential speed mode, the back-drive speed will be maintained while the torque is allowed to vary as process parameters change.

(6) After stable operation has been achieved, the auto-torque mode may be selected. In this mode, the back-drive torque will be maintained while the speed is allowed to vary, within preset limits, in order to maximize residence time. If torque begins to rise above the set point, the differential speed will be increased to scroll solids out of the bowl at a faster rate, thereby lowering the torque back to the set point.

(7) The shut down sequence shall be triggered either with a single push of the "STOP" button, via a fault condition or via the centrifuge enable/disable status used by the PCS. In any case, the system will disengage the sludge feed and polymer feed systems (using the “feed permissive” contacts), initiate the automatic flush cycle and disengage the main motor. The flush cycle shall consist of flushing the bowl with plant water during the deceleration of the bowl. Concurrently, the scroll continues to convey solids to the discharge ports and out of the bowl.

(8) Provision shall be made for a pause mode of operation where the centrifuge will continue to run while the sludge and polymer feed pumps are stopped. This mode of operation will allow the cake receiving truck to be changed (approximately a 15 minute delay).

(9) Provision shall also be made for a programmed shutdown based on sludge production target achieved or set timer/ time.

(10) The back-drive will automatically be de-energized at the end of the deceleration by a shutdown timer.

(11) Controlled Shutdown Sequence will consist of:

(a) Sludge feed pumps and polymer feed pump stopped.
(b) Main motor shut off allowing bowl to begin decelerating
(c) Water flush system timer started.
(d) Water flush system on.
(e) Timer for `scroll motor to stop' initiated.
(f) Water flush timer times out.
(g) Water flush system off
(h) Bowl decelerates to stop.
(i) Timer for “scroll motor to stop” times out.
(j) Scroll motor shuts off allowing scroll to decelerate and stop.

(12) Emergency Shutdown:

(a) The Emergency Shutdown (initiated either by the Emergency Stop push-button or by system alarms) will shut down the equipment simultaneously without going through the controlled shutdown sequence. After the condition is cleared and emergency stop push-button de-energized, the system shall require a safety-check and restarting by the operator. All start-up after an emergency shut-down will start with a cleaning (CIP) cycle with a pre-defined time.

(13) Equipment alarms:

(a) *High Torque, high current, high vibration or high bearing temperatures* will stop the polymer feed system and sludge feed pumps, alarm at panel and start bowl flush timer sequence. The scroll differential speed is also increased to maximum. When torque high alarm clears, bowl flush water sequence stops and the scroll differential speed resumes normal operation. Polymer feed system and sludge feed pumps can then be restarted.

(b) *Torque high-high, high-high vibration or high-high bearing temperature* will initiate the controlled shut down sequence and alarm at panel. After condition is cleared, operator to clear alarm via alarm reset push-button

(c) *Speed indication low* will initiate controlled shutdown and alarm at control panel.

(d) *Low relative/differential speed* will initiate controlled shut down sequence and alarm at panel. After condition is cleared, operator to clear alarm via alarm reset push-button

(e) *Thermal overload trip* on main motor will initiate emergency shut down sequence and alarm at panel. After condition is cleared, operator to clear alarm via alarm reset push-button.

(f) *Thermal overload trip* on scroll drive will initiate Emergency shut down (all pieces of equipment simultaneously). After condition is cleared, operator to clear alarm via alarm reset push-button.

(g) *High-high current* on the back-drive will initiate Emergency shut-down. After condition is cleared, operator to clear alarm via alarm reset push-button.

.5 Control functions on front of control panel shall, as a minimum, include:

(1) Start/Stop, on/off controls of:

(a) Panel/Remote Mode Select
(b) Automatic Start-up
(c) Automatic Shutdown
(d) Centrifuge Drives
(e) Wash Water Solenoid Valve
(f) Alarm Reset
(g) Bin Change Mode
(h) Acoustic Alarm

(2) OIT status indication for:

	Status
(a) Automatic Start-up	"Starting up in Auto"
(b) Automatic Shutdown	"Shutting down in Auto"
(c) Centrifuge	"Running"
(d) Wash Water Solenoid	"Open/Closed"
(e) Polymer System	"Running"
(f) FPS Feed Pump	"Running"
(g) TWAS Feed Pump	"Running"
(h) Polymer Feed Pump	"Running"

