



Tuesday, February 27, 2001

VIA HAND DELIVERY

Mr. Weston L. Williams, Manager
Grid Contracts/Tariff Negotiations/Development
Southern California Edison Company
2244 Walnut Grove, G01, Room 460
P. O. Box 800
Rosemead, CA 91770

RE: Wintec Energy, Ltd. TO Tariff Service Request X

Dear Mr. Williams:

Please find enclosed our referenced TO Tariff Service Request as summarized below:

1. 100MW Application Request – WINTEC REQUEST X;
2. USGS Map of the Vicinity;
3. Aerial Photograph of the area;
4. Copy of the Grant Deed proving site control;
5. Updated One-line Diagram of Wintec VIII and Wintec X; and
6. Transformer Data Sheets.

In addition, we request that Southern California Edison Company initiate the expedited procedures pursuant to Section 10.8 of the Transmission Owners Tariff for this new facility.

Should you have any questions or need anything additional, please do not hesitate to contact me immediately at (760) 323-9490 extension 122.

Very truly yours,

A handwritten signature in black ink, appearing to read "Jeffrey S. Welton". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Jeffrey S. Welton
Vice President

Enclosures

APPLICATION FOR SERVICE UNDER TRANSMISSION OWNERS TARIFF

WINTEC REQUEST X (Devers-Garnet 115kV Transmission Line)

This is an application request pursuant to the Transmission Owners Tariff to interconnect two (2) 50MW gas-fired simple cycle electricity generating facilities for a total of 100MW through the Southern California Edison Company ("SCE") 115kV Wintec VIII Interconnect. These facilities will be connecting through the Wintec VIII line extension to the 115kV tap on the Cal ISO controlled Devers-Garnet 115kV transmission line.

PRODUCER INTERCONNECTION INFORMATION

1. GENERAL INFORMATION

- A. Project Name: **WILDFLOWER ENERGY - INDIGO**
- B. Project Owner: **Wintec Energy, Ltd.
125 East Tahquitz Canyon Way, Suite 201
Palm Springs, California 92262
Telephone: (760) 323-9490
Fax: (760) 323-0688**
- C. Contact Person: **Frederick W. Noble / Jeffrey S. Welton
Wintec Energy, Ltd.
125 East Tahquitz Canyon Way, Suite 201
Palm Springs, California 92262
Telephone: (760) 323-9490
Fax: (760) 323-0688**

2. SITE DATA

- A. Project Location
- i) West of N. Indian Avenue & South of 18th Avenue adjacent to 19th Avenue North Palm Springs, Riverside County, California
 - ii) Location Map: **See enclosed USGS map and aerial photo.**
 - iii) Land Requirements: **5 Acres – Approx. 300 feet X 450 feet**
 - iv) Proof of site Control: **See attached Grant Deed**

B. Existing facility data

- i) SEE Wintec VIII TO Tariff Request
- ii) SEE Wintec VIII TO Tariff Request
- iii) SEE Wintec VIII TO Tariff Request
- iv) SEE Wintec VIII TO Tariff Request

3. PROJECT DATA

A. Project Type: 100MW gas-fired simple cycle electricity generating facility

B. Generation Detail

- i) Type of Generator: **LM6000 Enhanced Sprint combustion turbine generator – Synchronous**
- ii) Manufacturer: **General Electric**
- iii) Number of Units: **2**
- iv) Capacity size of each generator: **50MW (see attached data)**
- v) Kilovolt-ampere rating: **USE Wintec VIII Data Sheets**
- vi) Net Capacity (kW) available for delivery to SCE: **USE Wintec VIII Data Sheets**
- vii) Generator voltage rating: **USE Wintec VIII Data Sheets**
- viii) Ampere rating: **USE Wintec VIII Data Sheets**
- ix) Number of Phases: **USE Wintec VIII Data Sheets**
- x) Frequency: **USE Wintec VIII Data Sheets**
- xi) Power Factor: **USE Wintec VIII Data Sheets**

C. Interconnection Facilities

i) Interconnection equipment which will be:

a. Owned by Producer:

