

**PROPOSAL FORMS 3 & 4, AND EQUIPMENT DATA SHEETS – 50 kW Francis**

**PROPOSER:** \_\_\_\_\_

**PROPOSAL DATE:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

**PART 1 - GENERAL**

1.0.1 This Proposal is submitted to Three Sisters Irrigation District (“District”) at the office of the District as follows:

**Proposal Due: Tuesday, July 9, 2019 at 2:00 p.m. (Pacific Time)**

**Hand Delivery/Overnight Mail (Fed Ex or UPS) – No USPS Deliveries Accepted**

The following identification information **must be clearly displayed** on the outside of the package:

**RFP: TSID McKenzie Reservoir Hydroelectric Project – Supply, Startup and Testing of Turbine, Generator, Controls and Associated Equipment**

**Submitted: July 9, 2019 2:00 pm**

Proposals must be submitted to:

**Three Sisters Irrigation District  
Contracts/Purchasing  
68000 Hwy 20 West  
Bend, OR 97703**

1.0.2 The undersigned Proposer proposes and agrees, if this Proposal is accepted, to enter into an Agreement with the District, on the form included in the Contract Documents, to complete all Work as specified or indicated in the Contract Documents for the Total Proposal Price presented, within the Contract Period, and in accordance with the terms and conditions of these Contract Documents, with the exception of any deviations specifically identified as exceptions thereto, as more fully set forth in Section 17 of the Information for Proposers.

1.0.3 The Proposer accepts all of the terms and conditions of the Information for Proposers. This Proposal shall remain subject to acceptance for **65 days** after the actual Proposal opening date. The Proposer will agree to sign the Agreement and submit it with the indicated **Performance Security, evidence of required insurance and other required documents within 10 days** after the date of the District's Notice of Award.

1.0.4 In submitting this Proposal, the Proposer represents that:

- A. The Proposer has examined copies of all the Contract Documents and of the following Addenda; receipt of which is hereby acknowledged:

<b>Addendum No.</b>	<b>Dated</b>
_____	_____
_____	_____
_____	_____

- B. The Proposer is familiar with the content of these Contract Documents, with legal requirements for the completion of the Work, and with conditions affecting cost, progress or performance and completion of the Work, and has been provided with an opportunity to conduct an investigation of the site upon which the proposed equipment will be installed.
- C. This Proposal is made in good faith and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; the Proposer has not directly or indirectly induced or solicited any other Proposer to submit a false or sham Proposal; the Proposer has not solicited any person, firm or corporation to refrain from Proposal; and the Proposer has not sought by collusion to obtain an unfair advantage over any other Proposer or over the District.
- D. The Proposer has given the District's Project Leader written notice of all conflicts, errors, or discrepancies that have been discovered in the Contract Documents, and the written resolution thereof by the District's Project Leader is acceptable to the Proposer.
- E. The Work will be completed on or before the indicated completion date or within the indicated number of calendar days identified in the Proposal Form. The Proposer also accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

## 1.0.5 PROPOSAL SCHEDULE PRICING

### A. Proposal Form 3

Proposer proposes to design, fabricate, furnish, deliver, supervise installation, start-up and test, at the powerhouse site near Sisters, Oregon, USA the items set forth below, in strict accordance with the specifications and drawings set forth in these Proposal Documents (including all Addenda), for the price set forth below. Items 1 through 10 and 12 on Proposal Form 3 shall be provided on a fixed price basis which fixed price shall be FOB project site, including any import duties and import taxes which will also be paid by Proposer. Such fixed price shall include all costs for a) design, materials, labor and manufacture; b) transportation, warehousing, freight and insurance; c) spare parts; and d) all other equipment, labor and materials which are necessary to provide the District with the turbine/generator and associated equipment and services as more fully specified in these Proposal Documents; provided that pricing for item 11 shall be provided on a unit price basis. The quantities of such unit price items set forth below are estimates of the number of units of work which will be awarded under the Contract and are shown for the purpose of comparing Proposals. Actual quantities of work shall be as directed by the District and may vary from the quantities specified herein, and no claim may be made against the District for any excess or deficiencies of such quantities specified.

