

**PUERTO RICO ELECTRIC POWER AUTHORITY**

**Bid -- Purchase Order**

Page 1 of 6

Prepared Date

: 09/25/2009

Replies Required By

: 11/17/2009

Quote Number : Q033462

Description : MOTORES DEL GRF.....

Supplier : 00540202

**MARIO E. MIRANDA SANCHEZ**  
Supervisor de Compras Principal

To : BULLETIN BOARD  
DIVISION DE SUMINISTROS  
SAN JUAN PR 00936  
United States of America

From : MARIO MIRANDA  
PR Electric Power Authority  
PO Box 364267  
San Juan PR 00936-4267  
US

Phone :

Phone :

(787) 289-3300

Fax :

DELIVERY POINT OFFER:

DELIVERY PROMISE:

PAYMENT TERMS:

P.R. EXCISE TAXES INCLUDED

(Y/N)

SELLING TERMS (CHOOSE ONE)

FOB FAS CIF C+F

VALIDITY: (IN DAYS)

Authorized Signature

TITLE:

S.S.:

DATE:

PH:

FAX:

PUERTO RICO ELECTRIC POWER AUTHORITY

**Bid -- Purchase Order**

Page 2 of 6

Prepared Date

: 09/25/2009

Replies Required By

: 11/17/2009

Quote Number : Q033462

Description : MOTORES DEL GRF.....

Supplier : 00540202

Deliver To : COSTA SUR POWER GENERATION COMPLEX WAREHOUSE  
CARRETERA 127, CENTRAL COSTA SUR.  
PEÑUELAS  
PR

Notes: 3 DE NOVIEMBRE DE 2009

SUBASTA NUMERO: Q033462

REQ. 09-9825

\*\*\*\*\*APENDICE I\*\*\*\*\*

CONFORME A NUESTRA INVITACION A REUNION PRE-SUBASTA CON FECHA DEL  
10/07/2009.

LOS LICITADORES SON INFORMADOS COMO SIGUE:

LA SUBASTA TENDRA APERTURA EL:

DIA: 17 DE NOVIEMBRE DE 2009

HORA: 1:00 P.M.

LUGAR: EL ACTO DE APERTURA SE REALIZARA EN :

SALON DE SUBASTAS , TERCER PISO EDIF. NEOS SANTURCE , P. R.

LAS COTIZACIONES DEBERAN SER ENTREGADAS EN O ANTES DE LA FECHA Y HORA  
DE APERTURA EN :

CORREO DE LA DIVISION DE SUMINISTROS , 3ER PISO EDIF. NEOS  
SANTURCE , P. R.

CON LOS SIGUIENTES CAMBIOS Y/O ADICIONES:

1-SE INCLUYE CONTESTACION A PREGUNTAS ENVIADAS POR LOS POSIBLES  
SUPLIDORES.

NOTAS ESPECIALES:

1. LUEGO DE LA APERTURA DE LA SUBASTA, LOS LICITADORES, SUS REPRESENTANTES Y OTRAS PARTES NO PUEDEN COMUNICARSE EN FORMA ALGUNA CON EMPLEADOS DE LA AUTORIDAD DE ENERGIA ELECTRICA PARA ASUNTOS RELACIONADOS CON LAS PROPUESTAS BAJO ESTUDIO, SALVO LO DISPUESTO POR LEY NÚM. 170, DEL 12 DE AGOSTO DE 1988, SEGUN ENMENDADA Y LA REGLAMENTACION PROMULGADA A SU AMPARO. REGLAMENTO DE SUBASTAS, CAPITULO II, SECCION 8, ARTICULO C, INCISO 2.
2. LOS LICITADORES DEBEN SOMETER CON SU PROPUESTA COPIA DE LA CERTIFICACION DEL REGISTRO UNICO DE SUPLIDORES ( ASG ) VIGENTE.
3. LICITADOR AGRACIADO ENTREGARA UNA FIANZA DE EJECUCION 40%

RE: MOTORES DE INDUCCIÓN HORIZONTAL NUEVOS DE 2250 HP, 900 RPM DE  
RESGUARDO PARA LOS ABANICOS DE RECIRCULACIÓN DE GASES DE LA UNIDADES 5  
Y 6 DE LA CENTRAL COSTA SUR

**PUERTO RICO ELECTRIC POWER AUTHORITY**

**Bid -- Purchase Order**

Page 3 of 6

Prepared Date

: 09/25/2009

Replies Required By

: 11/17/2009

Quote Number : Q033462

Description : MOTORES DEL GRF.....

Supplier : 00540202

Line Number                      Item Number/Requisition

Commodity Code/Description

Quantity Required

Unit Price

Manufacturer Name

UOM

UOM

Reference

Lead Time

Total Line Value

Description

Discount %

1                      D081088/09-0000009825

1.00

EACH

NEW HORIZONTAL INDUCTION MOTOR TO DRIVE THE GAS RECOIRCULATION FANS OF  
UNITS 5 AND 6 OF SOUTH COAST STEAM PLANT, AS PER TS-E27-09 TECHNICAL  
SPECIFICACTIONS.

Line Number                      Item Number/Requisition

Commodity Code/Description

Quantity Required

Unit Price

Manufacturer Name

UOM

UOM

Reference

Lead Time

Total Line Value

Description

Discount %

2                      D081089/09-0000009825

1.00

EACH

OPTION OF SPARE SET OF BEARINGS (FRONT AND REAR) FOR NEW ELECTRIC  
INDUCTION MOTOR TO DRIVE THE GAS RECIRCULATION FANS OF UNITS 5 AND 6  
OF SOUTH COAST STEAM PLANT, AS PER TS-E27-09 TECHNICAL SPECIFICATIONS.

Line Number                      Item Number/Requisition

Commodity Code/Description

Quantity Required

Unit Price

Manufacturer Name

UOM

UOM

Reference

Lead Time

Total Line Value

Description

Discount %

3                      SM081090/09-0000009825

1.00

EACH

OPTION OF WITNESSED FACTORY ACCEPTANCE TESTS FOR THE NEW ELECTRIC  
INDUCTION MOTOR TO DRIVE THE GAS RECIRCULATION FANS OF UNITS 5 AND 6  
OF SOUTH COAST STEAM PLANT, AS PER TS-E27-09 TECHNICAL SPECIFICATIONS.

**PUERTO RICO ELECTRIC POWER AUTHORITY**

---

	<b>Bid -- Purchase Order</b>	<b>Page 4 of 6</b>
	<b>Prepared Date</b>	<b>: 09/25/2009</b>
	<b>Replies Required By</b>	<b>: 11/17/2009</b>
<b>Quote Number</b>	<b>: Q033462</b>	
<b>Description</b>	<b>: MOTORES DEL GRF.....</b>	
<b>Supplier</b>	<b>: 00540202</b>	

---

**REQUISITOS Y DOCUMENTOS GENERALES:**

1. TODO PROVEEDOR QUE INTERESE PARTICIPAR EN LOS PROCESOS DE COMPRAS EN LA AUTORIDAD DE ENERGIA ELECTRICA, TIENE QUE PERTENECER AL REGISTRO UNICO DE LICITADORES DE LA ADMINISTRACION DE SERVICIOS GENERALES DEL ESTADO LIBRE ASOCIADO DE PUERTO RICO Y AL REGISTRO DE LICITADORES DE LA AUTORIDAD DE ENERGÍA ELÉCTRICA.

2. TIENE QUE ESTAR REGISTRADO Y ACTIVO EN EL REGISTRO DE LICITADORES DE LA AUTORIDAD DE ENERGÍA ELÉCTRICA.

3. TIENE QUE ESTAR EVALUADO Y/O CALIFICADO PARA OFRECER LOS BIENES Y SERVICIOS SOLICITADOS ANTES DE SOMETER SU PROPUESTA.

4. LOS LICITADORES TIENEN QUE INCLUIR CON SU COTIZACIÓN UNA DECLARACIÓN JURADA DE NO CONFLICTO DE INTERESES.

-----  
**GENERAL REQUIRED DOCUMENTS AND REQUIREMENTS**

1. BIDDERS WHO HAS AN INTENTION TO PARTICIPATE IN PREPA'S PURCHASING PROCESSES SHALL BE REGISTERED AND ACTIVE IN PUERTO RICO'S GENERAL SERVICES ADMINISTRATION BIDDERS REGISTRY OFFICE AND PUERTO RICO'S ELECTRIC POWER AUTHORITY BIDDERS REGISTRY OFFICE.

2. BIDDERS MUST BE REGISTERED AND ACTIVE IN PREPA'S SUPPLIERS' REGISTRATION OFFICE.

3. ALL POSSIBLE BIDDERS MUST BE QUALIFIED AND/OR EVALUATED TO PROVIDE SERVICES OR GOODS BEFORE A PROPOSAL SUBMISSION.

4. BIDDERS SHALL INCLUDE PREPA'S SWORN STATEMENT OF NON- CONFLICT WITH PROPOSAL DOCUMENTS.

**CLAUSULAS PARA PAGOS DE IMPUESTOS ESTATALES Y FEDERALES**

EN CUMPLIMIENTO CON LA SECCIÓN 2906 DEL ARTÍCULO 2, DEL CÓDIGO DE RENTAS INTERNAS DE PUERTO RICO, LA AUTORIDAD DE ENERGÍA ELÉCTRICA ESTÁ EXENTA DEL PAGO DEL ARBITRIO GENERAL DEL 6.6%. ADEMÁS, A PARTIR DEL 15 DE NOVIEMBRE DE 2006, ESTÁ EXENTA DEL PAGO DEL IMPUESTO A LA VENTA Y USOS (IVU) ESTATAL Y MUNICIPAL POR VIRTUD DE LA SECCIÓN 2508 DE LA LEY 117 DEL 4 DE JULIO DE 2006, CONOCIDA COMO LA LEY DE JUSTICIA CONTRIBUTIVA.

\* LAS FACTURAS TIENEN QUE DETALLAR EL CONCEPTO DE LA COMPRA O SERVICIO.

-----  
**LOCAL AND FEDERAL TAXES CLAUSE**

IN COMPLIANCE WITH PUERTO RICO'S INTERNAL REVENUE SERVICE CODE,

PUERTO RICO ELECTRIC POWER AUTHORITY

Bid -- Purchase Order

Page 5 of 6

Prepared Date

: 09/25/2009

Replies Required By

: 11/17/2009

Quote Number : Q033462

Description : MOTORES DEL GRF.....

Supplier : 00540202

SECTION 2906, ARTICLE 2, PUERTO RICO ELECTRIC POWER AUTHORITY IS EXEMPT OF 6.6% TAX PAYMENT, ALSO, STARTING ON NOVEMBER 15TH, 2006; AND IN ACCORDANCE TO LAW 117 OF 4TH OF JULY OF 2006, KNOWN AS LEY DE JUSTICIA CONTRIBUTIVA ; PREPA IS EXEMPT OF IVU (IMPUESTO A LA VENTA Y USOS ESTATAL Y MUNICIPAL) TAX PAYMENT.

INVOICES SHALL INCLUDE ALL DETAILS RELATED TO GOOD OR SERVICE PURCHASED.

INSTRUCCIONES PARA PARTICIPAR EN SUBASTA FORMAL

1. SE INCLUYEN INSTRUCCIONES ESPECIALES PARA ESTA INVITACIÓN A SUBASTA FORMAL, ASÍ COMO LOS DOCUMENTOS QUE EN ELLA SE MENCIONAN.

2. LOS LICITADORES QUE INCLUYAN EN SU COTIZACIÓN SUS TÉRMINOS Y CONDICIONES DE VENTA O SERVICIO SERÁN DECLARADOS NO RESPONDIENTE. FAVOR VER EL ARTÍCULO 24 DE LAS INSTRUCCIONES A LOS LICITADORES.

3. GARANTÍA DE LA PROPUESTA  
EL LICITADOR SOMETERÁ CON SU PROPUESTA UNA GARANTÍA DE LICITACIÓN (BID BOND) POR LA CANTIDAD DE 10 PORCIENTO DEL PRECIO TOTAL COTIZADO. LAS PROPUESTAS QUE NO INCLUYAN ESTA GARANTÍA SERÁN RECHAZADAS.

4. LA AEE NO ACEPTARÁ ESTA COTIZACIÓN POR FACCIÓN MIL U OTROS MEDIOS ELECTRÓNICOS.

5. NO SE OTORGARÁ CONTRATO DE CLASE ALGUNA EN EL CUAL NO SE ACOMPAÑE, PREVIO A LA FIRMA, UNA CERTIFICACIÓN DEL DEPARTAMENTO DE HACIENDA DONDE ESTABLEZCA QUE ESTÁ AL DÍA EN EL PAGO DE CONTRIBUCIONES O POSEE ALGÚN PLAN DE PAGOS.

-----  
FORMAL BLIND SEAL BID INSTRUCTIONS

1. SPECIAL INSTRUCTIONS AND OTHER DOCUMENTS MENTIONED IN THIS PUBLICATION ARE ATTACHED.

2. BIDDERS THAT INCLUDE THEIR OWN TERMS AND CONDITIONS WILL BE DISQUALIFIED AUTOMATICALLY. (SEE INSTRUCTIONS TO BIDDERS, ARTICLE 24)

3. BID PROPOSAL WARRANTIES:  
A 10% OF A PROPOSAL TOTAL BID BOND IS REQUIRED FOR THIS BID. PROPOSALS THAT NOT INCLUDE REQUIRED BID BOND WILL BE DISQUALIFIED.