	Alarms
(i) Emergency Stop	"Fault"
(j) Bowl Drive VFD	"Fault"
(k) Bowl Drive Motor Thermal	"Fault"
(l) Back Drive VFD	"Fault"
(m) Back Drive Motor Thermal	"Fault"
(n) Back Drive High Torque	"Warning"
(o) Back Drive High Amps	"Warning"
(p) Back Drive High-High Torque	"Fault"
(q) Back Drive High-High Amps	"Fault"
(r) High Vibration	"Warning"
(s) High-High Vibration	"Fault"
(t) Low Relative/Differential RPM	"Fault"
(u) Bowl Locked	"Fault"
(v) Polymer System	"Fault"
(w) Sludge Feed Pumps	"Fault"
(x) Polymer Feed Pump	"Fault"
(y) Screw Conveying System	"Fault"
(z) High Bearing Temperature	"Warning"
(aa) High-High Bearing Temperature	"Fault"
(bb) Low/No Sludge Flow rate	"Fault"
(cc) Low/No Sludge Flow rate	"Fault"

Provide bypasses for all the above alarms in a password protected screen. Each by-pass must be automatically reset after a certain amount of time programmable through the OIT. This is to avoid any accidental permanent bypasses.

(3) Set point and measured parameter display of:

(a)	Bowl Speed	"RPM"
(b)	Back Drive Speed	"RPM"
(c)	Back Drive Torque	"Percent"
(d)	Relative/Differential Speed	"RPM"
(e)	Bowl Speed Set Point	"RPM"
(f)	Back Drive Torque Set Point	"RPM"
(g)	Relative/Differential Speed Set Point	"RPM"
(h)	Vibration	"mm/sec"
(i)	Centrate side main bearing temperature	Deg. C"
(j)	Cake side main bearing temperature	"Deg. C"
(k)	Main Drive Current	"Amps"
(l)	Back-drive Current	"Amps"
(m)	Back-drive temperature	"Deg. C"

.6 Alarms:

(1) Alarm conditions shall be indicated with flashing red indicators on the OIT alarm screen and shall cause alarm horn to sound and beacon to flash. Operator acknowledge pushbutton will silence horn and cause indicator lights and beacon to be steady on until alarm condition is cleared. Operating reset button will clear latched alarms. When no alarms remain present system start-up shall be allowed. When no alarms are present the OIT shall be indicate so by displaying alarm indicator text in green.

(2) Following conditions shall immediately shutdown the complete system in auto or manual:

(a) Emergency stop pushed
(b) Bowl drive VFD fault
(c) Bowl motor thermal overload trip
(d) Back drive VFD fault
(e) Back drive motor high temperature
(f) Back drive high-high torque
(g) Back drive high-high current
(h) High-High vibration
(i) Low relative/differential speed
(j) Bowl lock
(k) High-High bearing temperatures

(3) Following conditions shall shutdown polymer and sludge feed in auto mode:

(a) High vibration
(b) Back drive high torque

(c) Back Drive high current
(d) Main drive high current
(e) Polymer system fail
(f) Sludge feed system fail
(g) Conveyor system fail
(h) High bearing temperature
(i) Bin full mode
(j) Bin change mode

High vibration, high torque or high back-drive conditions will initiate a flush sequence the duration of which is operator adjustable through the OIT. If three consecutive high vibration, high torque or high back-drive current alarms occur within a one hour time limit an auto shutdown sequence shall be initiated.

.7 Clean-In-Place (CIP):

(1) Provide a clean-in-place cycle that is manually initiated from the local control panel.

(2) Clean-in-place cycle includes provisions for rotating the scroll conveyor in either or both forward and reverse directions at timed intervals.

(3) During the cleaning cycle, flushing water is automatically introduced at high rates.

(4) An auto stop shall automatically initiate the CIP.

2.7 Protective Coatings

.1 Shop prime and paint all equipment.

2.8 Spare Parts

.1 Provide the following spare parts for each centrifuge:

(1) One set main bearings and seals

(2) One set scroll bearings

(3) One set O-rings

(4) One thrust bearing

(5) One thrust bearing seal and lockwasher

(6) One spare set of belts of each size required

(7) Lube oil/grease for one year

.2 Provide the following special tools:

(1) One set disassembly tools

(2) One bearing puller

(3) Bowl/conveyor lifter and all special maintenance tools

PART 3 EXECUTION

3.1 Manufacturer's Representative

.1 Arrange for a technically qualified Manufacturer's Representative to attend the installation work, train operating and maintenance staff and undertake the testing of the system for sufficient periods to ensure the equipment is installed, operated, and maintained in accordance with the Manufacturer's recommended procedures.

.2 The minimum periods of site attendance are identified in the following table along with the Form to be completed on each of these trips. A "day" is defined as eight working hours on site.

Item	Description	No. of Days per Trip	Form
1	Equipment Delivery	0.5	100
2	Installation Assistance (combined with Item 1)	0.5	101
3	Witnessing of Equipment Installation	1	102
4	Operator and Maintenance Training (combined with Item 3)	1	T1
5	Equipment Performance Testing	3 + 5	103
6	Process Performance Testing	1	104
7	Operator and Maintenance Training (combined with Item 6)	1	T2
8	Follow-up Inspection (Optimization)	2	-
9	End of Warranty Inspection	2	-

.3 The total number of trips will depend on the Contractor's schedule. The cost of additional trips, to be determined by the Engineer, will be borne by the Contractor.