Payment at the unit prices agreed upon shall be in full for the completed work and shall cover all expenditures incidental to satisfactory compliance with the contract, unless otherwise specifically provided by the District.

### B. Proposal Form 4

The District reserves the right to procure switchgear controls from other vendors. The District reserves the right to procure software for automated and remote control of the facility from other vendors.

**PROPOSAL FORM 3 - 50 kW Turgo or Pelton**

<b>Item</b>	<b>Description</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Price</b>	<b>Extended Price (US Dollars)</b>
1	Engineering for turbine, generator, and all accessory equipment including submittals.	1	LS		
2	Manufacture and delivery of turbine and accessory equipment.	1	LS		
3	Manufacture and delivery of 480 VAC generator and accessories based on ODP generator enclosure.	1	LS		
5	Manufacture and delivery batteries, inverter and related equipment (if required).	1	LS		
6	Manufacture and delivery of all other equipment required under the specifications, and not covered in above prices (attached description of what is included in this price)	1	LS		
7	Spare parts and maintenance materials for all equipment and accessories per specifications.	1	LS		
8	Field service engineer for erection.	1	LS		
9	Field service engineer for commissioning and startup.	1	LS		
10	Ten day operational test.	1	LS		
11	Training.	40	Hours		
12	Operation and Maintenance Manuals.	1	LS		

Grand Total (USD) \$ \_\_\_\_\_

**PROPOSAL FORM 4 - 50 kW Turgo or Pelton**

<b>Item</b>	<b>Description</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Price</b>	<b>Extended Price (US Dollars)</b>
1	Manufacture and delivery of turbine/generator control panel and communications equipment.	1	LS		
2	Manufacture and delivery of powerhouse control and communication equipment for connection with existing intake PLC.	1	LS		
3	Manufacture and delivery of generator switchgear.	1	LS		

Grand Total (USD) \$\_\_\_\_\_

1.0.6 Proposer GUARANTEES PERFORMANCE (Subject to Liquidated damages) IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

	<b>District Target Date (Days from NTP)</b>	<b>Proposer Guaranteed No. of Calendar Days from Notice to Proceed* (No. of Days)</b>
1. First submittals in accordance with Section 01300 of the Specifications	(30 days)	_____
2. Second submittal in accordance with Section 01300 of the Specifications	(60 days)	_____
3. Delivery of embedded parts for turbine and generator for installation by others in powerhouse foundation	(120 days)	_____
4. Delivery of remainder of turbine-generator and auxiliary electrical equipment	(180 days)	_____

\* It is anticipated that the District will issue its Notice to Proceed on or about July 22, 2019 (contingent upon receipt of the Performance Bond); however, such date may change and no such change shall affect the Proposer’s liability for liquidated damages in the event it fails to meet the Guaranteed Performance Schedule set forth above.

Other District Target Dates (not guaranteed by District) are set forth below. Following delivery of all Equipment as set forth above, Proposer will proceed diligently with the remainder of the Work until completion, subject to the availability of District-supplied items (such as completed powerhouse, water and transmission line) necessary for completion of the Work.

- |   |                   |
|---|-------------------|
| 1. Commence embedment work  | August 1, 2019    |
| 2. Distribution line ready for service                              | November 1, 2019  |
| 3. Ready to roll turbine-generator                                  | December 1 2019   |
| 4. District target date for start<br>of 10-day acceptance test      | February 15, 2019 |
| 5. District target date for completion<br>of 10-day acceptance test | February 28, 2019 |

1.0.7 PERFORMANCE AND CHARACTERISTIC GUARANTEES (Proposer to fill in blanks)

A. General

1. Each Proposer guarantees the stated performance and characteristics of the equipment they proposes to furnish.
2. Failure to provide all the information and data required as indicated by this section will result in an incomplete Proposal which may not qualify for consideration by District.