4. PROPOSALS WILL NOT BE ACCEPTED BY FAX OR E-MAIL.

5. PREPA WILL NOT SIGN ANY CONTRACT OR PO WITHOUT A PUERTO RICO I.R.S. NO DEBT CERTIFICATION.  
CRITERIO DE ACEPTACIÓN PARA APLICAR LA LEY NÚMERO 14 DEL 8 DE ENERO DE 2004

LA LEY NÚMERO 14 DEL 8 DE ENERO DE 2004 APLICA A LAS COMPRAS DE LA AUTORIDAD DE ENERGÍA ELÉCTRICA.

**PUERTO RICO ELECTRIC POWER AUTHORITY**

---

**Bid -- Purchase Order**

Page 6 of 6

Prepared Date

: 09/25/2009

Replies Required By

: 11/17/2009

Quote Number : Q033462

Description : MOTORES DEL GRF.....

Supplier : 00540202

---

PARA CONSIDERAR Y APLICAR ESTA LEY EL LICITADOR TIENE QUE SOMETER CON  
SU COTIZACIÓN COPIA DE LA RESOLUCIÓN CON EL INCENTIVO DE PREFERENCIA  
OTORGADO POR LA JUNTA PARA LA INVERSIÓN DE LA INDUSTRIA PUERTORRIQUEÑA  
ADSCRITA A LA COMPAÑÍA DE FOMENTO INDUSTRIAL.

-----  
ACCEPTANCE CRITERIA FOR LAW NO. 14 OF JANUARY 8TH, 2004

LAW NO. 14 OF JANUARY 8TH, 2004; APPLIES TO PREPA'S PURCHASES.

IN ORDER TO CONSIDER AND APPLY THIS LAW, BIDDERS SHAL HAVE TO INCLUDE  
WITH A PROPOSAL, AN APPROVED COPY OF THE INCENTIVO DE PREFERENCIA  
RESOLUTION. THIS DOCUMENT WILL PRESENT AN INCENTIVE PERCENTAGE  
APPROVED BY LA JUNTA PARA LA INVERSIÓN DE LA INDUSTRIA  
PUERTORRIQUEÑA .

---

ANSWERS TO BIDDERS QUESTIONS

Q33462

TS-E27-09

MANUFACTURE AND DELIVERY OF ONE NEW INDUCTION MOTOR TO  
DRIVE THE GAS RECIRCULATION FANS OF UNITS 5 AND 6 OF SOUTH COAST  
STEAM PLANT

BIDDER: RG ENGINEERING, INC.

1.  $WR^2$  (Rotational Inertia) has different values in two different locations.
  - a. On TS-E27-09, Rev.2, page 2: Driven equipment operational specifications, Rotational Inertia ( $WR^2$ ) = 51,600 lbs.ft<sup>2</sup>.
  - b. On South Coast 5-6 GRF Fan Drawing 1. PDF: Along the right margin, section B: WT of Fan = 61,000 lbs, WT of Wheel = 7000 lbs, WT of Shaft = 11,400 lbs,  $WR^2$  = 74,260 lb/ft<sup>2</sup>.

Please advise which  $WR^2$  value is correct, 51,600 or 74,260.

ANSWER: The correct value for the rotational inertia  $WR^2$  is 74,260.  
(Note: The values of fan parameters indicated in the PDF drawing described in item b of the question are also correct.)

2. Load-Torque speed curve. This curve for the original motor has not been provided in the PREPA specifications.

The PREPA specification requires many curves and data be provided to PREPA both at the time of the bid and the time documents are submitted for approval. The load-torque speed curve for the existing motor is essential to providing this information.

Please supply the load-torque speed curve.

ANSWER: The load-torque speed curve of the existing motor is not available.

3. Motor dimensions. The motor outline drawings provided are not complete. In particular, the NEMA F dimension, the horizontal distance from the motor centerline to the center of the bolt hole in the motor is not provided in the documentation supplied by PREPA for the motor. The drawing supplied for the fan does not include motor dimensions. Please provide a clear drawing of this dimension individually.

ANSWERS TO BIDDERS QUESTIONS  
Q33462 TS-E27-09

ANSWER: The horizontal distance from the motor centerline to the center of the bolt hole in the motor is 17 inches.

4. Sleeve bearings. The existing motor has a Kingsbury type thrust bearing. This is a horizontal motor. No thrust value has been given. Should "0" thrust be considered?

ANSWER: Zero ("0") thrust is to be considered. (Note: The information provided describing the bearing type of the existing motor in Article I.A (table) of the *Addendum A Proposal Rev.2* is not correct. The existing motor does not have a thrust bearing. The new motor shall be provided with sleeve bearings as described in Articles H.1 and H.2 of the Technical Specifications.



From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTENTION \_\_\_\_\_

PRICE REQUEST

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

DATE OF SUBMITTAL: \_\_\_\_\_

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

PUERTO RICO ELECTRIC POWER AUTHORITY  
PO BOX 70151  
SAN JUAN, PUERTO RICO 00936

PUERTO RICO ELECTRIC POWER AUTHORITY

Bid -- Purchase Order

Page 1 of 5

Prepared Date

: 09/25/2009

Replies Required By

: 10/07/2009

Quote Number : Q033462

Description : PRE-SUBASTA---COMPRA MOTORES DEL GRF.....

Supplier : 00540202

*Mario E. Miranda Sanchez*

To : BULLETIN BOARD  
DIVISION DE SUMINISTROS  
SAN JUAN PR 00936  
United States of America

From : MARIO MIRANDA  
PR Electric Power Authority  
PO Box 364267  
San Juan PR 00936-4267  
US

Phone :

Phone : (787) 289-3300

Fax :

DELIVERY POINT OFFER:

DELIVERY PROMISE:

PAYMENT TERMS:

P.R. EXCISE TAXES INCLUDED

(Y/N) \_\_\_\_\_

SELLING TERMS (CHOOSE ONE)

FOB \_\_\_\_\_ FAS \_\_\_\_\_ CIF \_\_\_\_\_ C+F \_\_\_\_\_

VALIDITY: (IN DAYS)

Authorized Signature

TITLE:

S.S.:

DATE:

PH:

FAX:

PUERTO RICO ELECTRIC POWER AUTHORITY

Bid -- Purchase Order

Page 2 of 5

Prepared Date

: 09/25/2009

Replies Required By

: 10/07/2009

Quote Number : Q033462

Description : PRE-SUBASTA---COMPRA MOTORES DEL GRF.....

Supplier : 00540202

Deliver To : COSTA SUR POWER GENERATION COMPLEX WAREHOUSE  
CARRETERA 127, CENTRAL COSTA SUR.  
PEÑUELAS  
PR

Notes: 25 DE SEPTIEMBRE DE 2009

PRE-SUBASTA: Q033462

REQ. 09-9825

SE CONVOCA A TODOS LOS POSIBLES LICITADORES A UNA REUNION PRE-SUBASTA A LLEVARSE A CABO EL:

DIA: 7 DE OCTUBRE DE 2009

HORA: 1:00 P.M.

LUGAR: CENTRAL COSTA SUR, SALON DE CONFERENCIAS OFIC. ADMINISTRATIVAS

NOTA: SE INCLUYEN ESPECIFICACIONES TECNICAS

RE: MOTORES DE INDUCCIÓN HORIZONTAL NUEVOS DE 2250 HP, 900 RPM DE RESGUARDO PARA LOS ABANICOS DE RECIRCULACIÓN DE GASES DE LA UNIDADES 5 Y 6 DE LA CENTRAL COSTA SUR

Line Number	Item Number/Requisition	Quantity Required	Unit Price
Commodity Code/Description		UOM	UOM
Manufacturer Name		Lead Time	Total Line Value
Reference			Discount %
Description			

1 D081088/09-0000009825

2.00

EACH

NEW HORIZONTAL INDUCTION MOTOR TO DRIVE THE GAS RECOIRCULATION FANS OF UNITS 5 AND 6 OF SOUTH COAST STEAM PLANT, AS PER TS-E27-09 TECHNICAL SPECIFICACTIONS.

**PUERTO RICO ELECTRIC POWER AUTHORITY**

**Bid -- Purchase Order**

Page 3 of 5

Prepared Date

: 09/25/2009

Replies Required By

: 10/07/2009

Quote Number : Q033462

Description : PRE-SUBASTA---COMPRA MOTORES DEL GRF.....

Supplier : 00540202

Line Number                      Item Number/Requisition

Commodity Code/Description

Quantity Required

Unit Price

Manufacturer Name

UOM

UOM

Reference

Lead Time

Total Line Value

Description

Discount %

2

D081089/09-0000009825

2.00

EACH

OPTION OF SPARE SET OF BEARINGS (FRONT AND REAR) FOR NEW ELECTRIC  
INDUCTION MOTOR TO DRIVE THE GAS RECIRCULATION FANS OF UNITS 5 AND 6  
OF SOUTH COAST STEAM PLANT, AS PER TS-E27-09 TECHNICAL SPECIFICATIONS.

Line Number                      Item Number/Requisition

Commodity Code/Description

Quantity Required

Unit Price

Manufacturer Name

UOM

UOM

Reference

Lead Time

Total Line Value

Description

Discount %

3

SM081090/09-0000009825

1.00

EACH

OPTION OF WITNESSED FACTORY ACCEPTANCE TESTS FOR THE NEW ELECTRIC  
INDUCTION MOTOR TO DRIVE THE GAS RECIRCULATION FANS OF UNITS 5 AND 6  
OF SOUTH COAST STEAM PLANT, AS PER TS-E27-09 TECHNICAL SPECIFICATIONS.

**REQUISITOS Y DOCUMENTOS GENERALES:**

1. TODO PROVEEDOR QUE INTERESE PARTICIPAR EN LOS PROCESOS DE COMPRAS  
EN LA AUTORIDAD DE ENERGIA ELECTRICA, TIENE QUE PERTENECER AL REGISTRO  
UNICO DE LICITADORES DE LA ADMINISTRACION DE SERVICIOS GENERALES DEL  
ESTADO LIBRE ASOCIADO DE PUERTO RICO Y AL REGISTRO DE LICITADORES DE  
LA AUTORIDAD DE ENERGÍA ELÉCTRICA.

2. TIENE QUE ESTAR REGISTRADO Y ACTIVO EN EL REGISTRO DE LICITADORES DE  
LA AUTORIDAD DE ENERGÍA ELÉCTRICA.

3. TIENE QUE ESTAR EVALUADO Y/O CALIFICADO PARA OFRECER LOS BIENES Y  
SERVICIOS SOLICITADOS ANTES DE SOMETER SU PROPUESTA.

**PUERTO RICO ELECTRIC POWER AUTHORITY**

**Bid -- Purchase Order**

Page 4 of 5

Prepared Date

: 09/25/2009

Replies Required By

: 10/07/2009

Quote Number : Q033462

Description : PRE-SUBASTA---COMPRA MOTORES DEL GRF.....

Supplier : 00540202

4. LOS LICITADORES TIENEN QUE INCLUIR CON SU COTIZACIÓN UNA DECLARACIÓN JURADA DE NO CONFLICTO DE INTERESES.

-----  
**GENERAL REQUIRED DOCUMENTS AND REQUIREMENTS**

1. BIDDERS WHO HAS AN INTENTION TO PARTICIPATE IN PREPA'S PURCHASING PROCESSES SHALL BE REGISTERED AND ACTIVE IN PUERTO RICO'S GENERAL SERVICES ADMINISTRATION BIDDERS REGISTRY OFFICE AND PUERTO RICO'S ELECTRIC POWER AUTHORITY BIDDERS REGISTRY OFFICE.

2. BIDDERS MUST BE REGISTERED AND ACTIVE IN PREPA'S SUPPLIERS' REGISTRATION OFFICE.

3. ALL POSSIBLE BIDDERS MUST BE QUALIFIED AND/OR EVALUATED TO PROVIDE SERVICES OR GOODS BEFORE A PROPOSAL SUBMISSION.

4. BIDDERS SHALL INCLUDE PREPA'S SWORN STATEMENT OF NON- CONFLICT WITH PROPOSAL DOCUMENTS.

**CLAUSULAS PARA PAGOS DE IMPUESTOS ESTATALES Y FEDERALES**

EN CUMPLIMIENTO CON LA SECCIÓN 2906 DEL ARTÍCULO 2, DEL CÓDIGO DE RENTAS INTERNAS DE PUERTO RICO, LA AUTORIDAD DE ENERGÍA ELÉCTRICA ESTÁ EXENTA DEL PAGO DEL ARBITRIO GENERAL DEL 6.6%. ADEMÁS, A PARTIR DEL 15 DE NOVIEMBRE DE 2006, ESTÁ EXENTA DEL PAGO DEL IMPUESTO A LA VENTA Y USOS (IVU) ESTATAL Y MUNICIPAL POR VIRTUD DE LA SECCIÓN 2508 DE LA LEY 117 DEL 4 DE JULIO DE 2006, CONOCIDA COMO LA LEY DE JUSTICIA CONTRIBUTIVA.

\* LAS FACTURAS TIENEN QUE DETALLAR EL CONCEPTO DE LA COMPRA O SERVICIO.

-----  
**LOCAL AND FEDERAL TAXES CLAUSE**

IN COMPLIANCE WITH PUERTO RICO'S INTERNAL REVENUE SERVICE CODE, SECTION 2906, ARTICLE 2, PUERTO RICO ELECTRIC POWER AUTHORITY IS EXCEMPT OF 6.6% TAX PAYMENT, ALSO, STARTING ON NOVEMBER 15TH, 2006; AND IN ACCORDANCE TO LAW 117 OF 4TH OF JULY OF 2006, KNOWN AS LEY DE JUSTICIA CONTRIBUTIVA ; PREPA IS EXCEMPT OF IVU (IMPUESTO A LA VENTA Y USOS ESTATAL Y MUNICIPAL) TAX PAYMENT.