115kV Transformer, 13.8kV Switchyard, Relays, Disconnects, and ISO Metering and Telemetering.

b. Constructed by Producer and deeded to Edison:

115kV Switchyard, Relays, and Disconnects.

c. Constructed by Edison:

Any necessary Devers-Garnet 115kV System Improvements, 115kV Tap and necessary line extension(s) and/or improvements.

ii) Date on which interconnection is desired:

JULY 1, 2001

iii) Proposed Point of Interconnection and Voltage:

The Point of Delivery will be at the SCE 115kV Interconnect Facilities that will be constructed adjacent to the Wintec VIII generating facility on the Project Parcel (see enclosed map and aerial photo) for delivery to the Devers Substation via the Wintec VIII line extension to the Wintec VIII 115kV tap on the California ISO Controlled Devers-Garnet 115kV Transmission line.

With respect to this matter, please contact, Frederick W. Noble or Jeffrey S. Welton of Wintec Energy, Ltd., at telephone number (760) 323-9490, ext. 126 and 122, respectively, and Fax number (760) 323-0688.

33°55'36", 116°33'59"

33°55'36", 116°32'26"



**WINTEC X
100MW TO TARIFF
REQUEST
FEBRUARY 2001**

DILON ROAD

Trailer Park
Film Springs

18TH AVENUE

Sect 15, T3S, R4E, SBBM
APN: 666-320-014

**DEVERS-GARNET 115KV
WASH**

W. KAREN AVENUE

N. INDIAN AVENUE

19TH AVENUE

**Wintec VIII
115kV Tap
Transmission Line**

INTERSTATE 10

20TH AVENUE

Substation

Water Tank

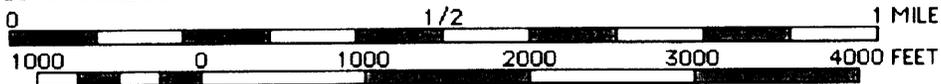
Garnet

BM 687

33°53'52", 116°33'59" NAD83

33°53'52", 116°32'26"