B. Turbine-Generator and Accessories

1. Net head when used in this document shall be interpreted as net head at the turbine inlet valve upstream flange.
2. The Proposer shall provide graphical curves and tabulations of guaranteed performance covering at a minimum, the range from 25 percent output to maximum output for the turbine. Curves shall include the following:
  - The relationship between flow, head, efficiency and power output (at transformer high side)
  - The relationship between flow, head, efficiency and power output (at generator terminals)
  - The relationship between flow, head, efficiency and power output (at turbine shaft)
3. The guarantees of performance provided herein shall include acceptable operation, without objectionable or detrimental power surges, cavitation, or perceptible vibration within the specific performance envelope regardless of generator rating.

4. The maximum runaway speed of the turbine when operating at 100% flow under a net head of 190 feet net head and with no load on the generator except windage and friction, is calculated to be not more than \_\_\_\_\_ RPM.
5. The turbine discharge when operating at 100% flow under a net head of 190 feet and with full load on the generator is \_\_\_\_\_ cfs.
6. The turbine generator is guaranteed to operate satisfactorily for a period of \_\_\_\_\_ hours at the runaway speed given in 4, above.
7. The maximum wear, defined as loss of metal from the runner, caused by cavitation, erosion, or pitting during the first 8000 hours of operation is guaranteed to be not more than \_\_\_\_\_ pounds of metal.
8. The minimum runner life at maximum flow is expected to be \_\_\_\_\_ years.
9. District may, after opening of Proposals and prior to the award of Contract, require the Proposer to submit satisfactory information that the performance and characteristics, both guaranteed and expected, of the turbine it proposes to furnish under its Proposal, are based upon data derived from prior model tests and/or upon the tested field performance of comparable size turbine of its own design and manufacture. The data furnished shall include, but is not limited to, turbine output, discharge and efficiency; turbine setting, derivations and limits; and runaway speed characteristics.

With the Proposal, each Proposer shall include documentation of the basis of design of the turbine, such as a model test, or field test of a homologous unit, that was used to develop the turbine efficiencies quoted and guaranteed above.

Each or any Proposer may be required to submit additional data and information to substantiate the accuracy, calibration, and reliability of its laboratory and test stand and the data submitted in conformance with the requirements of this paragraph.

10. Proposers are urged to review the System Impact Study from Central Electric Cooperative (“CEC”) that describes certain requirements of the power plant systems to reduce the electrical impact on the CEC system. It is stated in the study that instantaneous connection of the generator to the CEC system will result in unacceptable “flicker”. Therefore, the Proposer will be required to furnish a device that ramps the voltage to the generator over a period of seconds. After full voltage is applied a bypass device will maintain full voltage on the generator.

The generator package will also be required to operate at power factor between 0.97 lead and 0.97 lag. Proposers will be required to furnish capacitors or other equipment to attain that goal.

11. All electrical components will be constructed in accordance with ANSI, IEEE, and NEMA standards and shall be UL listed.
12. The guaranteed power output and efficiency including, but not limited to, friction, core losses, and windage losses at each of the operating conditions listed below is (fill in following table):



GUARANTEED EFFICIENCY CHART AT 1.0 POWER FACTOR (fill in)

FLOW (cfs)	NET HEAD	E(t) GUARANTEED TURBINE EFFICIENCY	E(g) GUARANTEED GENERATOR EFFICIENCY	E(x) GUARANTEED STEP-UP TRANSFORMER EFFICIENCY	TOTAL OVERALL PLANT EFFICIENCY E(t)*E(g)*E(x)	GUARANTEED OUTPUT Kw (Transformer High Side)
1	244			na		
2	229			na		
3	211			na		
4	190			na		

13. Turbine Setting and Tailwater Elevation: Penstock pipe sits between top elevation of 3369 and bottom elevation of 3049.8. Proposer is proposing that the turbine centerline is elevation \_\_\_\_\_ feet and tailrace floor must be a maximum of elevation \_\_\_\_\_ feet. (Note: water must exit building at 90 degrees from inlet pipe centerline- see arrangement drawings) Note: High water level of reservoir is below the tailrace discharge pipe. In order to back pressure the turbine discharge Proposer will need provide the District with specifications for tailrace sump structure.)
14. Proposer shall submit with its Proposal proposed CCH70-3 Quality Sheets fully filled in with all information regarding proposed testing and inspection. Minimum quality level in the highly stressed area (VII) of the runner will be UT level 1 acceptance criteria.