INVOICES SHALL INCLUDE ALL DETAILS RELATED TO GOOD OR SERVICE PURCHASED.

**INSTRUCCIONES PARA PARTICIPAR EN SUBASTA FORMAL**

1. SE INCLUYEN INSTRUCCIONES ESPECIALES PARA ESTA INVITACIÓN A SUBASTA, ASÍ COMO LOS DOCUMENTOS QUE EN ELLA SE MENCIONAN.

2. LOS LICITADORES QUE INCLUYAN EN SU COTIZACIÓN SUS TÉRMINOS Y CONDICIONES DE VENTA O SERVICIO SERÁN DECLARADOS NO RESPONDIENTE. FAVOR VER EL ARTÍCULO 24 DE LAS INSTRUCCIONES A LOS LICITADORES.

**PUERTO RICO ELECTRIC POWER AUTHORITY**

**Bid -- Purchase Order**

Page 5 of 5

Prepared Date

: 09/25/2009

Replies Required By

: 10/07/2009

Quote Number : Q033462

Description : PRE-SUBASTA---COMPRA MOTORES DEL GRF.....

Supplier : 00540202

**3. GARANTÍA DE LA PROPUESTA**

EL LICITADOR SOMETERÁ CON SU PROPUESTA UNA GARANTÍA DE LICITACIÓN (BID BOND) POR LA CANTIDAD DE 10 PORCIENTO DEL PRECIO TOTAL COTIZADO. LAS PROPUESTAS QUE NO INCLUYAN ESTA GARANTÍA SERÁN RECHAZADAS.

4. LA AEE NO ACEPTARÁ ESTA COTIZACIÓN POR FAX O MEDIOS ELECTRÓNICOS.

5. NO SE OTORGARÁ CONTRATO DE CLASE ALGUNA EN EL CUAL NO SE ACOMPAÑE, PREVIO A LA FIRMA, UNA CERTIFICACIÓN DEL DEPARTAMENTO DE HACIENDA COMO QUE ESTÁ AL DÍA O TIENE PLAN DE PAGOS POR CONTRIBUCIÓN.

-----  
**FORMAL BLIND SEAL BID INSTRUCTIONS**

1. SPECIAL INSTRUCTIONS AND OTHER DOCUMENTS MENTIONED IN THIS PUBLICATION ARE ATTACHED.

2. BIDDERS THAT INCLUDE THEIR OWN TERMS AND CONDITIONS WILL BE DISQUALIFIED AUTOMATICALLY. (SEE INSTRUCTIONS TO BIDDERS, ARTICLE 24)

**3. BID PROPOSAL WARRANTIES:**

A 10% OF A PROPOSAL TOTAL BID BOND IS REQUIRED FOR THIS BID. PROPOSALS THAT NOT INCLUDE REQUIRED BID BOND WILL BE DISQUALIFIED.

4. PROPOSALS WILL NOT BE ACCEPTED BY FAX OR E-MAIL.

5. PREPA WILL NOT SIGN ANY CONTRACT OR PO WITHOUT A PUERTO RICO I.R.S. NO DEBT CERTIFICATION.

CRITERIO DE ACEPTACIÓN PARA APLICAR LA LEY NÚMERO 14 DEL 8 DE ENERO DE 2004

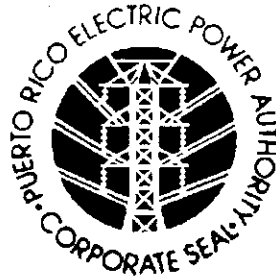
LA LEY NÚMERO 14 DEL 8 DE ENERO DE 2004 APLICA A LAS COMPRAS DE LA AUTORIDAD DE ENERGÍA ELÉCTRICA.

PARA CONSIDERAR Y APLICAR ESTA LEY EL LICITADOR TIENE QUE SOMETER CON SU COTIZACIÓN COPIA DE LA RESOLUCIÓN CON EL INCENTIVO DE PREFERENCIA OTORGADO POR LA JUNTA PARA LA INVERSIÓN DE LA INDUSTRIA PUERTORRIQUEÑA ADSCRITA A LA COMPAÑÍA DE FOMENTO INDUSTRIAL.

-----  
**ACCEPTANCE CRITERIA FOR LAW NO. 14 OF JANUARY 8TH, 2004**

LAW NO. 14 OF JANUARY 8TH, 2004; APPLIES TO PREPA'S PURCHASES.

IN ORDER TO CONSIDER AND APPLY THIS LAW, BIDDERS SHAL HAVE TO INCLUDE WITH A PROPOSAL, AN APPROVED COPY OF THE INCENTIVO DE PREFERENCIA RESOLUTION. THIS DOCUMENT WILL PRESENT AN INCENTIVE PERCENTAGE APPROVED BY LA JUNTA PARA LA INVERSIÓN DE LA INDUSTRIA PUERTORRIQUEÑA .



**PUERTO RICO ELECTRIC POWER AUTHORITY  
ENGINEERING AND POWER PLANTS  
TECHNICAL SERVICES DIVISION**

**TECHNICAL SPECIFICATIONS FOR THE  
PURCHASE OF TWO NEW HORIZONTAL  
ELECTRIC INDUCTION MOTORS TO DRIVE  
THE GAS RECIRCULATION FANS AT SOUTH  
COAST STEAM PLANT UNITS 5 AND 6 IN  
GUAYANILLA, PUERTO RICO**

**TECHNICAL SPECIFICATION: TS-E27-09  
EMPAC WORK ORDER: 09-040640  
REV. 1 AUGUST 4, 2009**

**TECHNICAL SPECIFICATIONS FOR THE PURCHASE OF TWO NEW  
HORIZONTAL ELECTRIC INDUCTION MOTORS TO DRIVE THE GAS  
RECIRCULATION FANS AT SOUTH COAST STEAM PLANT UNITS 5 AND 6  
IN GUAYANILLA, PUERTO RICO  
TECHNICAL SPECIFICATION: TS-E27-09  
EMPAC WORK ORDER: 09-040640  
REV. 1 @ AUGUST 4, 2009**

A. Scope

These Technical Specifications are prepared for the manufacture and delivery of two (2) new horizontal electric induction motors, which shall be used to drive South Coast Steam Plant Units 5 and 6 Gas Recirculation Fans. The new motors shall be interchangeable in order to be used at either generating unit. The new motors shall be installed on existing facilities at indicated locations, and shall be used as a substitute of existing motors.

The motors shall be delivered within 270 consecutive days after drawings approval to South Coast Steam Plant. This is a turn-key project which shall be awarded to only one Bidder.

The motors purchased in this order shall be new in all its parts. Bid proposals offering partially or completely remanufactured motors for this application shall be rejected.

B. Kind of service

1. Technical data of driving (existing) equipment

The new motors shall be used as a substitute to existing equipment of the same capacity at South Coast Steam Plant Units 5 and 6. The new motors shall be designed to fit in the existing bases without modifications to the existing facilities and shall be capable to drive the following horizontal gas recirculation fans. Existing or original motor specifications and characteristics are provided as a reference in section I.A of Addendum A: "Proposal to Supply Electric Motors", and in Addendum B, included as part of these Technical Specifications.

2. Technical Data of Driven Equipment

Driven Equipment Operational Specifications	
Manufacturer	Clarage Fan Company
Type	RT Fan
Weight (Rotating Parts)	19,044 lbs.



Driven Equipment Operational Specifications	
Rotational Inertia ( $WR^2$ )	51,600 lbs.-ft <sup>2</sup>
Nominal Speed	900 rpm
Duty	Continuous

C. Ambient operational conditions

New motors will be installed at sea level and will operate in a tropical climate zone, at an ambient temperature of 40° C. Motors shall be operated continuously at full load during a natural year (8,760 hours). This equipment will be operated at an area subject to severe dust and mild salt spray due to prevailing winds. Hurricane winds of 150 miles per hour (50 lb/ft<sup>2</sup>) may be originated at the area where the motor will be installed. The motors shall be capable to withstand these winds without damages or negative effects on its operational characteristics.

D. Capacity and performance

The new motors shall be of general-purpose characteristics, with heavy-duty design and construction. They shall be squirrel cage type, horizontal with two thousand two hundred fifty (2250) horsepower capacity, preferably identical to existing (original) motors characteristics as indicated at Section I.A of Addendum A: "Proposal to Supply Electric Motor", but with modern design and construction and high operational efficiency.

E. Type of equipment to be acquired

1. Standard manufacturing

Unless inconsistent with this specification, the Contractor shall supply equipment of standard construction as per industry manufacturing standards and policies for the construction of electrical motors.

2. Standards and applicable codes

Unless otherwise specified herein, the latest applicable standards of the American National Standards Institute (ANSI), Institute of Electronic and Electrical Engineers (IEEE), National Electrical Manufacturers Association (NEMA), Electrical Apparatus Service Association (EASA), and all other applicable standards or codes of other organizations related to electrical motors design, construction or operation, shall govern.

3. Construction

The equipment shall be manufactured to operate within appropriate safety standards, taking in consideration not only the equipment, but also the operating personnel. They shall operate in a proper way within the operational requirements described or implied in this specification without undue strain, wear, heating, vibration, corrosion, or other operational troubles.

4. Materials used in motors construction

The equipment and all of its components and parts shall be capable to operate at high temperatures or other severe conditions, and they shall be constructed with the best available materials adequate for the required service. Toxic or other hazardous materials, parts or paints shall not be used. PREPA may require, at any moment, the Materials Safety Data Sheet of any product used in the manufacturing of this equipment.

5. Replacement parts

Parts subject to wear, corrosion or other deterioration, or requiring adjustment, inspection, or repair caused by normal use shall be accessible and capable of reasonable and convenient removal when required. Diagrams and/or instruction manuals for the replacement of such parts shall be provided with the motor.

6. Threads of bolts, nuts, stud and screws

Bolts, nuts, studs and screws shall have threads conforming to ANSI Standards, preferably in integer unit measures (whole numbers) in the English System. In the event that the equipment and its threaded components are constructed using the metric system, this fact shall be indicated in the Exceptions section of Addendum A and in the quotation submitted to PREPA. Only hexagonal nuts shall be used.

7. Lifting points

Threaded holes to attach eye bolts of standard size in the English System and of common use, shall be provided on the external frame of the motor to allow the lifting of the equipment in a safe manner including the heaviest components.

8. Support points

Support points provided by the manufacturer shall be designed for reasonable convenient connection to the foundations or supports at the installation site.

9. Electrical insulation materials

Insulating materials used in motors construction shall be of the best quality available and shall comply with the latest ANSI, NEMA, IEEE Standards, and the Electric Apparatus Service Association (EASA). The use of asbestos material is totally prohibited.

10. Conflicts or discrepancies

In case of conflict between standards, the more stringent requirements will apply.

F. Proposal required information

Bidders shall provide all the information required in the TS-E27-09 Addendum A: "Proposal to Supply Electric Motors" Rev. 2, and include the complete Addendum with its proposals. The following information required is included as part of the Addendum:

1. Standards fulfillment:

Bidders shall confirm on Addendum A that the motors offered complies in their design, construction and materials used with the latest applicable standards and regulations from the following organizations:

- a. American National Standard Institute (ANSI)
- b. National Electrical Manufacturers Association (NEMA)
- c. Institute of Electrical and Electronics Engineers (IEEE)
- d. National Electric Code (NEC)

2. Repair shops

Bidders shall provide the name, contact information and location of authorized repair shops in PR or Continental USA in which repair works necessary to be performed during and after motor warranty period will be done in an effective and fast manner.

3. Utilities using referred equipment

Bidders shall provide in the required space of Addendum A, a list of Power Utilities (including contact person and telephone numbers) using the offered motor of similar capacity and design for a period of five (5) years or more.

4. Technical information required for repairs

Bidders shall provide for evaluation all technical information, including drawings, required and necessary in the event of any motor repair (beyond its warranty period) by a local motor repair shop, taking in consideration that PREPA has to issue public bids to perform this type of work.

5. Electric insulation

Details of insulation class and treatment given to stator coils of motor shall be provided.

G. New motor electrical specifications

The following information defines PREPA requirements for the new motors to be supplied by means of this specification. These requirements are based on existing motors nameplate data, included as reference in Addendum A, "Proposal to Supply Electric Motors" and the operational experience with existing equipment. Requirements on this section may be stricter than original requirements to improve or correct existing problems with old equipment.

1. Design requirements

The new induction motor shall be squirrel cage type as per the following specifications:

New Motor Electrical, Physical and Operational Specifications	
Generic Design and Motor Type	Horizontal, Squirrel Cage Induction Motor
Horsepower Capacity	2250 HP
Stator Winding Configuration	Wye
Type of Squirrel Cage Motor and Electrical Characteristics	Normal starting torque and normal current, equivalent to NEMA Design B motors.
Rated Voltage	4,000 VAC
Nominal Voltage	4,160 VAC
Phases	3
Frequency	60 Hz
Nominal/Full Load Speed	900/890 RPM (Data from existing motors)
Service Factor	1.15
Insulation/ Enclosure	Class F/ Weather Protected Type II

New Motor Electrical, Physical and Operational Specifications	
Temperature Rise @ 1.15 SF	90° C (by resistance)
Duty	Continuous
Full load Amps	279 max (data from existing motors)
Stator RTD's	Copper 10 ohm @ 25°C
Bearing Thermocouples	Copper Constantan Dual Element
Rotor and Stator Bars	Copper or Approved Copper Alloys
Motor weight (data from existing motors)	13,600 lbs

2. Other requirements

a. Rotation and axial play

The shaft rotation shall be bidirectional. Total rotor endplay shall be adequate to the specific characteristics and application of the motor as per NEMA MG 1-20.81.

b. Service factor

The motor shall be capable to be loaded up to 1.15 times its nominal capacity of 2250 HP and its load equivalent in amperes at nominal voltage, frequency and temperature, without exceeding the 90°C temperature rise.

c. Frame and foundations

The frame of the new motor shall be of similar physical characteristics and dimensions of existing motor frames, in order for the new motors to be installed directly and without modifications to the existing installations or bases at the plant.