3.2 Installation

.1 The Supplier's Representative shall verify satisfactory delivery of the equipment by completing Form 100, illustrated in Section 01650.

.2 The Supplier's Representative shall instruct the Contractor in the methods and precautions to be followed in the installation of the equipment. Certify the Contractors' understanding by completing Form 101, illustrated in Section 01650.

3.3 Installation Witnessing

.1 The Contractor shall ensure the equipment is installed plumb, square and true within the tolerances specified by the Supplier and as indicated in the Contract Documents.

.2 The Contractor shall ensure that the equipment is installed as required to provide satisfactory service.

.3 The Supplier's Representative shall cooperate with the Contractor to deliver a successful installation as documented by Form 102 illustrated in Section 01650.

3.4 Performance Testing

.1 The Supplier's Representative shall ensure the equipment, including all component parts, operates as intended. The testing procedure is set out in Section 3.5.

.2 The Supplier's Representative shall cooperate with the Contractor to test the equipment as documented by Form 103, illustrated in Section 01650.

3.5 Equipment Performance Testing Procedure

.1 General

(1) Except as modified by this section, conduct testing in accordance with the general requirements of Section 01650.

.2 Start-up

(1) Submit a detailed start-up procedure for approval.

(2) Provide site services of the centrifuge Supplier's Representative for the tuning, monitoring, inspecting, and starting of the centrifuge during the entire start-up procedure.

(3) Start-up Procedure:

(a) Tune and adjust the centrifuge to begin initial start-up

(b) Unless otherwise specified, sludge, polymer, water, and electric power will be provided for the start-up period

(c) Subsequent to proper tuning, perform an initial thorough inspection of all system components, including electrical and instrumentation controls

(d) Recommend suitable dry polymer for the given sludge conditions

(e) Subsequent to initial inspection and check-out, operate the centrifuge for a minimum period of 18 hours of continuous operation (3 days at 6 hours/day), or as feasible with the sludge inventory in the plant

(f) The initial start-up procedure is deemed complete if no malfunctions occur during the 18 hours of continuous operation

(g) If malfunctions occur during the 18 hours of continuous operation, perform and complete corrective action within 48 hours and restart the centrifuge for a minimum of 18 hours of additional continuous operation

(h) The start-up procedure is then deemed complete if no malfunctions occur during the 18 hours of continuous operation. Form 102 will be signed upon the successful completion of the 18 hour test period.

(i) If malfunctions occur during the 18 hours of continuous operation, terminate the stirrup period and perform and complete corrective action within 48 hours prior to requesting an additional start-up test

(j) If an additional start-up is necessary, follow the procedures outlined above

.3 Testing

(1) Submit a detailed procedure and schedule for approval

(2) Begin testing only after completing the start-up procedure.

(3) Unless otherwise specified sludge, polymer, water, and electric power will be provided for the testing period.

(4) The procedure for testing is as follows:

(a) Operate the centrifuge for 6 continuous hours per day for a period of 5 consecutive calendar days

(b) Demonstrate that the centrifuge performance during the testing period meets or exceeds the minimum performance requirements defined in these specifications.

(c) In the event of unacceptable performance, perform any supplemental testing, analysis, equipment adjustments, modifications, changes, or additions and request a retest of the unacceptable system at no additional cost.

.4 Sampling and Analysis

(1) Samples will be collected by the Supplier and analyzed by AECOM and RDOS staff during the testing period. Samples will be tested in accordance with the following:

(a) Centrifuge feed sludge: Total suspended solids (TSS); Volatile suspended solids (VSS); and Total solids (TS)

(b) Centrate: TSS

(c) Dewatered sludge cake: TS

(2) Representative samples will be collected for analyses every one hour during the testing.

(3) In addition, centrifuge feed sludge instantaneous and cumulative flow rates, polymer usage, power usage, torque, and any other parameters necessary to demonstrate compliance with the performance requirements specified will be recorded.

(4) Submit a report summarizing the operating parameters assessed during the test period, recommending optimal setpoints and listing final testing data in concise tabular form at the conclusion of the test period.

(5) Upon the successful completion of the testing procedure, Form 103 will be signed.

3.6 Commissioning

.1 Contractor and Manufacturer's Representative to be in attendance during commissioning of the process system that includes the equipment specified in this section to ensure the equipment functions as intended in the process system as documented by **Form 104**. Cooperate with the Commissioning Team in developing the Commissioning Plan for this equipment. Provide assistance as required for system programming, start-up and troubleshooting. Conform to the requirements of Section 01670.