1.0.9 SUBCOMPONENT PROPOSAL PRICING ITEMS

- 1. Spare Parts: List all spare parts included in the Proposal price that are being supplied in accordance with Section 01100 and other technical portions of the Specifications (use separate sheet if necessary):

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- 2. Special Tools: List all special tools and devices being supplied under this contract and included in the Proposal price, as specified under Section 01100 of the Specifications:

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- 3. Are all recommended Spare Parts available from Proposer's stock for future orders?

Yes\_\_\_\_\_ No\_\_\_\_\_

If No, list exceptions.

Indicate location (country, state & city) where spare parts stocks are warehoused for:

Turbine:

Generator:

PLC and SCADA System:

Protective Relays:

4. The following preliminary drawings and information shall be provided by Proposer with the Proposal:
  - a. Preliminary drawings showing the general arrangement of the turbine, generator, turbine inlet valves and all necessary equipment in plan, elevation, and section. These drawings shall show the principal dimensions of the equipment and location, direction, and magnitude of forces, including support requirements and all those dimensions which affect the powerhouse arrangement. All interface requirements shall be clearly indicated and dimensioned.
  - b. List of material specifications (designations) for principal parts and equipment.
  - c. List of all motors, including horsepower, rpm, and manufacturer.
  - d. Turbine and generator bearing materials and design life.

1.10 PERFORMANCE TEST

- A. Final IEC Code Efficiency Test of Turbine will be performed by District using IEC thermodynamic method. No cost to Proposer unless unit fails its test. Proposer may witness test at his expense if so desired.
- B. Confirm generator will be factory tested for efficiency per specifications?  
       Yes\_\_\_\_\_ No\_\_\_\_\_

1.12 ERECTION SUPERVISOR

Erection Supervisor Name: \_\_\_\_\_

1.13 ANTICIPATED PROGRESS SCHEDULE

Proposer shall attach to his Proposal a bar chart schedule of at least 12 lines showing the order in which the Work is planned to be performed, critical start and completion dates and estimated completion dates of the various portions of the Work, in accordance with Section 01050 of the Contract Documents.

1.14 EXPERIENCE

- A. Proposer shall provide a listing of at least three (3) examples of similar hydroelectric project equipment supply contracts that it has completed within the past five (5) years. Include rating, name and location of project, size, scope of supply, and client name and telephone number.
- B. How many years has your firm been in the business of manufacture and supply of Francis turbines and generators? \_\_\_\_\_years.
- C. To demonstrate your firm’s financial strength, please specify a listing of your firm’s gross annual income for the past three years:

2016: \_\_\_\_\_  
 2017: \_\_\_\_\_  
 2018: \_\_\_\_\_

D. In the past five years, has your firm designed, fabricated and successfully supplied at least one induction generator and Francis turbine of 0.25 MW capacity? Yes \_\_\_\_\_ No \_\_\_\_\_

List Project name, location, size, scope of supply, and client name and telephone number:

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E. Attach resume for Proposer's proposed Project Manager & Erection Supervisor to demonstrate experience for at least one similar size project (in MW output and cost) during the five-year period preceding submission of the Proposer's proposal.

1.15 EXCEPTIONS to Agreement form or Specifications, including General and Supplemental General Conditions (list on separate sheet if necessary).

1.16 PROPOSAL ALTERNATIVES: (list on separate sheet if necessary). District will only consider alternatives after evaluation of the base Proposal in full accordance with the Specifications. However, District encourages Proposers to offer cost-effective alternatives that maintain the material aspects of the quality and functionality of the equipment being offered. Each alternative should be described here in detail and any pricing differential should be clearly explained here if District was to accept this alternative. Use separate sheets if necessary.

## **PART 2 – PRODUCTS AND EQUIPMENT DATA**

Proposer shall fill in the following technical information about his proposed equipment.

The following data shall be submitted with this Proposal. Changes to the data provided herein after Proposal submittal shall be subject to the District's approval.