TN MN
13 1/2°



NORTH

N. INDIAN AVENUE

DILLON ROAD

19TH AVENUE

LINE EXTENSION

Garnet Avenue

GARNET SUBSTATION

WINTEC X
100MW TO TARIFF
115kV Interconnect
Request

Wintec VIII
115kV
TAP

DEVERS-GARNET 115kV

KAREN AVENUE

Banning-Foil-Garnet-
Maraschino-Windfarm 115kV

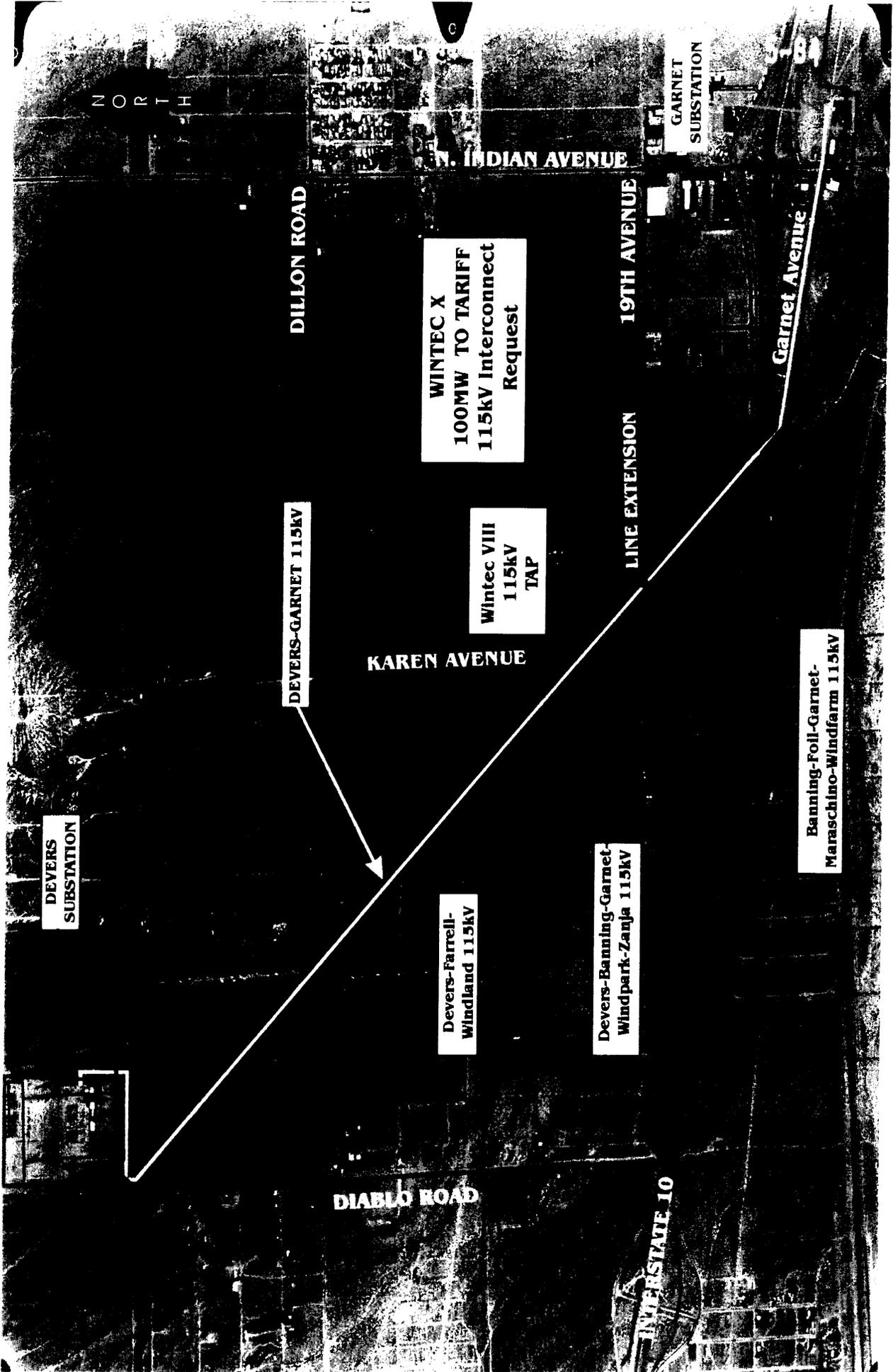
DEVERS SUBSTATION

Devers-Farrell-
Windland 115kV

Devers-Banning-Garnet-
Windpark-Zanja 115kV

DIABLO ROAD

INTERSTATE 10



RECORDING REQUESTED BY:
First American Title Company
AND WHEN RECORDED MAIL THIS DEED AND,
UNLESS OTHERWISE SHOWN BELOW,
MAIL TAX STATEMENTS TO:

NO COR FILED

067250

RECEIVED FOR RECORD
AT 2:00 P.M.

FEB 19 1999

Recorded in Official Records
of Riverside County, California
Recorder
Fees \$ 6

received
3-10-99

Wintec Energy, LTD.
Frederick W. Noble
P.O. Box 457
N. Palm Springs, CA 92258

SPACE ABOVE THIS LINE FOR RECORDER'S USE

Grant Deed **A.P.N.** 666-320-014 6
TRA 011-087 8

The undersigned grantor(s) declare(s):
Documentary transfer tax is \$ 0-
() computed on full value of property conveyed, or
() computed on full value less value of liens and encumbrances remaining at time of sale.
() Unincorporated area: () City of _____

T
LS and

2/12/99 562327

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,
RAY R. COULTER, a professional corporation, A California Corporation

hereby GRANT(S) to
WINTEC ENERGY, LTD., a California Corporation

the real property in the City of _____, County of **Riverside**
State of California, described as

**The Southwest one quarter of the Southwest one quarter of the Northeast one quarter of
Section 15, Township 3 South, Range 4 East, San Bernardino Base and Meridian, as shown
by United States Government Survey.**

Dated **February 18, 1999**

Signature **Ray R. Coulter, a professional corporation**

State of California)
County of **Riverside**) S.S.