3.7 Training

.1 The Supplier’s Representative shall provide training to the Owner’s Designated Staff in the proper operation and maintenance of the equipment as documented by **Forms T1** and **T2**.

3.8 Follow-up Inspection (Optimization)

.1 After a period designated by the Owner (approximately 6 months after commissioning), a qualified Supplier’s Representative shall visit the site to assist the plant staff in optimizing the centrifuge performance.

3.9 End of Warranty Inspection

.1 After a period designated by the Owner (approximately 24 months after commissioning), a qualified representative will provide a follow-up inspection of the centrifuge installation.

.2 During this period, the following services will be performed by the centrifuge manufacturer’s technical representative at their expense in the presence of designated plant staff:

(1) Replace the main bearings;

(2) Remove the scroll for inspection; and

(3) Optimize and adjust the centrifuge, as requested by Owner's Designated Staff.

END OF SECTION 11610

PART 1 GENERAL

1.1 Acceptable Manufacturers

.1 General Electrical

.2 US Electric

.3 Toshiba

.4 Baldor

.5 Siemens

.6 Allen Bradley

PART 2 PRODUCTS

2.1 Motors

.1 The exposure classification for each motor is specified with the related equipment.

(1) Motors installed in high hazard areas, which are intended to continue running when dangerous gases are sensed, shall be TEXP, minimum. When driven by VFD, they shall have integrated 120 VAC rated thermal switch for high temperature protection.

(2) All other motor enclosures to be TEFC unless otherwise indicated.

.2 Motors less than 0.37 kW or less to be 120 V, 60 Hz, single phase service, and all motors 0.56 kW or greater to be 600 V, 60 Hz, three phase service.

.3 All 3 phase motors to be Class F insulation with Class B rise, service factor of 1.15 at 40 ºC ambient, high efficiency and high power factor.

.4 Motors shall be designed for full voltage starting and capable of running successfully when the voltage is + 10% to – 10% of nameplate voltage.

.5 Motors shall have the capacity sufficient to operate the driven load and associated devices under all conditions of operation without overloading. They shall not be smaller than the kW rating shown on the equipment specification sheets.

.6 Provide adequately sized, diagonally split, gasketted, EEMAC 4 terminal boxes complete with threaded hub for conduit entry, suitable for Class 1 Div 2 service.

.7 Provide a ground connection and lifting eyes or lugs.

.8 Provide positive temperature co-efficient thermisters for all motors over 56 kW (75 hp). One thermister should be provided for each phase, factory embedded into the motor windings.

.9 The thermisters shall be compatible with the thermister protection relays provided by others. Relays shall be Siemens No.3UN6 or similar.

.10 Two speed motors shall be two winding design.

.11 Ensure that motors used with variable speed drives have adequate cooling capacity when operating through the entire speed range capacity of the drive. If required, the additional cooling fan motor shall be single phase 120VAC.

.12 Motors powered by AC Adjustable Speed Drives (Inverter Grade)

(1) Motors will be designed for use on generic PWM waveform to meet NEMA MG1, Part 31, Section 31.40.4.2.

(2) Motors shall be capable of operating at variable torque load over a 5:1 speed range.

(3) Motors will be marked to CSA C22.2 No. 100-95 clause 12.4 and have in addition to the normal motor marking:

(a) Motor application (e.g. Inverter-duty);

(b) Speed range over which the machine is designed to operate;

(c) Type of torque application for which the machine is designed e.g. VT (variable torque), CT (constant torque), Chp (constant horsepower) or equivalent);

(d) Type of inverter it is designed for e.g. PWM (pulse width modulated)

PART 3 EXECUTION

3.1 Installation

.1 All motors are to be supplied as an integral component of some other item of equipment. The Manufacturers' Representative of that equipment shall be responsible for the supervision of installation, site testing, and commissioning of the motor as part of the equipment as specified in other sections. The motor manufacturer shall inform both the Manufacture Representative for the equipment and the General Contractor of requirements for the motor, installation, testing and commissioning.

.2 Confirm coordination required, final connections, loads and locations of motors, prior to installation.

.3 Motors for mechanical equipment installed by that trade. Location of motors, conduit and connection points shown for equipment supplied by the mechanical trade are for estimating purposes only.

.4 Provide line voltage and signal connections for all mechanical equipment.

.5 Use liquid tight flex for all motor connections from conduit systems.

.6 Check motors for correct rotation.

.7 Confirm proper nameplate markings before hooking up motors intended for use with AC variable speed drive.

.8 Confirm that two speed motors are of the isolated, two winding design. If not isolated winding advise Owner and do not terminate.

END OF SECTION 16150