If the motor needs a transition or adaptor piece to match existing dimensions and shaft height, the Supplier shall and must provide it with the motor. The transition piece provided shall be designed so that it matches existing base foundation dimensions and can be installed directly and without modifications to the existing bases and/or facilities. (Note:

Since two motors are purchased, the Supplier shall provide one base for each motor, if applicable.)

No matter the information provided by PREPA (due to the lack of information and drawings of these motors), the Supplier is sole responsible to check and verify in place the actual dimensions in order that the new motors can be installed directly and without modifications to the existing bases and/or facilities.

d. Winding insulation temperature measurement

This temperature shall be measured by a minimum of six copper, 10 ohms RTD's, factory embedded and equally distributed around the 360°. The temperature rise specified shall never be exceeded by any part of the operating equipment, nevertheless that the motor be operated continuously at its maximum electrical and mechanical power, including its additional capacity provided by the service factor specified above its nominal capacity.

e. Bearing thermocouples and thermometers

Each motor bearing shall include the following equipment:

1. One thermocouple Copper Constantan Dual Element provided with its wiring and independent connection box. See Section H.13.d.
2. One dial thermometer, helix type bimetal element, 3 inch diameter head (minimum), 0.5 inch NPT male connection nut, rugged 304 SS construction, 0°F to 240°F dial range, 2° divisions, back connection and an appropriate stem length for the application.

f. Thermal resistors

The motor shall be provided with thermal heating resistors (space heaters) of adequate capacity to operate at 120 volts, one phase, and 60 hertz. The space heaters shall never be in contact with the stator windings. The motors shall include an independent connection box of appropriate size with the provisions to connect the heaters to the existing facilities. The thermal resistor shall be installed so as to transfer the heat to the core instead of the winding, keeping at least 10°C over the environment (ambient) temperature (approximately 40°C), insuring that no internal water vapor condensation occurs inside the new, proposed equipment.

3. Electrical insulation technical requirements

a. General characteristics

The motor shall be provided with class F (non-hygroscopic) insulation with design and operational characteristics adequate to be operated in an ambient and conditions usually found in the power plants. They are located in a tropical zone close or near sea level. The insulation shall have anti-fungi properties. The insulation shall have integrity and shall be sealed and made with materials capable to protect against the detrimental effects of high (100%) relative humidity, oil and chemicals.

b. Insulation methods

Insulation method required for the conductors, coils and material in motor windings shall be vacuum pressure impregnated ("VPI") or solvent less B-stage Epoxy-resin rich tapes. Whenever VPI is not utilized, after coils are completed, the stator assembly shall be completely flooded by immersion with the best available dirt resistant insulating varnish, drained and baked, producing a sealed, dry and smooth external winding surface. Conventional winding insulation methods not expressly indicated in this section will be rejected. Any insulating method used on motors fabrication shall improve coil performance and motors life in severe environments and eliminate all corona-generating points on the windings.

c. Windings and end turns

The windings and end turns shall be firmly braced and firmly secured to avoid vibrations. The contractor, supplier or manufacturer shall verify that end turns do not interfere with the installation and removal of the motor rotor, with its normal operation and with the future assembly and disassembly.

4. Starting and operating requirements

For the purpose of being able to evaluate bidder proposals, the following information, expressly confirming requirements fulfillment as specified or differences as applicable, shall be provided on bid proposal. Not providing required relevant information may render proposal as non-responsive (no-bid) at PREPA discretion.

a. Rotation

Motor electrical and mechanical characteristics shall allow the motor rotation and cooling system to be bidirectional.

b. Starting characteristics

The new motor minimum starting torque requirement shall be 100% of the load. The breakdown torque shall be equal or greater than 180% of the load. Motors shall be capable of across the line starting, and accelerating with 100% mechanical coupled load, up to rated (nominal, nameplate) speed including the service factor required. Motor shall be capable of two consecutive starts, and a third start within fifteen minutes to forty five minutes after the second start without any detrimental defect to its mechanical and electrical design characteristics and related components (NEMA MG 1-20.43).

c. Operational voltage limits

Motor shall be capable of continuous operation at full load with eighty percent (80%) nominal voltage on its power leads, and shall satisfy starting requirements in a range between 80% to 120% of nameplate's nominal operation voltage (NEMA MG 1-20.45).

d. Operational current limits

Full load current when operating within ten percent (10%) of rated voltage shall not exceed by more than fifteen percent (15%) rated full load current (1.15 times) including the power factor.

e. Operational time and starting current limits

1. The real starting current of the motor shall not exceed the established limits of the KVA per horsepower.
2. The locked rotor time interval shall be equal or greater than the maximum acceleration period (in time) when the equipment is started with maximum load, including the service factor, at minimum voltage limit (80% of the nominal voltage), without any detrimental effect to the operating equipment.

f. Winding temperature increment

Winding real temperature increment, when operating the equipment continuously at its nominal full load and mechanical capacity, including the specified service factor, shall not exceed the temperature rise limits as specified and required.

g. Grounding connections

Motor shall have provisions for grounding according to latest NEMA MG2-209 revision and all other applicable standards. The motor shall



have two (2) suitable grounding pads, one located on main conduit lead box side of motor, and the other in opposite side, both on or near the frame base, capable of accepting #4/0 AWG copper conductors for this purpose.

h. Operating speed

The nominal speed of the new motor shall be 900 RPM. The full load speed of the new motor shall be no less than 890 RPM.

5. Rotor specifications:

a. General

Motor rotor bars and rings of the squirrel cage type shall be constructed using copper or copper alloys approved for this kind of equipment with appropriate structural reinforcements for adequate operation and failure prevention. Proposals offering motors with aluminum conductors/bars will be rejected.

The number of rotor flutes shall not be equal to the number of poles of the motor in order to permit the use of predictive equipments without electrical interference or distortion.

Coils ends shall be braced with surge epoxy rings end castings. Care must be taken with these rings so that it shall not interfere with rotor installation or removal.

b. Mechanical balance of the rotor

The rotor shall be statically and dynamically balanced (at its nominal load and speed) in accordance with the requirement of the standard MG-1-20.53 and its latest recommendations and revisions. When new mechanical couplings are requested to be included with the motors, the balance shall be done with the coupling installed on the motor.

c. Vibrations

The vibrations of the motor, at its maximum load and nominal speed, shall not exceed an amplitude of one mil of an inch (0.001 inch) crest to crest, in accordance with the recommendations of the IEEE Standard 7-16-1969 as revised 9-15-1982 or its most recent revision. In relation to the equipment characteristics referred to the horizontal, vertical and axial vibrations, the Supplier shall submit for any equipment supplied to the Authority, the following:

- Estimated horizontal, vertical and axial vibrations as

expected for the equipment (motor with its transition base, if applicable).

- Tolerable limits of vibration in normal operation and recommended limit for shut down.
- Vibration and current spectrum of the equipment manufactured for PREPA.

Note: The manufacturer may supply these data in his preferred measurement units, but it shall include at least one set of data in inches/second.

d. Design materials and construction

New motors design, materials and construction shall secure the most reliable service, the best operation characteristics, oscillation elimination and the lower possible noise measured as per IEEE standard 85 and its latest revision.

H. Mechanical specifications

1. Lubrication system

The motor shall be provided with two (2) split sleeve bearings, as described on Item H.2 below, designed to operate by means of a self lubrication system, presently in service with the existing motors. The lubricant or oil shall be supplied to the bearing or equipment during its start up, operation and shut down by means of the required lubrication system.

2. Bearings

Heavy-duty sleeve bearings are required by PREPA, preferably of the outboard type. They shall be of easy removal, bi-directional, split housing, and lubricated by means of a self-lubrication system. The bearings shall be constructed as per NEMA and any other applicable standards for the design, for the materials to be used and for the construction of motor bearings for the specific application of the reference motor. Bearings shall be appropriate to operate under the conditions established for the motor operation. They shall be sealed against leaks and vapors of the lubricant to the interior of the motor. They shall also be sealed externally against the incoming moisture, dirt and dust.

The bearing housing shall provide, for each bearing, in an adequate location, drain plugs that could be easily removed when necessary. Lines with adequate valves shall be provided to allow for oil sampling for each bearing and/or for the main tank(s) of the lubricant. These lines for oil sampling shall not be taken directly from the bottom of the bearing or tank reservoirs where sludge precipitates (to

avoid sediment in the samples). Facilities to add and remove oil easily shall be provided.

Ball bearings will not be accepted as an alternative to the main proposal. Proposals of motors with ball bearings will be rejected.

Bidders shall quote for two spare set of bearings as an option to be evaluated at PREPA discretion, one for each motor. The set will include a front end bearing assembly and one rear end assembly. Each assembly must include the following: housing, bearing liners, bearing seals and lubrication rings. If the assemblies are identical, two shall be provided.

For evaluation purposes this option shall be evaluated as part of the main bid.

3. Bearing electric insulation

One of the motor bearings shall be electrically insulated to eliminate the possibility of circulating eddy currents through the shaft and journal with their detrimental effects. One and only one of the bearings shall be designed and constructed to drain or allow the current flow to ground without any detrimental effects to equipment.

4. Mechanical couplings

The new motor shall use existing couplings without any required modification. Bidders are responsible to inspect and verify in site the existing couplings at the equipment. If the new motor needs a different coupling, then it shall be included with the motors without additional cost to PREPA. The load side of the coupling shall be supplied without perforation (blind).

5. Frame

The new motors frame shall be similar to the existing motors physical characteristics and shall be designed for its direct installation without any modifications to the existing bases and power connection facilities, as specified in Articles B.1 and G.2.c.

Included in Addendum B are drawings and additional information of the existing motor, which shall be used as a reference guide for the design of the new motor. No matter the information provided in this drawing, the Supplier is sole responsible to check and verify in place the actual dimensions in order that the new motor shall be designed and installed directly and without modifications to the existing bases and/or facilities. Exceptions between existing dimensions and the new equipment shall be indicated on corresponding Section VI "Exceptions" of Addendum A. Any repairable difference or discrepancy between the offered or supplied equipment and the existing installation or equipment shall be explicitly

indicated in Section VI "Exceptions" of Addendum A: "Proposal to Supply Electric Motor".

6. Inspection Peepholes

Motors with sleeve bearings shall have inspection peepholes to visually inspect the lubricant flow and ring sight gauges to see the oil level and condition. They shall be constructed using clear glass. The sight gauge shall be provided with a drain plug of easy removal for each one of the bearings.

7. Allowable axial displacements

The maximum axial displacement allowed to the shaft, motor endplay, shall be as required in Article G.2.a. This should be measured from both ends of displacement up to the magnetic center of the rotor at maximum load and nominal speed. The magnetic center and its allowable limits shall be clearly indicated and identified on the journal housing and/or on the motor frame.

8. Frame characteristics

The motor frame shall be designed so that it could be easily cleaned without the necessity of dismantling the equipment for this purpose. The cooling vents shall be provided with stainless steel protectors or screens and reusable air filters with their filter housing if applicable (filters shall be provided). The required external housing is Weather Protected Type II.

9. Connection boxes characteristics

The connection boxes for the power leads, RTD's, thermocouples and heaters shall be of appropriate dimensions and with enough space to allow the connection and disconnection easily. The connection boxes shall be located in accordance with the existing motor boxes location or as per supplied diagram by PREPA if a written requirement is made by the bidder or supplier. A 2-inch pipe tap shall be provided in the top of the main electrical connection box.

10. External protective paint

All the external components exposed to the ambient or subject to heating being fabricated from cast iron, iron, steel or carbon steel shall be painted in factory with at least two layers of the best quality paint in the market and shall be heat, oil and dirt resistant. They shall resist ambient effects as they apply in accordance with the best industry practices on the equipment manufacturer. All the other components and parts made in iron, steel or steel alloy, not exposed to the ambient or subject to high temperatures, shall be finished in factory with at least one priming coat plus a second external coat in order to obtain minimum thickness of 4.5 mils. The primer should be a red iron oxide zinc chromate alkyd

of .75 to 1 mil adequate to protect equipment against corrosion in the conditions and location of the equipment in a tropical zone. The outer paint layers shall be as per manufacturer standard color or as per instructions supplied by PREPA through its representative. Motors external frame and parts shall be completely painted. No lead-based paints shall be used.

11. Personnel qualifications and labor development requirements

All work shall be performed and completed in a thorough workmanlike manner and shall follow the best modern practice in the manufacture of materials and apparatus of the type covered by this specification, without any omission from the specification or drawings. All parts shall be made accurately and to standard gauge, where possible, so as to facilitate replacement and repairs.

12. Range of preferred weight

New motor total weight shall not exceed existing motor weight of 13,600 lbs. However, PREPA reserves its right to approve and accept new equipments proposed with additional weight up to 15% above existing motor weight.

13. Requirements to adapt the motor to the existing facilities

a. Power leads

Stator leads shall extend at least **36 inches** beyond the frame. The power conductors shall be constructed of super stranded copper conductor or approved copper alloys of the appropriate gauge for this particular application. The conductor insulation shall be super flexible with the required voltage capacity. The holes in the stator frame through which the leads extend shall be equipped with insulated bushings or substantial non-degradable material, designed to protect leads from chafing due to bending or friction. They shall be of ample dimension to permit them to be securely fastened to the frame.