Signature of Grantor
By: Ray R. Coulter
Ray R. Coulter, President

On **February 18, 1999** before me,
Kelly Collier personally
appeared _____

Ray R. Coulter personally
known to me (or proved to me on the basis of satisfactory evidence) to be the
person(s) whose name(s) is/are subscribed to the within instrument and
acknowledged to me that he/she/they executed the same in his/her/their
authorized capacity(ies), and that by his/her/their signature(s) on the instrument
the person(s), or the entity upon behalf of which the person(s) acted, executed
the instrument.

KELLY COLLIER
Comm. # 1057217
NOTARY PUBLIC CALIFORNIA
Riverside County
My Comm. Expires May 28, 1999

WITNESS my hand and official seal.

MAIL TAX STATEMENTS TO, SAME AS ABOVE

**ENRON
ENGINEERING & CONSTRUCTION COMPANY**

**SPECIFICATION
FOR
GENERATOR STEP UP TRANSFORMERS**

LM6000 Projects

JUNE, 2000

Revision 0

Issued By: _____

Approved By: _____

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ENRON ENGINEERING & CONSTRUCTION COMPANY

TABLE OF CONTENTS

1.SCOPE..... 88

2.EQUIPMENT AND SERVICES BY SELLER..... 88

3.EQUIPMENT AND SERVICES BY PURCHASER..... 88

4.CODES, STANDARDS AND SPECIFICATIONS..... 88

5.DESIGN CRITERIA..... 89

5.1.Construction Requirements..... 90

5.1.1.Bushings..... 90

5.1.2.Transformer Accessories..... 90

5.2.Cooling..... 92

5.3.Auxiliary Cooling..... 92

5.4.Tap Changer..... 93

5.5.Low Voltage Termination..... 94

5.6.Annunciation..... 94

5.7.General..... 94

5.8.Tanks..... 95

5.9.Provisions for Handling and Field Erection..... 95

5.10.Finish..... 96

5.11.Transformer Identification..... 96

5.12.Oil Preservation System..... 96

5.13.Surge Arresters..... 97

6.DOCUMENTATION..... 97

6.1.Drawing Requirements..... 97

6.2.Spare Parts List..... 98

6.3.Installation, Operating and Maintenance Instructions..... 98

7.TESTING AND INSPECTION..... 98

7.1.Transformer Tests..... 98

7.2.Temperature Tests..... 99

7.3.Loss Evaluation..... 100

7.4.Inspection..... 100

7.5.Notification..... 100

8.SHIPPING AND HANDLING..... 100

9.purchaser data sheets - 1) 138 kv, 80 MVA 2) 138 kv, 64 MVA 3) 115/230 kv, 64 mva

10.SELLER DATA SHEETS - 1) 138 kv, 80 MVA 2) 138 kv, 64 MVA 3) 115/230 kv, 64 mva

1. SCOPE

This specification covers the general requirements for liquid immersed, power transformers which will be installed in an outdoor area. This specification shall cover the requirements for generator step-up (GSU) transformers as specified in the Purchaser Data Sheets.

2. EQUIPMENT AND SERVICES BY SELLER

The Seller shall supply the following equipment and services:

- a) Number and type of transformers described on the attached Purchaser Data Sheets.
- b) Accessories for each transformer described in section 5.1.2 of this specification.
- c) Copies of drawings, instruction books, O&M books, schematics, test reports, and spare parts lists as described in section 6.0 of this specification and in AGREEMENT.
- d) Testing for each transformer as described in section 7.0 of this specification.
- e) Shipment and delivery as described in section 8.0 of this specification and the purchase order.

3. EQUIPMENT AND SERVICES BY PURCHASER

The following equipment and services will be options not covered by this specification or AGREEMENT:

- a) Foundation(s) for supporting the equipment, including provisions for oil containment and drainage.