### 2.01 Horizontal Francis Turbine

- a. Manufacturer name:
- b. Normal turbine speed, rpm:
- c. Maximum allowable runaway duration, hrs:
- d. Minimum flow for controllable, stable operation, cfs:
- e. Discharge diameter of turbine runner, inches:
- f. Turbine runner material:
- g. Rated turbine output, hp (1 kW = 1.341 hp):
- h. Maximum particle size able to pass through runner when gates 100 percent open, in:
- i. Provide drawing or drawings that give the following dimensions:
  1. Diameter of inlet piping drain valve, in.
  2. Diameter of inlet pipe, in.
  3. Length of transition section from penstock to turbine inlet valve, in.
  4. Vertical distance between center line of penstock and center line of runner, in.
  5. Horizontal distance from centerline of penstock to outermost component of generator (along shaft centerline), in.
  6. Vertical distance from centerline of penstock to lowest point of turbine-generator, in.
  7. Vertical distance from centerline of penstock to lowest point of the tailwater floor, in.
  8. Vertical and horizontal dimensions of tailwater discharge passage Height x Width.
  9. Minimum vertical distance from top water in tailrace to bottom of runner, inches.
  10. Confirming that tailrace exit can leave building on a centerline that is 90 degrees from centerline of the turbine runner.
  11. Maximum vertical distance of any piece of equipment above penstock centerline, in.
  12. Maximum vertical distance above penstock centerline required for turbine/generator component removal and maintenance, ft.
  13. Maximum horizontal distance from centerline of penstock required for turbine-generator component removal and maintenance, measured along generator shaft centerline, ft.
- j. Weight of runner, lb:
- k. Total weight of turbine housing, lb:

- l. Laydown area required for complete maintenance (each equipment item) L x W:
- m. Description and weight of heaviest individual item to be handled during installation, lb:
- n. Description and weight of heaviest individual item to be handled during maintenance, lb:
- o. Description and dimensions of largest individual item to be handled during installation:
  - (1) Width, in.
  - (2) Height, in.
  - (3) Length, in.
- p. Description and dimensions of largest individual item to be handled during maintenance
  - (1) Width, in.
  - (2) Height, in.
  - (3) Length, in.
- q.  $WR^2$  of complete rotating assembly, lb-ft<sup>2</sup>(inertia):
- r. Describe turbine/generator bearing system.
- s. Quantity of oil required to fill bearing reservoir(s), gallons.
- t. Are overall preliminary powerhouse dimensions shown on the reference drawings adequate? Yes or No with comments.
  - i) \_\_\_\_\_
  - ii) \_\_\_\_\_
- u. Setting height of turbine centerline above powerhouse floor, in.
- v. Guaranteed maximum pressure rise in penstock upon unit load rejection \_\_\_\_\_% above full static load.

2.02 Inlet Valve

- a. Manufacturer name:
- b. Model number:
- c. Diameter of valve, in:
- d. Valve inlet flange size, in:
- e. Valve inlet flange type/class:
- f. Length of valve, flange-to-flange, in:
- g. Pressure rating:
- h. Valve weight incl. actuator, lb:
- i. Actuator Type and Manufacturer.
- j. Valve head-loss coefficient.

2.03 Induction Generator

- a. Manufacturer's name and model no.
- b. Type.
- c. Induction speed, rpm.
- d. Continuous rated generator output at 0.9 power factor and class B temperature rise in kW-Continuous.
- e. Weight of rotor incl. coupling and shaft, lb.
- f. Weight of stator, lb.
- g. Voltage, V.
- h. Service factor.
- i. Full Load current at rated winding temperature rise, Amps.
- j. Insulation class of stator winding.
- k. Provide detailed description of generator insulation system- refer to specification 16200, para. 2.03 for details).
- l. Rated temperature rise of stator winding insulation, °F.
- m. Insulation of rotor, Class (synchronous machines only).
- n. Rated temperature rise of rotor insulation (synchronous machines only).
- o. Rotor rated voltage/current, V/A (synchronous machines only).
- p. Generator Reactances in Per Units (as apply to induction generators).
  1. Direct-axis synchronous reactance,  $X_d$ .
  2. Quadrature-axis synchronous reactance,  $X_q$ .
  3. Direct-axis transient reactance,  $X'_d$ .
  4. Direct-axis subtransient reactance,  $X''_d$ .
  5. Direct-axis subtransient, reactance to resistance ratio,  $X''_d/R$ .
  6. Negative sequence reactance,  $X_2$ .
  7. Zero sequence reactance,  $X_0$ .
- q. Time constants at 75°C (in seconds) (as apply to induction generators).
  1. Direct axis transient open circuit,  $T'_{do}$ .
  2. Direct axis transient short circuit,  $T'_d$ .
  3. Direct axis subtransient, open circuit,  $T''_{do}$ .
  4. Direct axis subtransient, short circuit,  $T''_d$ .
  5. Armature,  $T_a$ .
- r. Short Circuit Current at No load (Amp):
- s. Voltage Regulation (without auto regulator), %.