The new motors shall have a separate connection box to locate the stator wye configuration closing power cable leads. This connection box shall be identical in dimension and located at the opposite side of the main connection box. The wye closing power leads shall be brought out appropriately within this box to permit proper and easy access for its connection.

b. Space heaters cables

The space heaters cables shall be provided with weatherproof electrical terminals and shall be brought out to a separated weatherproof connection box, which shall be used exclusively for this application.

c. RTD's & thermocouples cables

The stator temperature detectors and bearing thermocouples cables shall be brought out to a separate terminal weatherproof box on the motor frame for convenient connection. The leads and conductors shall be appropriate for this particular application.

d. Bearings thermocouples and thermometers

Motor bearings shall be equipped with dual element, type T thermocouples (copper constantan) and 3-inch dial thermometers, helix type bimetal element. They will be used to obtain temperature readings in the lubricated area.

Thermocouple leads shall be brought out to terminals located on an appropriate connection box at head assembly (see item c above). Head assembly shall be aluminum made and shall be painted with the color code for T-type thermocouples. Insulated holders shall be used as required to prevent static pick up. The head assemblies shall be arranged for convenient connection to PREPA existing conduits. The leads and conductors should be designed and constructed for this particular application.

e. Noise contamination

The no load overall sound power level ( dBA reference,  $10^{-12}$  watts) of these motors shall be less than 85 decibels when measured in accordance with IEEE Standard 85; and ANSI 51.2 and 51.3 and its latest revisions.

Proposals offering motors with an overall sound power level up to 90 dB will be evaluated and considered at PREPA discretion.

f. Winding temperature detectors

Stator winding temperature shall be measured by six (6) copper, 10 ohms at 25°C, factory embedded resistance temperature detector's (RTD's), two per phase. They shall be located and equally distributed in the 360° of the winding. The leads and conductors shall be designed and constructed for this particular application.

g. Inspection windows

Two inspection windows (if applicable) shall be provided, one on each side of the housing. These windows shall have handles and gaskets to

protect from the ambient. They shall be of the appropriate dimensions to allow cleaning the lowest part of the motor.

I. Tests

1. General

The manufacturer shall make all necessary tests to ensure his material and workmanship are of the required degree of excellence and that the equipment furnished by him shall perform as specified and guaranteed. All tests shall be conducted in accordance with the latest applicable tests codes for this type of equipment from the National Electrical Manufacturers Association, the American National Standard Institute, the Institute of Electrical and Electronics Engineers and other related organizations.

The manufacturer shall provide PREPA all data obtained from the equipment tests as required. The obtained values shall be tabulated in each and every one of the tests and written certified including the graphs and curves obtained. Any test failure due to inability to meet appropriate parameters as required by PREPA and as proposed and guaranteed by the contractor, shall be considered sufficient cause for motor rejection.

2. Factory/Shop acceptance tests

Factory acceptance tests are required by PREPA. PREPA's intention is to witness factory tests to verify efficiency and performance parameters of the motors.

A notice with at least 45 days of anticipation time shall be given to PREPA to allow PREPA to make arrangements to send their representatives to witness the acceptance tests, if PREPA so desires.

The following minimum tests shall be made on the motors during factory acceptance tests:

- a. Measurement of winding resistance
- b. Magnetic center determination
- c. Air gap measurement

- d. Bearing temperature rise at running speed
- e. No-load readings of current, voltage, power and nominal speed at rated voltage and frequency
- f. Mechanical vibration
- g. Direction of rotation versus phase sequence
- h. Insulation resistance
- i. High-potential test
- j. Determination of locked-rotor (zero-speed) torque and current
- k. Determination of speed-torque curve
- l. Determination of speed-current curve
- m. Temperature tests
- n. Sound measurement as per IEEE 85
- o. Shaft voltage test as per IEEE 112.9.4
- p. Determination of efficiency and power factor at 100% load

The results of the tests shall be sent to PREPA within ten (10) consecutive days after their completion and before equipment shipment to PREPA.

Cost of witnessed tests shall be quoted as an option. Travel, hotel and food expenses shall be the responsibility of PREPA.

For evaluation purposes this option shall be evaluated as part of the main bid.

3. Motors efficiency tests

Motor efficiency shall be determined using IEEE 112 test method F. The results of the efficiency tests shall be used to determine motors compliance with the efficiencies offered and guaranteed by the contractor in his proposal. Failure to meet guaranteed efficiency shall be considered sufficient cause for motor rejection.



4. Alternative or simulated tests

When operational factory acceptance tests at nominal voltage, current and/or speed cannot be accomplished at manufacturer facilities due to sound and valid reasons, including under capacity to operate the motor, then alternatives such as simulated tests at lower than nominal capacity can be performed. Alternative tests shall be authorized by PREPA in written, depending on the validity of the reasons to PREPA satisfaction. The obtained values shall be tabulated in each and every one of the tests and written certified including the graphs and curves obtained. The results shall be sent to the PREPA within five (5) days after the tests completion and before the equipment shipment to PREPA.

5. Additional tests

PREPA reserves its right to perform all necessary electrical tests to the motors or additional tests using its personnel or third party contractors before or after the final acceptance and installation at PREPA discretion.

J. Motor Drawings and Instruction Manuals

Supplier shall provide as part of new motors delivery a final AS BUILT set of drawings and motor instruction manuals in hard copy and Microsoft Word (.doc) or Adobe Acrobat Reader (.pdf) format.

SPECIAL CONDITIONS  
TS-E27-09  
REV. 1 @ AUGUST 4, 2009

I. Definitions

These Special Conditions and the Technical Specifications contains the minimum requirements for the purchase of two (2) new horizontal electric induction motors to drive the Gas Recirculation Fans of Units 5 and 6 of South Coast Steam Plant, from the Puerto Rico Electric Power Authority, "PREPA" herein after, towards possible suppliers denominated "Bidders" during bidding process. For the purpose of this specification, "Purchasing Officer" shall mean the Head, Purchasing Division, and "Engineer" shall mean the Head, Maintenance and Power Plants Technical Services Division for PREPA, both acting directly or through their properly authorized agents, denominated "PREPA representatives". After bid award, the awarded organization or company will be herein after denominated "Supplier" or "Contractor". "Purchasing Officer", "Engineer" and PREPA designated representative for the above purpose shall coordinate all necessary PREPA work, decisions or technical assessment with Bidders, Supplier(s) or Contractors.

II. Main Purpose

Intended initial purpose of these Special Conditions and Technical Specifications is to acquire two (2) new horizontal electric induction motors for the aforesaid purpose. Motors bid offering, quotations or supplied motors, must be similar to original equipment installed at indicated plant sites taking in consideration their electrical, mechanical, operational and physical characteristics and dimensions. The new supplied motors shall be direct interchange of existing motors without modifications to the existing facilities for its proper installation. **If discrepancies are found between the provided motors and the existing motors, it will be the Contractor sole responsibility to solve all the difficulties found in order to provide an effective motor installation and operation without any cost to PREPA.**

This includes, but shall not be limited to, all necessary site inspections or visits for field measurements as adaptation of the new motor to existing lubrication system, power system, mechanical couplings, instruments and supervisory equipment and all new motor modification requirements to the specific installation site in the plant. New motor adaptation requirements includes, when applicable, electrical and/or instrumentation installations and other existing provisions as the use of existing mechanic coupling and to provide adequate alignment facilities, etc. Any and all deviations from original motor specifications shall be expressly indicated on Section VI, "Exceptions" of the required information for bid analysis, Addendum A, denominated "Proposal to Supply Electric Motor", which including Invitation/Bid/Purchase Requisitions/order, Technical Specifications and Special Conditions and any and all other included drawings and documents shall constitute the complete document which state all PREPA requirements for the indicated purpose.

The motors shall be appropriate and adequate for the application and use in a generating power plant and shall be designed for an estimated minimum useful life

of 20 years, when the motors are operated at its nominal voltage and 100% of its full capacity. The Contractor or Supplier shall guarantee this period of time of useful life and the availability of parts and components required to be replaced in order to achieve the useful design life. In addition, these components and parts of the equipment shall be designed and constructed so that they be easily substituted or replaced.

### III. Requirements

The following includes several requirements and conditions which Bidder or Supplier favored with bid award and corresponding purchase order ("Contractor") to supply required equipment, are required to comply with, and which will be considered, as indicated or applicable in bid evaluation and recommendation.

#### A. Warranty

The Contractor warrants the satisfactory and successful operation of the motors furnished under this order for the services specified and required during its expected life; that all materials, parts, equipment, and work furnished, comply in all respects with these Technical Specifications and Special Conditions; that they are free from latent and patent defects in design, materials and workmanship; that they are suitable and adequate for the purposes for which they are designed and for such other purposes, if any, as specified. The warranty period will begin at the date on which the equipment is delivered to its delivery place and accepted by PREPA, and will continue for a period of 365 calendar days. During the warranty period the Contractor will, upon written notices by PREPA, fully remedy, free of expense to PREPA, such defects as may develop on said materials, parts or equipment, provided that it has been properly stored, installed, maintained, and operated within the specified parameters. If the equipment is not installed or set in service within the first six (6) months, PREPA requires that the warranty period be extended for eighteen (18) months.

Proposals limiting Contractor's warranty or liability, such as exclusion of warranties of merchantability and fitness for particular purpose will be rejected.

For those materials, parts, and equipment, which prove defective or deficient during the warranty period, the Contractor at his own expense shall repair or replace, transport-in, from Contractor's facilities to PREPA's site and transport-out, from PREPA's site to Contractor's facilities, such materials, parts and/or equipment. The performance Bond shall cover and serve as guarantee for the Contractor's failure, in whole or in part, to properly perform his obligations under this warranty.

For parts and equipment to be procured by Contractor from other suppliers, and which will be furnished by the Contractor to PREPA under this order, a written warranty shall be obtained by the Contractor from such suppliers and legally tendered to PREPA prior to commencement of work.

B. Motor efficiency evaluation

The evaluation, analysis and awarding of this bid shall be made in accordance with the Life Cycle Cost Criteria or the Energy Efficiency Rating of the equipment, as required by Law 69 of June 8, 1979. Bidders shall fill the required spaces related to the energy efficiency criteria included in this invitation to bid. Bids not complying with this requirement shall not be accepted.

Efficiency evaluation and life cycle cost evaluation of this bid shall be done in accordance with equipment data provided by Bidder(s) and documents herewith included in Addendum C, Life Cycle Cost and Energy Efficiency Rating. Motors efficiency shall be determined using **IEEE 112 method F** (See Section I, Tests of the Technical Specifications). PREPA shall verify the motor efficiency based on shop witnessed tests results. This Addendum explains the criteria and calculation to be used to determine the energy efficiency utilization and to evaluate the costs of the useful life between two (2) or more motors of different efficiencies and different power factors.

**Bid proposals without required information for efficiency evaluation and life cycle cost evaluation shall be rejected.**

PREPA intends to verify the efficiency and performance parameters at factory acceptance witnessed shop tests. **Any test failure due to inability to meet appropriate parameters as required by PREPA and as proposed and guaranteed by the Bidder, shall be considered sufficient cause for motor rejection.**

C. Delivery

1. **Delivery time required for the motors shall be 270 consecutive days after drawings approval to South Coast Steam Plant. Quotations with delivery time within the required delivery time will be considered on an equal basis. Quotations exceeding the maximum delivery time as stated above will be rejected.**
2. Time schedule for the delivery of equipment:
  - a. **After order award, the Contractor shall supply to PREPA within thirty (30) consecutive days all diagrams and/or drawings for a written approval from PREPA to start the manufacture of the**

equipment (see section III. H.1.a). If the Supplier fails to comply with the time established to submit the drawings for approval, then **the excess of time shall be subtracted from the required delivery time established on Section III.C.1 (Delivery).**

- b. **Drawings shall be written approved by PREPA representative for the commencement of the equipment manufacture within twenty-five consecutive days after received from the contractor** (see section III.H.1.a).

- 1. If the real time for evaluation and approval of drawings exceeds the time previously established, PREPA will grant an **equivalent time extension for delivery.**

- c. If drawings are not approved by PREPA, because they do not comply with PREPA requirements, the Supplier shall have **twenty additional consecutive days to submit the new drawings** and these days will be subtracted from the required delivery time established on Section III.C.1 (Delivery).

If drawings or diagrams submitted to PREPA complies with PREPA requirements and they are not approved because of PREPA's special interest or reasons, then an equivalent time extension will be granted for this period of time.

- d. After drawings approval by PREPA, the Supplier shall have the time established in section III.C.1. (Delivery) to furnish the new equipment as specified.

**In no way the Supplier shall start fabrication or manufacture of the equipment until the drawings are already approved by PREPA by stamping the corresponding seal. This will be the final authorization to proceed with the manufacture.**

- 3. **The motors shall be delivered to South Coast Steam Plant in Guayanilla, PR freight insurance and taxes included** (F.O.B. South Coast Steam Plant). The Supplier is responsible to comply with the shipping, handling, identification and delivery indicated in Section III.I.

D. Penalty for delays

The date to be used in order to determine the delay penalty, if this is applicable, will be the date of drawings approval by PREPA, as per Sections III.C, III.H.1.a and the remaining applicable sections.