4. CODES, STANDARDS AND SPECIFICATIONS

The transformers shall be constructed, wired, and tested in accordance with all applicable sections of the latest edition of standards shown below (unless otherwise stated) in this specification. Standards shall include, but not be limited to:

ANSI American National Standards Institute
ANSI/IEEE C57 Distribution, Power, and Regulating Transformers
ANSI/IEEE C62.1 Surge Arresters for AC Power Circuits

ANSI/IEEE C21.24 Bushings
NEMA Degrees of Protection of Enclosures of Switchgear and Control Gear
ANSI/IEEE C57.131 Load Tap Changers
ASTM D3487.1981 Mineral Insulating Oils
IEEE C57.92 Loading Guide for Oil Immersed Transformers
ANSI/IEEE C37 Switchgear
ANSI/IEEE C57.1290 (Noise)
ANSI/IEEE C57.98 Guide to the Lightning Impulse and Switching Impulse Testing of
Power Transformers and Reactors
NEC National Electrical Code
TR1 NEMA Standard Transformers, Regulators and Reactors (Applicable to Noise
Levels only)
NEMA National Electrical Manufacturer's Association
IEEE Institute of Electrical and Electronics Engineers
UL Underwriters Laboratories

It shall be the Seller's responsibility to be or to become knowledgeable of the requirements of these Standards and Codes and any applicable standards and codes in effect for this plant site. Any changes or alterations to the equipment to make it meet Standards and Codes requirements shall be at the expense of the Seller.

In the event of conflicting requirements, the order of precedence shall be the AGREEMENT, Data Sheet, this specification, and applicable standards and codes.

5. DESIGN CRITERIA

The transformers shall be capable of operating at rated kVA output at 0.85 PF, 95% rated frequency and 105% input voltage without exceeding the rated temperature rise (65°C by resistance, 80°C hottest spot). The windings shall be copper.

The current carrying capability shall be limited only by the capacity of the core and coils and not by other components such as bushings and tap changers. The transformer's thermal and mechanical damage (I^2t) curves shall be provided to Purchaser.

Unless otherwise stated on the Purchaser Data Sheets, generator step-up transformers will be directly connected to the generator in such a way that they may be subjected to load rejection conditions resulting in higher voltage and current contributions from the generator. Therefore, these transformers shall be designed to withstand the

mechanical and thermal stresses with 1.4 times rated voltage for 8 seconds applied at the transformer terminals to which the generator is to be connected.

All transformers shall be capable of withstanding without damage the mechanical and thermal stresses caused by faults that trip the turbine generator fully loaded at maximum output.

Conformance to these requirements shall be demonstrated by certified short-circuit test data on a transformer with similar core and coil design.

The Seller shall certify that the transformers are free of PCB's and provide a nameplate showing the transformers are non-PCB type.

5.1. Construction Requirements

Construction requirements are as detailed below and in the attached Purchaser Data Sheets:

5.1.1. Bushings

Transformer bushings rated above 110 kV BIL shall be oil filled. The high and low voltage bushings shall be located as specified in the attached Purchaser Data Sheets. They shall be field removable, with gaskets, and shall not be welded to the tank. Connections to transformer will be furnished by Purchaser after coordination with the Seller on the connection method. The bushing wells shall have dust covers in place for shipment.

Insulation class in kV of the line bushing shall be as high as or higher than the rated line-to-line voltage of each transformer or as specified on the Purchaser Data Sheets.

Neutral bushings shall be furnished for all three phase Wye-connected windings. Neutral studs shall not be connected (grounded) to the transformer tank by the Seller. The neutral bushing shall be brought out.

5.1.2. Transformer Accessories

Each transformer shall be equipped with all normally furnished standard accessories. All dial type indicating devices shall be easily read from base level. These accessories shall include, but not be limited to, the following:

- a) A magnetic liquid level indicator.