- t. Winding Capacitance to Ground (3 phase), uF.
- u. Generator Moment of Intertia, lb-ft<sup>2</sup> \_\_\_\_\_
- v. Generator shaft material of construction: \_\_\_\_\_
- w. Bearings, type.
- x. Bearing lubrication and cooling system type.
- y. CT Accuracy Class.
- z. Space Heater, kW and voltage.
- aa. Stator RTDs, type/no.

#### 2.04 Hydraulic Power Unit

- a. Manufacturer's Name.
- b. Model Number.
- c. Type.
- d. Operating Pressure.
- e. Pump Capacities.

#### 2.05 Generator Voltage Application Device / Generator Breaker

- a. Manufacturer Name.
- b. Model Number.
- c. Rated Continuous Current, amp.
- d. Rated Voltage.
- e. BIL, kV.
- f. Rated Momentary Current, amp.
- g. Rated Interrupting Current.
- h. Rated Closing Fault Current, amp Close and Latch Capability.
- i. Tripping Time (# of cycles).
- j. Closing Time (# of cycles).
- k. Weight, lb.
- l. Dimensions.

#### 2.06 Voltage Transformers

- a. Nominal circuit voltage, kV.
- b. Primary line to neutral voltage, kV.
- c. ANSI Accuracy Class at Secondary voltage.
- d. Minimum thermal rating, kVA.
- e. Winding Ratio.



- f. Weight, lb.
  - g. BIL, kV.
- 2.07 Current Transformers
- a. Current Ratios in Amp:
  - b. ANSI Accuracy Class and Burden:
  - c. Manufacturer and Type:
- 2.08 Batteries
- Manufacturer and Model.
- Number of Cells.
- Voltage.
- Rating Amp-hrs.
- Batteries have been selected with capacity of operate critical systems for \_\_\_\_ hours without charging.
- 2.09 Battery Charger
- Manufacturer and Model.
- Rating.
- 2.10 Inverter
- Manufacturer and Model.
- Rating, kW.
- Dimensions and Weight.
- 2.11 Motor Control Center
- Manufacturer and Model.
- Voltage and Current Ratings.
- Number of Motor starters.
- Dimensions and Weight.
- 2.12 Generator Switchgear and Control System:
- Switchgear Manufacturer and Model.
- Generator Control System Manufacturer and Model.
- 2.13 Powerhouse PLC/Governor (Woodward or equal) Manufacturer and Model.
- Intake PLC Manufacturer and Model.
- SCADA Terminal Manufacturer.
- HMI Terminal manufacturer.
- SCADA software provided:

Provide plant AC one-line diagram, written description of generator control system operation, programming and general configuration. Include control and communication block diagrams and equipment layout diagrams as needed to support the descriptions, or confirm acceptance of communication system drawing included in Proposal Documents by District. (Use extra sheets and attach drawings as needed).

**PART 3 - PROPOSAL FORM SIGNATURE PAGE**

DATE: \_\_\_\_\_

Proposer NAME: \_\_\_\_\_  
(LEGAL NAME)

Proposer ADDRESS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_  
(AUTHORIZED AGENT)

PHONE NUMBER: \_\_\_\_\_

CELL PHONE NO.: \_\_\_\_\_

FAX NUMBER: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

Corporate Seal(Affix corporate seal above)

END OF PROPOSAL FORM