If the Contractor fails to comply with the delivery dates established in these Special Conditions, PREPA might, by written notice to the Contractor terminate his right to supply the new motors because of the delay. In such event, PREPA may cancel official purchase order issued and award a new order to the second best Bidder or open new bid for motor purchase. If PREPA does not terminate the right of the Contractor to proceed, the Contractor shall deliver equipment later, in which event the contractor shall pay to PREPA a penalty of one half (1/2) of one percent (0.50%) for each calendar day of delay in the delivery and acceptance of the motor, completing the work or separable part thereof up to a maximum of ten (10%) percent of the order price, and the Contractor and his sureties shall be liable for the amount thereof; PROVIDED that the Contractor shall not be liable to such amount when the delay in delivery is due to unforeseeable causes beyond the control, and without the fault or negligence of the contractor, including, but not restricted to, Acts of God or the public enemy, fires, hurricanes, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or delays or subcontractors due to such causes, or failures on the part of PREPA to carry out his obligations; PROVIDED, HOWEVER, that the Contractor shall within ten (10) days from the beginning of any such delay, notify to the Head of the Materials Management Division in writing of the causes of the delay, who shall ascertain the facts and extend of the delay and extend the time for delivery when in his judgment, the findings of facts justify such an extension; PROVIDED, FURTHER that no claim shall be made by the Contractor against PREPA, its agents, contractors, subcontractors, employees, successors, assigns, or any cause whatsoever, during the progress of any portion of the work embraced in the contract. Any damages caused by the delays or hindrances exclusively by PREPA shall be considered as fully compensated for by the extensions of time as provided above. If the delays causes are not reasonable or accepted, appropriate adjustment on Contractor's payments may be done by PREPA. If the delays causes are reasonable and accepted by PREPA, the Contractor will be entitled to an equitable adjustment. Contractor agrees that said penalty shall not be subject to reduction, moderation, or modification since this penalty is a pecuniary punishment for the delay, and not a liquidation of damages.

Bidder shall clearly state in his proposal the acceptance of this clause; however, Bidder's silence on this regard shall be understood to mean full acceptance of the clause and all its terms. Rejection or no acceptance of this clause will be cause for rejection of Bidder's proposal.

The Contractor must send to PREPA a written acknowledgment of the order or request.

In case the Contractor fails to send the acknowledgment, this clause will be activated commencing two weeks from the date of PREPA's written request or order.

United States Mail postmark dates, or any other means of acknowledgment approved by PREPA, will be used in the determination of the periods of time stated in this clause.

E. Insurance

1. Requirements for policies of insurance

All policies required under this Technical Specifications and Special Conditions will be endorsed as below:

- a. As additional insured:  
PUERTO RICO ELECTRIC POWER AUTHORITY  
Risks and Loss Control Management Office  
PO BOX 364267  
SAN JUAN PR 00936-4267
- b. With respect to its cancellation, all policies will be endorsed as follows: "This policy can not be canceled, or changed to limit or reduce insurance provided, or change insured name, without a written notice with thirty (30) days of anticipation to PREPA's Risks and Loss Control Management Office, evidences by a certified letter receipt".
- c. An endorsement including this purchase under contractual responsibility coverage identified by number, date and parts of the Contract.
- d. Subrogation renunciation in behalf of PREPA.
- e. Violation of any guaranty or policy conditions will not affect PREPA rights under this policy.

2. Policies and bonds required

- a. All insurance policies and bonds required will be done in an acceptable way for PREPA and they shall be through insurance companies authorized to provide those services in Puerto Rico.
- b. The Contractor will provide the original and a certificate copy of any Bond required fully expedited by an agent countersigned by an authorized representative.
- c. The Contractor will provide a complete copy of each policy required by this order, endorsements originals, as described in section III. E.1, and the insurance certification signed by a company authorized representative describing the provided Insurance. Certification will

be made using the "ACORD" formulary, which can be obtained at PREPA's Risk and Loss Control Management Office (**Tel. 521-4586, Fax 521-4590**).

- d. The Contractor, as per PREPA written requirement, will provide the most recent annual statement presented to the Puerto Rico Insurance Commissioner including the most recent annual financial statement of the authorized insurance companies, which insured or reinsured any insurance required.
- e. The Contractor shall provide the required policies and bonds within ten (10) days after the bid award.

3. Excess limits and additional insurance

- a. If different limits and additional coverage are required in the Special Conditions, it is understood that the Special Conditions required will prevail.
- b. It is understood that the Contractor could have limits and coverage in excess of contract requirements.

4. Responsibility and Contractor's obligations

For the present it is understood and agreed that the existence of the insurance required in these Special Conditions will not mean a resignation or relief of any of the responsibilities or obligations of the Contractor under this mentioned Document.

5. Bond

- a. The Contractor will provide the following as order guarantee, when the order is awarded:
  - 1. A one hundred (100%) percent performance bond of the quoted price with enough and good warranty at PREPA satisfaction that the Contractor will fully comply with contracted work within specified term.
- b. Additional warranty

If the warranty provided is not acceptable by PREPA, the Contractor will provide the additional guarantee required from time to time to protect the interest of PREPA and the people providing the workmanship or materials in the realization of the work covered by these Special Conditions.



F. Required information with Bidders proposal and evaluation factors

Requirements to consider any quotations in Bid process are included below. **Not to include any specifically required information shall cause the rejection of the proposal.** In addition to all other factors pertaining to all Technical Specifications Sections and any and all documents included as part of the bid invitation and/or purchase order included as part of the totality of the requirements, the following factors will be considered (when applicable), based on Bidder's proposals information. The following information shall be submitted to consider proposals in the evaluation process. **Bids not meeting these requirements may be considered non-responsive and PREPA reserves the right to reject them.**

1. To provide all the information required in Addendum A: "Proposal to Supply Electric Motors"

**Bidders shall fill and complete all information required on Addendum A: "Proposal to Supply Electric Motors"** attached and included as part of these Specifications and Special Conditions. Bidders shall fill all blanks, complete and include all the additional information required in all sections and pages of Addendum A, and include it as part of the requirements of this Technical Specification and Special Conditions.

2. Other requirements

- a. Tests list

Bidder shall furnish information on tests that will be performed to the motor and its criteria toward the interpretation of results.

- b. Diagrams and drawings

**Bidders shall supply the drawings, diagrams and the technical information used for the manufacture of the motor, indicating all the dimensions, technical specifications and engineering instructions for the offered motor.**

Operational characteristics, recommended limits, maximum limits of electrical and mechanical parameters like current, voltage, efficiency, power, temperature vibrations, etc., shall be included. In addition, graphs with curves and parameters measurements shall be included as follows.

- 1) Starting current versus time graph, including the maximum time of safe operation for the equipment during start up and with locked rotor.

- 2) Starting current versus acceleration time at 80 and 100 percent of the nominal voltage including the initial load ( $WK^2$ ) of the loading equipment with motor being at rest or shut down prior to the start up. A similar elaborated graph is required for the motor at its nominal maximum temperature at full load.
- 3) Torque and current versus speed graph at 80 and 100 percent of the nominal voltage.
- 4) Torque versus speed graph indicating the following points including its corresponding load current.
  - a) Locked-rotor torque
  - b) Accelerating torque
  - c) Pull-up torque
  - d) Full-load torque
  - e) Pull-out torque
  - f) Break down torque

c. Design of materials

List of sources of materials and their original, which shall be subject to purchaser's approval.

d. Service shop

Location of nearest field service shop: address, telephone, facsimile and manager's name.

e. List of equipment users

Bidders shall supply a list of power plants using the same proposed equipment for more than five (5) years, including sufficient technical and chronological information to demonstrate that the design has proven to be successful. The list shall provide the power plant name, company, locations, telephones and contact persons to confirm the provided information.

f. Basic bid cost items

**Bidders shall supply the following itemized cost quotation or estimated cost for each individual item**, whether it is or not included on the cost of the basic equipment quotation. This information shall be considered in equal conditions as they apply and shall be used as an evaluation criteria for base bid award, unless otherwise indicated:

- 1) Motor basic price. **The basic price shall include the transition base for the motor, if applicable.**

g. Optional cost items

**Bidders shall also include prices for the following items, which will apply in case that PREPA decides to include them in the order.** PREPA reserves the right to include or exclude all the items.

- 1) Factory acceptance witnessed tests for one motor - PREPA has the intention to send representatives to witness real operation tests in factory. This cost shall be included on base bid evaluation cost.
- 2) Two spare sets of bearings as described in Sections H.1 and H.2 of the Technical Specifications. This item shall be included on base bid evaluation cost.

3. Exceptions

In Section VI "Exceptions" of Addendum A, **every exception, no matter how minor, shall be indicated and explained to each specific section of this specification.** Any statement in this specification shall prevail over any conflicting statement in Bidder's proposal unless an express exception is listed in the special paragraph entitle "Exceptions" in Addendum A. However for the purpose of this specification, differences between equipment offered and existing or original equipment are not necessarily considered exceptions. Such differences, when offered equipment can be adapted to existing facilities and equipment without any cost to PREPA and under sole Contractor's responsibility for such modifications, are NOT considered as "Exceptions". Differences between equipment offered and existing one shall be expressly stated at Section VI: "Exceptions" of Addendum A and the adaptation of supplied equipment, including any and all associated costs shall be of sole Contractor's responsibility, including all necessary site inspectors on visit for field measurements or another purpose related to this project.

G. Payment

Unless otherwise stated in bid proposal, subject to PREPA approval, equipment supplied invoice will be paid as per PREPA Standard Payment Terms, after formal acceptance of equipment by PREPA.

PREPA does not accept any payment to be issued before actual equipment receipt and acceptance.

H. Required technical information, documents and material with new equipment delivery

1. **Formal acceptance of equipment(s) is subject to the receipt by PREPA of required drawings, diagrams, technical information and installation/operation manuals.**

a. Diagrams, drawings and technical information

The Supplier shall send to PREPA final design and engineering information as required, including the following items:

- 1) A final set of drawings. **In addition, a copy of the drawings shall be included in CD-ROM format compatible with AutoCAD LT 2000i or latest version.** These drawings shall include the technical manufacturing design information of the equipment with electrical characteristics and mechanical dimensions.

b. Instruction manuals

**Included with the equipment to be received and accepted by PREPA,** the Contractor shall provide a set in original of instruction manual(s) including all the technical information needed for the installation, tests, operation, and repair of the equipment.

This information shall also include the technical manufacturing design information of the equipment with electrical characteristics and mechanical dimensions. **Copy of these manuals shall be sent in CD-ROM format compatible with Microsoft Word or Adobe Acrobat Reader latest versions.**

All technical information related to the equipment foundations, electrical and mechanical connection, and real weight of the equipment, shall also be provided.

2. Instruction manuals and training material

a. General

The intention of these specifications is to define the requirements of PREPA related with the delivery by the Contractor, of the instruction manuals, technical information and drawings of the equipment to be provided by him or its subcontractor. These specifications won't be understood as limitations in reference to the information that the Contractor or manufacturer could or shall supply in its instruction manual(s).

b. Instruction manuals

The Contractor is responsible to include in the instruction manuals all the necessary information to operate, and maintain adequately, the equipment during its useful life by PREPA. The instruction manual shall include at least a detailed description of the equipment, its operational and performance characteristics, instructions for the maintenance, including the total assembly or disassembly of the equipment and an organized parts list including all the real components of the equipment, with its correspondent isometric diagram.

1) Operating instructions of the equipment

The section(s) of the instruction manual which refer to the equipment operation shall provide at least clearly detailed instructions for equipment start up, its normal operation and the normal and critical operational parameters and for the emergency trip out of the equipment.

2) Operational characteristics

The section(s) of the manual which deal with the operational characteristics shall include the engineering technical specifications of the equipment used for the equipment manufacturing, the recommended limits, and the maximum limits of electrical and mechanical parameters like current, voltage, efficiency, power, temperature vibrations, etc. Elaborated graphs with curves and parameters measurements shall be included. The graphs and curves of the equipment supplied to PREPA shall interrelate these parameters so that adequate operation could be monitored to prevent from possible damages or failures.

a) Minimum requirements of the operating curve of the motor:

The Contractor is responsible to supply PREPA all the graphs needed to monitor the appropriate operation

of the equipment including at least, but not limiting the following:

- (1) Starting current versus time graph, including the maximum time of safe operation for the equipment during start up and with locked rotor.
- (2) Starting current versus acceleration time at 80 and 100 percent of the nominal voltage including the initial load ( $WK^2$ ) of the loading equipment with motor being at rest or shut down prior to the start up. A similar elaborated graph is required for the motor at its nominal maximum temperature at full load.
- (3) Torque and current versus speed graph at 80 and 100 percent of the nominal voltage.
- (4) Torque versus speed graph indicating the following points including its corresponding load current.
  - (a) Locked-rotor torque
  - (b) Accelerating torque
  - (c) Pull-up torque
  - (d) Full-load torque
  - (e) Pull-out torque
  - (f) Break down torque

All these graphs shall be supplied in graph paper adequate for its representation and shall include the data used to make them.

3) Maintenance

The maintenance and/or equipment repair section(s) shall include at least the following information:

- a) Instructions and detailed procedures for installation, dismantling and assembly of the equipment and all its parts and components. It shall also include all the

tools and equipment needed for the complete assembly and disassembly of the equipment.

- b) Instructions and recommendations for all the maintenance works required by the equipment.
- c) Instructions to make all the necessary mechanical adjustments, measurements and clearances and the electrical measurements to repair or technically evaluate the equipment.
- d) Recommended inspections and/or specific work including the time interval to provide the adequate preventive maintenance during its useful life.
- e) Recommendations or specific criteria to evaluate the parameters of the equipment to be included in a preventive maintenance program.