- b) A dial type thermometer, equipped with two pointers, one to indicate top liquid temperature at the time of reading, and the other to indicate the maximum temperature reached since the last resetting.
- c) A non-adjustable liquid level gauge with low level alarm contacts shall be provided to alarm when the oil level drops below normal operating level. For contact rating see Section 9.6.
- d) A pressure/vacuum gauge and a pressure/vacuum bleeder with sampling valve, mounted on the transformer tank and piped to the gas space above the liquid.
- e) Ball valve to serve as a drain valve, bottom filler pressure connection, and liquid sampling valve.
- f) Ball valve to serve as the top filter pressure connection and vacuum pump connection.
- g) Radiator valves, when detachable radiators are supplied.
- h) A pressure relief device, suitably sized for transformer capacity, self-resetting mechanical type, located on the tank cover, and equipped with a mechanical target for local visual signal and alarm contacts. For contact rating see Section 9.6.
- i) Ball valve to serve as sudden fault, pressure relay connection when sudden pressure relay is specified.
- j) Brackets for high voltage surge arresters. Arresters rated above 300 kV shall be separately mounted and supports are by others.
- k) A stainless steel nameplate mounted approximately at eye-level height on the transformer tank, and presenting the following information:
 - 1. Graphic representation of the connections of the high voltage and low voltage windings.
 - 2. The kVA ratings at all cooling class ratings and temperature rises.
 - 3. Transformer impedance, on the base OA(ONAN) kVA capacity at 65°C rise.
 - 4. Tap changer positions, voltages, and full load current at each tap setting.

5. Low voltage rating and full load current.
6. Gallons of liquid in tank radiators, and in any liquid filled terminal chambers.
7. Design maximum operating pressures (positive and negative) for the transformer tank.
8. All other information as required by ANSI/IEEE C57.12.

Additional accessories, as required, shall be as specified on the Purchaser Data Sheets. Current transformers and accessories shall be in accordance with the following:

a) Current Transformers

Low - Voltage Winding - Current transformers shall be single and or multi-ratio bushing type. Current transformers shall coordinate with the current transformers on the Turbine Generator. The number and ratings shall be shown as in the Purchaser Data Sheets.

High - Voltage Winding - Current transformers shall be multi-ratio bushing type and shall conform to the IEEE C57.13. The number and ratings shall be as shown in the Purchaser Data Sheets.

All secondary leads shall be run in conduit, to terminal blocks (shorting type) located in a junction box on the side of the transformer tank. The terminal blocks shall be clearly marked, designating the CT, phase, and the tag number.

All transformer accessories (indicating devices, cooling equipment, etc.) shall be interconnected from device to terminal box by the use of rigid galvanized steel conduit.

5.2. Cooling

Radiators shall be Menk or Tranter model type radiators. They shall be capable of withstanding full vacuum (0.1 torr).

5.3. Auxiliary Cooling

Cooling equipment control shall be automatic with provisions for manual override. Automatic control shall be by the top liquid temperature or winding temperature method. The method will be specified on the Purchaser Data Sheets.

The winding temperature element (or device) shall be responsive to the load current derived from one phase of a winding.

Control equipment shall include the following:

- a) Top liquid temperature or winding temperature actuated switch(es). The device shall include an indicator readable from base level and shall have electrical contacts for control of the auxiliary cooling equipment, and one additional contact which opens to alarm on high temperature. For contact rating see table in Section 9.6.
- b) Weatherproof and explosion proof, for transformers in hazardous areas, cabinets for control equipment located on the transformer at a height suitable for operation and maintenance by a person standing at base level.
- c) Manually operated switch for choosing automatic or manual control.
- d) All motor controllers, relays, terminal blocks, etc.
- e) All conduit and wiring necessary to connect the control equipment into a complete, functional system.
- f) The transformer shall have a weatherproof control cabinet with 120 VAC, single phase space heaters and terminal blocks for all alarm controls and CT wiring.
- g) The control cabinet shall include one 15A, 120 VAC, 2 wire with ground type residual current device with socket outlet.

The power for the transformer auxiliary cooling equipment will be supplied by Purchaser and will be as shown on Purchaser Data Sheets.

Future Auxiliary Cooling

When "future" auxiliary cooling is specified, all items that cannot be safely installed while the transformer is energized shall be supplied and installed on the initial order.

5.4. Tap Changer

Externally operated manual tap changer for de-energized operation, shall be provided on the high voltage winding. The tap changer handle shall have provisions for padlocking, and shall provide visible indication of the tap position without unlocking.