4) Spare parts

The section(s) of parts list and components shall include at least the following information:

- a) Classified and organized part list and/or spare components of the equipment including the drawings or diagrams needed for its identification and installation and removal. A list of the recommended available spare parts shall also be included.
- b) The Contractor shall also include complete and clear instructions to order spare parts including the estimated delivery time and the budgetary price of each component.

I. Packing and marking

1. Packing

Equipment shall be adequately prepared, cleaned and finished before actual packing procedure is to be performed. Packing shall be suitable for export to a tropical climate location and for ocean transportation, and shall include the following requirements:

- a. Preparation for ocean transportation

Use only packages constructed of sound new lumber of dimensions proportioned to the size and weight of contents. The Contractor shall not use second hand packing material. All packages must be steel strapped with at least two (2) straps on each package to ensure a solid package and to prevent pilferage. Bundled material must be rigidly steel strapped.

b. Adequate protection

Contractor shall protect the equipment and materials from damage in transit and shall be responsible for any damage due to improper preparation for shipment or weather effects during shipment.

c. Heavy parts

Heavy parts or machines shall be skid mounted or crated according to size and characteristics. All parts shall be prepared for ready handling with slings unless it is unsafe to attach slings to the packing. In such cases, the packed equipment or parts shall be provided with slings coming out to the outside of the boxes. If the slings are not recommended a warning shall be written advising about that. The warning shall be written with letters of one (1) inch or taller at least on two (2) vertical oppose faces.

d. Fragile components

Fragile material must be securely braced within the containers or otherwise amply fastened and packed to prevent shifting or rattling.

e. Ambient protection

The shipping containers shall be fully lined with strong and durable waterproof paper in order to protect the contents from the elements while in transit or stored without cover.

f. Prohibited shipping materials

The Contractor is the only responsible that under any circumstance shall not use straw, rice, or chaff for packing materials.

g. Protection against rust or corrosion

Machined parts must be protected against rust forming and corrosive elements.

h. Authorization to use open containers



The Contractor shall not use open-type crates or fiberboard cartons without prior written authorization of the Engineer.

i. Authorization prior to shipment

The Contractor shall not forward any articles without packing as specified herein without obtaining prior written approval of the Engineer.

j. Separate shipping for the spare parts

Spare parts must be boxed separately. Under no circumstances are they to be included in the containers with the related commodity.

2. External marking

a. General

All external marking must be legibly and durably applied on two (2) sides and both ends of containers in letters at least one and one-half inches (1-1/2") high. This same condition applies to bare material such as, but not limited to, pipe and structural steel. Bundles shall be metal tagged both ends with this information.

b. Packages numeration

Packages must be numbered consecutively for all shipments under the same contract, whether the package is large or small. The metal tags on bundled material must show the number of pieces contained in the bundle and no two packages shipped under one contract shall carry the same package number.

c. Dimensions and weight indications

Net take and gross weight in pounds and the correct outside measurements in terms of length, width and height in feet and inches must be shown on each package, shipping tags and bare pieces.

d. Identification text required

All packages shall be properly marked and such marks shall include the following information:

CONSIGNED TO PREPA  
WAREHOUSE NO. 059

SOUTH COAST STEAM PLANT, GUAYANILLA, PR  
ATTENTION: ENG. PEDRO MORALES, HEAD  
SOUTH COAST STEAM PLANT DIVISION  
PROJECT TS-E27-09  
PREPA WORK ORDER NO. 09-040640  
GAS RECIRCULATION FAN MOTORS UNITS 5 AND 6

e. Sling locations

Marks indicating where to "SLING" shall be put on containers or in its defect or fault indicate "No Sling" at least on 2 vertical faces.

f. Fragile equipment

The packages containing delicate and fragile material shall be marked in black block letters "**FRAGILE, DO NOT DROP**".

3. Shipping instructions and packing list

a. Unless otherwise established by written instructions from PREPA before proceeding with shipment of the materials or equipment under this order, the Contractor shall request shipping instructions from PREPA's Purchasing Division. At the same time the above shipping instructions are requested, the Contractor shall forward to the Purchasing Officer of PREPA, Via Air Mail, duplicate copies of said request for shipping instructions accompanied by detailed packing list in the English Language of all equipment and materials to be shipped. The prompt compliance with these instructions will serve to expedite payment of invoices.

b. Required information on the packing list

Three (3) signed copies of packing lists (one packing list for each separate shipment) are required and the following information must be shown therein:

- 1) Purchase order number, item number, marks, package number. (Packing list shall indicate the number of pieces of each and every item contained in a case or bundle package number).
- 2) Net, tare and gross weights in pounds for each package.

- 3) Outside dimensions of each package specified in terms of length, width and height. Basic unit of measurement must be feet.
- 4) Total cubic footage of each package.
- 5) The type of each container must be correctly stated, and specified i.e., box, bundle, drum, reel, bare piece, plate, etc.
- 6) Number(s) of package(s) making the complete contract. Numbers shall not be duplicated. Any break in continuity must be explained.
- 7) Export marks.
- 8) Two (2) copies of list of contents and description must be enclosed in each container.

J. Quality Assurance Clause

The Supplier or Contractor shall establish a quality control program adequate to satisfy all requirements specified in the procurement documents. The program shall contain all those measures necessary to assure that all basic technical requisites asked for in: drawings, specifications, codes, tests and inspections, special instructions for design, manufacture, cleaning, installation, packing, handling, shipping, long storage when necessary and test equipment, are fulfilled.

PREPA reserves the right to conduct audits and inspections to the facilities, activities and/or documents when estimated necessary in order to assure that the quality control program is adequate and is being properly implemented. The Supplier or Contractor shall allow PREPA access to its facilities and documents, so that PREPA, through audits and inspections can verify the quality of the purchased products or services.

In every case in which the materials or services to be furnished to PREPA are subcontracted partially or totally by the main Contractor, the subcontract shall request the subcontractor to accept and comply with all the requirements of this Quality Assurance Clause.

K. Executive Order Number EO-1991-24 dated June 18, 1991

The Contractor guarantees and certifies that at the moment of the subscription of this contract his Income Tax Report for the last past five (5) years before the date of this order has been filled out and there is not any debt with Commonwealth of Puerto Rico or is subject to a payment plan and the terms and conditions of this plan are in order.

Explicitly it is understood that this is an essential condition of the present order, and if part or the whole certification is not correct, this will be a justified cause to allow the contracting officer to terminate the contract and the Contractor will be responsible to reimburse all the money received under this order. This requirement will be extensive to any subcontractor related with the order when it is awarded or during its term. It will also include any professionals and technicians used by the Contractor. The Contractor will be responsible to comply with the required certification.

**PROPOSAL TO SUPPLY ELECTRIC MOTORS  
(ADDENDUM A)**

Technical Specification: TS-E27-09  
EMPAC Work Order 09-040640  
Rev. 1 @ 08/04/2009

For the purchase of one (2) new horizontal squirrel cage electric induction motors to drive the Gas Recirculation Fans at Units 5 and 6 of South Coast Steam Plant. The motors will be purchased as a substitute of the existing motors.

- I. Available information, to be used as a reference, of the existing equipment to be replaced (see Section G. of the Technical Specifications for the new equipment requirements):

A.

ORIGINAL (EXISTING) MOTOR NAMEPLATE DATA	
Manufacturer	Allis-Chalmers
Type	ANOD Horizontal Type Induction Motor
Serial Number	47104-1
Horsepower	2250 HP
Voltage	4,000 VAC
Full Load Amps	279
Hertz	60
Phases	3
Service Factor	1.15
No Load RPM/Full Load RPM	900/890
Temp. Rise @ 1.15 SF	90° C
Heater	1.5 KW / 120 VAC
Motor Rotation	Bidirectional
Rotor Class	Squirrel Cage
Motor Weight	13,600 lbs

ORIGINAL (EXISTING) MOTOR NAMEPLATE DATA	
Stator RTD's	Copper 10 ohm
Enclosure	Weather Protected
Bearing Type	Kingsbury, Split-Sleeve
Bearing Temp Detectors	Copper Constantan Type T
Type of Service	Continuous

Observations and/or comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

II. Bidders information required by PREPA

A. Technical information of proposed equipment

To consider Bidder's offers, each Bidder shall supply preliminary manufacturing design information and/or new motor nameplate data and other relevant technical information related as required, including one (1) original set of factory design drawings including mechanical dimensions, construction materials characteristics, mechanical, electrical and operational design characteristics of motor and all its components, parts and systems including but not limited to power, lubrication, cooling and instrumentation systems.

1. Detailed and specific description of offered equipment (include all documents, drawings or additional explanatory sheets):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Additional requirements: required graphs on section F.2.b of the Special Conditions (minimum requirements for motor operational curves). Bidders shall supply the following graphs:

- a. Time vs. starting current including the maximum time of safe operation for the equipment during start up and with locked rotor.
- b. Speed vs. torque and current, at 80 and 100% of nominal voltage.

- c. Starting current versus acceleration time at 80 and 100 percent of the nominal voltage including the initial load ( $WK^2$ ) of the loading equipment with motor being at rest or shut down prior to the start up. A similar elaborated graph is required for the motor at its nominal maximum temperature at full load.
- d. Torque versus speed graph indicating the following points including its corresponding load current.
  - 1) Locked-rotor torque
  - 2) Accelerating torque
  - 3) Pull-up torque
  - 4) Full-load torque
  - 5) Pull-out torque
  - 6) Break down torque

B. Life cycle cost technical data for evaluation

- 1. Quantity of identical equipments or equipments with similar capacity and characteristics installed and in operation actually:
  - a. Quantity of similar equipments in actual operation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - b. Locations/countries: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - c. Quantities of similar equipments in actual operation in Puerto Rico: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 2. Reference from equipments in operation, preferably in Puerto Rico, continental United States, Canada and/or other countries, beginning from the shortest

geographical distance.

Equipments with similar or identical capacity and characteristics with:

a.

Five (5) or more years in operation:			
	Company, Address, Telephone, Fax	Contact Person (Name, Position)	Date of Installation & Operation Start Up
1			
2			
3			

b.

Recently sold, installed and in operation:			
	Company, Address, Telephone, Fax	Contact Person, (Name, Position)	Date of Installation and Operation Start Up



Recently sold, installed and in operation:			
1.			
2.			
3.			

c. Equipment construction materials characteristics and design information.

1) Materials used on the manufacture of electric motor:

Kind of material and general manufacture process:

a) Insulation methods: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

b) Stator winding: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

c) Rotor winding, bars and construction: \_\_\_\_\_  
 \_\_\_\_\_

d) Frame: \_\_\_\_\_  
 \_\_\_\_\_

2) Enclosure type: \_\_\_\_\_

3) Stator winding configuration: \_\_\_\_\_

- 4) Energy efficiency: \_\_\_\_\_
- 5) Required information related to equipment efficiency at different loads:

Load level % respect to nominal capacity	Efficiency %	Power Factor %
100% full load		
50% full load		

Was efficiency calculated according IEEE  
Standard 112- F ?

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

Explain: \_\_\_\_\_

- 6) Operational characteristics

- a) Full load speed \_\_\_\_\_RPM  
Nominal speed: \_\_\_\_\_RPM
- b) Full load total current consumption \_\_\_\_\_ amps and full  
load current consumption per phase \_\_\_\_\_ amps at 60 HZ.
- c) Starting current consumption is \_\_\_\_\_ amps per phase  
at 60 HZ (\_\_\_\_\_ times full load current), during a \_\_\_\_\_  
(seconds, minutes) period without detrimental effects or  
damages for the equipment.
- d) Type of service \_\_\_\_\_  
Service factor: \_\_\_\_\_ @ \_\_\_\_\_ temp. rise.
- e) Full load torque: \_\_\_\_\_ lb/ft.  
Percent of full load torque at starting: \_\_\_\_\_ %.

Breakdown torque: \_\_\_\_\_ % @ 100% voltage.

Breakdown torque: \_\_\_\_\_ % @ 80% voltage.

f) Moment of Inertia (WK2): \_\_\_\_\_ lb/ft<sup>2</sup>

Quantity and frequency of permissible starts:

\_\_\_\_\_ consecutive starts and \_\_\_\_\_ starts

after \_\_\_\_\_ (minutes, hour).

7) Type of insulation in accordance with IEEE Standard 1 and type of treatment:

Insulation class Type: \_\_\_\_\_

8) Bearing information (Bearings Information required as per AFBMA and manufacturer nomenclature.):

a) Recommended lubricant characteristics:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

b) Front end and rear end bearing characteristics:

Describe: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Are bearings heavy duty sleeve type? \_\_\_\_ Yes \_\_\_\_ No

If no, explain:

\_\_\_\_\_  
\_\_\_\_\_

c) General lubrication system characteristics:

Do bearings operate with a self lubrication system?

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

If no, explain: \_\_\_\_\_

\_\_\_\_\_

- 9) Equipment operational noise level: \_\_\_\_\_ db in accordance with standard or procedure: \_\_\_\_\_

- 10) Motor shaft rotation: \_\_\_\_\_

- 11) Does offered equipment complies with all and each of the latest requirements and standards of the following organizations?

\_\_\_\_(a) American National Standards Institute (ANSI).

\_\_\_\_(b) National Electrical Manufacturers Association (NEMA)

\_\_\_\_(c) National Electric Code (NEC)

\_\_\_\_(d) Institute of Electrical and Electronics Engineers (IEEE)

Explain in details below or in an additional sheet in case of no fulfillment with one or more standards of above organizations:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 12) Manufacturing country and measure units:

- a) Is the equipment manufactured in the United States or Canada?

Yes \_\_\_\_\_, in \_\_\_\_\_

No \_\_\_\_\_ If not, indicate country and city of manufacture:

Country: \_\_\_\_\_

City: \_\_\_\_\_

Company: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

b) Is the manufactured equipment in complete English

System units: \_\_\_\_\_

If no, indicate the measure system used:

\_\_\_\_\_

13) Mechanical and physical characteristics:

a) Weight: \_\_\_\_\_ lbs (net),

\_\_\_\_\_ lbs (gross for shipment)

b) Volume: \_\_\_\_\_ ft<sup>3</sup> (motor),

\_\_\_\_\_ ft<sup>3</sup> (for shipment)

c) According to the information

\_\_\_\_\_ provided in documents,

\_\_\_\_\_ obtained from a visit of final motor location site,

the offered motor can be installed:

\_\_\_\_\_ without any modification of existing facilities.

\_\_\_\_\_ with minor modifications to existing facilities.

Explain: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ with major modifications

Explain: \_\_\_\_\_

\_\_\_\_\_

Include additional sheets if necessary or complete differences in section VI (Exceptions).

14) Does the offered motor require a transition base? \_\_\_\_Yes \_\_\_\_ No

III. Organization related information, physical facilities and technical capacity.

A. Location of manufacturing facilities:

1. Physical and postal address:

---

---

---

2. Telephone/Fax: ( ) - \_\_\_\_ - \_\_\_\_  
( ) - \_\_\_\_ - \_\_\_\_  
( ) - \_\_\_\_ - \_\_\_\_

3. Contact person and position:

---

---

---

B. Geographical nearest qualified shop(s) location where necessary warranty period jobs will be done with manufacturer authorization:

1. Physical and postal address:

---

---

---

2. Telephone/Fax ( ) - \_\_\_\_ - \_\_\_\_  
( ) - \_\_\_\_ - \_\_\_\_  
( ) - \_\_\_\_ - \_\_\_\_

3. Contact person and position:

---

---

---

IV. Costs, insurance and delivery related information:

A. Proposed lump sum price (two motors and its transition bases if applicable):

Lump sum price: \$\_\_\_\_\_. If not explicitly stated, it is assumed that this price includes manufacture, delivery, transportation, freight, insurance, local and federal

taxes, until the equipment is finally delivered at South Coast Steam Plant and after it is inspected, tested and accepted by written by the Engineer or its authorized representative by the Authority.

Costs details of the lump sum price mentioned above.

Item	Total Cost for two Motors
a. Motors basic price (including transition bases for each if applicable)	\$_____ each X 2 = \$_____ (lump sum price)

B. Delivery time and terms:

The Supplier agrees to deliver the motors in \_\_\_\_\_ consecutive days F.O.B. after drawings approval in the indicated plant.

C. Optional equipment costs:

1. Factory acceptance witnessed tests for one motor:

\$\_\_\_\_\_ for \_\_\_\_\_ day(s) and 2 person(s).

Location where the tests will be performed:

\_\_\_\_\_  
\_\_\_\_\_

2. Two spare sets of bearings, each set consisting of a front end bearing assembly and a rear end bearing assembly, as described in Sections H.1 and H.2 of the Technical Specifications:

\$\_\_\_\_\_ set X 2 = \_\_\_\_\_.

Details of set: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

V. Bidders identification:

Company: \_\_\_\_\_  
Address: \_\_\_\_\_

Telephone: \_\_\_\_\_  
Fax: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Name: \_\_\_\_\_  
Date: \_\_\_\_\_

Authorized representative who provides the information:

Name and title of principal functionary: \_\_\_\_\_  
(If another person)

VI. Exceptions:

Please classify exceptions. If necessary, additional documents, drawings, offered equipment specifications and any necessary information to clarify indicated differences shall be included.

A. Claimed exceptions by Supplier or Contractor:

Exceptions:

1. Differences in electrical characteristics, electrical requirements or electrical installation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. Differences in mechanical characteristics and dimensions, including but not limited to frame, basement, shaft, enclosure: \_\_\_\_\_  
\_\_\_\_\_
3. Differences in lubrication system characteristics, its components and equipments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Differences related to installation, supervisory equipment and existing installation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. Other exceptions: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Exceptions provided by:



Signature/ Date: \_\_\_\_\_

Name: \_\_\_\_\_

TS-E27-09

ADDENDUM B

EXISTING MOTOR DRAWINGS AND PICTURES

[illegible]

FORM 3747-6  
LITHO IN U.S.A./A-C

## Engineering Data

## AC MACHINES

Customer Combustion Engineering-Puerto Rico Water ResourcesCustomer's Order No. \_\_\_\_\_ District Office Requisition No. \_\_\_\_\_ A-C Order Number 01-0510-47104Machine Type ANCD Serial Number(s) 47104-1, -2, -3 A-C Mfg. No. 01-0510-47104Rating: Hp/Motor 2250 ; Kw -- ; Rpm 890 ; Volts 4000 ;Phase 3 ; Cycles 60 ; P.F. -- %; Amps 279 ; Service Factor 1.15 ;Insulation: Stator - Class B Rotor - Class CageMaximum Ambient Air Temperature 40 °CTemperature Rise: Continuous 115 °C by THER. ☐ DET. ☐ Res. ☒ <sup>A</sup>Rotor ONLY RES. no injury\_\_\_\_\_ °C by THER. ☐ DET. ☐

Rotor \_\_\_\_\_ °C by RES. \_\_\_\_\_

Resistance at 25 °C: Stator .13 Ohms Terminal to Terminal

Rotor \_\_\_\_\_ Ohms \_\_\_\_\_

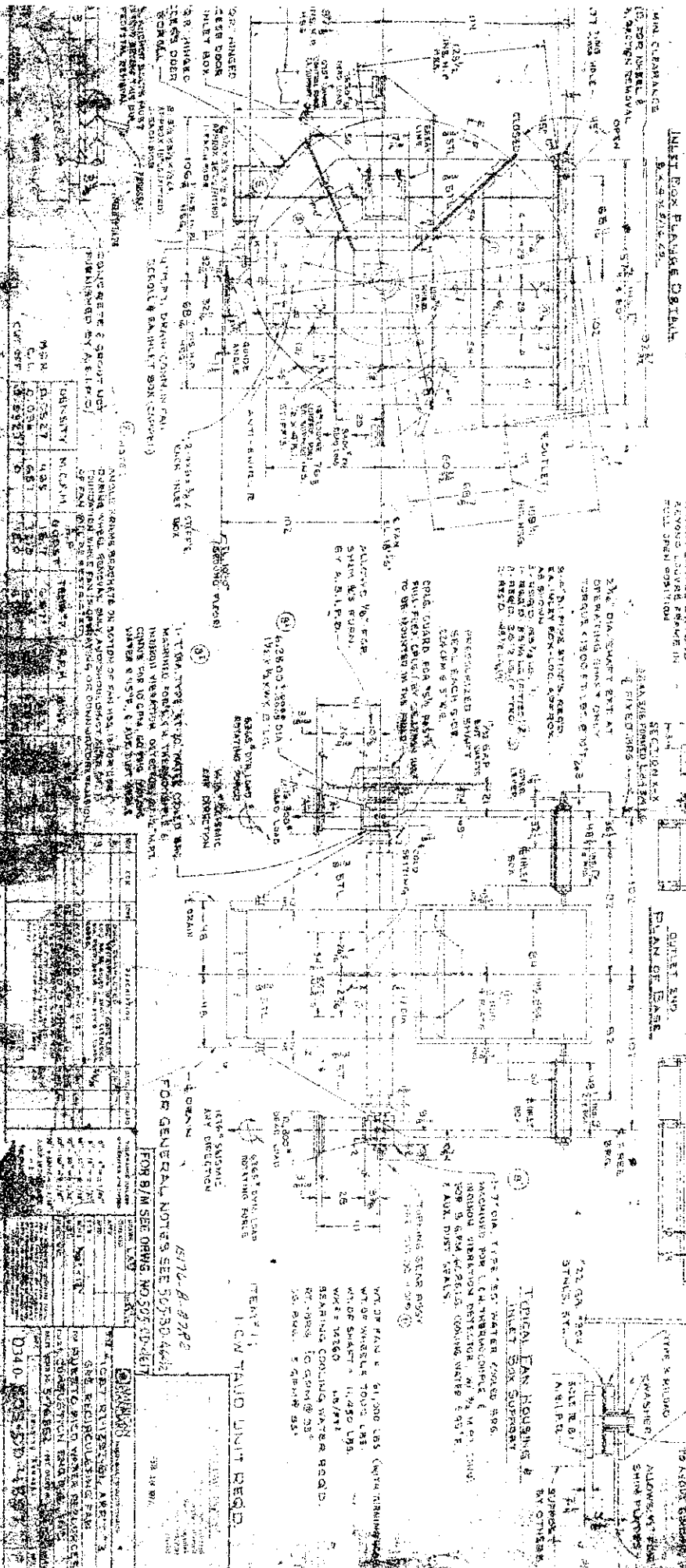
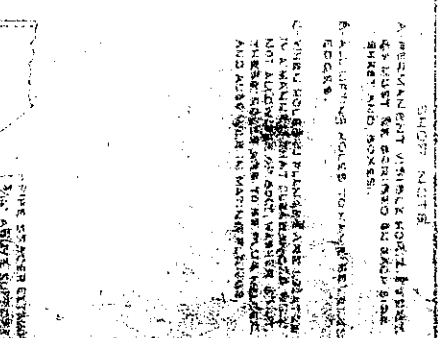
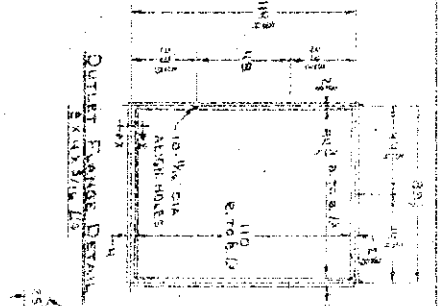
Bearings: Lubrication System: 1 - Oil Rings ☒ 2 - Recirculating System ☐ 3 - Special ☐  
4 - Recirculating System with Oil Rings ☐ 6 - Grease ☐Lubricant: Sleeve and Kingsbury - type thrust Bearings: Use a good grade of industrial oil having a viscosity of 275 to 325 S.S.U. at 100°F.

Anti-Friction Bearings (Grease-Lubricated): Use a good grade of anti-friction bearing type grease of soda base, having a high melting point, and free of solid fillers or other harmful ingredients. The consistency of the grease should be NLGI grade #2 or #3.

Anti-Friction Bearings (Oil-Lubricated): The spherical roller thrust bearing should use a good grade of industrial oil having a viscosity of 800 SSU at 100°F.

Locked Rotor Starting Current 610 % of Full Load Current. Air Gap In Inches .060Wound Rotor Motor - Secondary Characteristics: (a) Open Circuit Secondary Voltage  $E_2$  \_\_\_\_\_ Volts.(b) Full Load Secondary Current  $I_2$  \_\_\_\_\_ Amps.Recommended Starting Restrictions: Frequent starting may damage the motor windings. With motor cold, do not attempt more than 2 consecutive starts, and allow the motor to coast to rest between starts. With motor hot, do not attempt more than 1 consecutive starts. An interval of 30 minutes, with motor running, or 60 minutes, with motor not running, must elapse before an additional start.

GRH 10-5-74



ADDENDUM C  
TECHNICAL SPECIFICATION TS-E27-09  
REV. @ AUGUST 4, 2009

Calculation of Life Cycle Cost Differential  
Between Two Electric Motors of Different  
Efficiency and Power Factor

A. Parameters and Nomenclature:

	<u>Motor A</u>	<u>Motor B</u>
Efficiency	Ea	Eb
Power Factor	(PF)a	(PF)b
Horsepower	(HP)a	(HP)b

Common Factors:

Energy Cost (EC) = \$ / Kw-Hr

Expected life (n) = 20 years

Usage Factor (U) = Hr / year

Escalation Factor (e) = % / year

Interest Rate (i) = % / year

Demand Charge (D Ch) = \$ / KVA / year

B. Calculations:

1. Present value of energy charge (PVEC)

$$(PVEC) = \sum_{1}^n pv * EC$$

Where:

$$pv = \frac{(1+e)^n}{1+i}$$

2. Cost per kilowatt = (PVEC) \* (U)

3. Kilowatt inputs for each motor =  $\frac{\text{motor hp} * 0.746}{\text{Efficiency}}$

a. Motor A: (KW)a =  $\frac{(HP)a * 0.746}{Ea}$

b. Motor B: (KW)b =  $\frac{(HP)b * 0.746}{Eb}$

4. Efficiency benefit of one motor over the other:

$$\begin{aligned}\text{Benefit} &= (\text{Difference in KW inputs}) * (\text{Cost per KW}) \\ &= [(KW)_a - (KW)_b] * [\$ / KW]\end{aligned}$$

5. Power factor benefits:  $KVA = KW / PF$

a.  $(KVA)_a = \frac{(KW)_a}{(PF)_a}$

b.  $(KVA)_b = \frac{(KW)_b}{(PF)_b}$

- c. Benefit of one motor over the other due to power factor:

$$\begin{aligned}\text{Benefit} &= KVA \text{ Difference} * \text{Demand Charge} * \text{Value of Energy Cost} \\ &= [(KVA)_a - (KVA)_b] * [D Ch] * [PVEC]\end{aligned}$$

- d. Total benefits of one motor over the other =

$$\text{Efficiency Benefits} + \text{Power Factor Benefits}$$

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTENTION \_\_\_\_\_

PRICE REQUEST

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

DATE OF SUBMITTAL: \_\_\_\_\_

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

**PUERTO RICO ELECTRIC POWER AUTHORITY**

PO BOX 70151  
SAN JUAN, PUERTO RICO 00936