The winding temperature element (or device) shall be responsive to the load current derived from one phase of a winding.

Control equipment shall include the following:

- a) Top liquid temperature or winding temperature actuated switch(es). The device shall include an indicator readable from base level and shall have electrical contacts for control of the auxiliary cooling equipment, and one additional contact which opens to alarm on high temperature. For contact rating see table in Section 9.6.
- b) Weatherproof and explosion proof, for transformers in hazardous areas, cabinets for control equipment located on the transformer at a height suitable for operation and maintenance by a person standing at base level.
- c) Manually operated switch for choosing automatic or manual control.
- d) All motor controllers, relays, terminal blocks, etc.
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5.4. Tap Changer

Externally operated manual tap changer for de-energized operation, shall be provided on the high voltage winding. The tap changer handle shall have provisions for padlocking, and shall provide visible indication of the tap position without unlocking.

For a given winding, the number 1 or the letter A shall be assigned to the tap having the greatest number of effective turns. Unless otherwise noted in the Purchaser Data Sheets, the tap changer shall have five positions with four, 2.5% full capacity taps (see data sheets for number of taps above and below rated high voltage). Tap changer internal mechanisms are to be readily accessible for inspection and repair without untanking the transformer.

5.5. Low Voltage Termination

The low voltage bushings shall be located with flanges to terminate Segregated Bus Duct or Isolated Phase Bus and located as specified in the Data Sheets. The flanges shall be located such that any part of the Phase Bus Duct is not within the strike distance of the high voltage bushings.

5.6. Annunciation

All alarm contacts shall be wired to screw type terminals in the fan control junction box. All wiring connectors shall be solder-less compression, ring-type.

All DC signals, including wiring and terminals, shall be isolated by metal barriers from AC signals.

5.7. General

All wiring insulation shall be rated 600V, 90°C, XHHW, type SIS. Control wiring shall be minimum #12 AWG, standard copper. Signal wiring shall be minimum standard copper. For 5 ampere current transformers #10 AWG conductor shall be used.

Control wiring terminal boards shall be barrier type rated 600V, 30 amp. with washer head binding screws, General Electric Company Type EB-25 or equal. Wiring and terminals shall be marked to agree with drawings.

The transformer shall be designed and constructed to be completely self-protected by its ability to withstand, without mechanical or thermal damage, the effects of six (6) external short circuits, as specified in ANSI Test Standard C57.12.90, Section 12.3.4.

All components, including relay coils, circuit breakers, etc., shall be 600V AC Class Industrial Grade. All components shall be temperature and enclosure compensated. Temperature operating range shall be 0°C to 55°C. All thermal elements shall be designed and selected for a normal ambient operating temperature of 40°C.

The impedance between windings shall be as listed on the Purchaser Data Sheets with the standard ANSI tolerance of plus or minus 7.5%. The Seller shall state in the test report the method used to determine the neutral zero sequence impedance.

Unless specified otherwise the noise level for each transformer shall not be higher than the limitation imposed by the latest revision of the NEMA TR1 standards.

Insulation for components shall be designed to withstand two times the maximum operating range of voltage plus 1000 volts for one (1) minute.

5.8. Tanks

The main transformer tank and any attached compartment, piping, which is subject to operating pressure shall be designed to withstand, without permanent deformation, pressure 25% greater than the maximum operating pressure.

When shipped without liquid the tank shall be designed for vacuum filling (essentially full vacuum). Auxiliary compartments, such as expansion tanks, when not designed for vacuum filling, shall be designated as such and provided with isolating valves.

The tank shall be fabricated from welded steel plate and the main cover shall be bolted or welded to the tank. It will also have a fabricated base. The base shall be suitable for mounting on a flat slab type foundation.

One or more manholes shall be provided in the cover. Manholes shall be located and sized to permit change out of bushings.

Tank grounding provisions shall consist of two ground pads, welded on opposite corners of the base or on the tank wall near the base. The pads will be drilled and tapped for standard NEMA two-holes on center.

5.9. Provisions for Handling and Field Erection

Lifting Facilities

Means for lifting the complete transformer shall be provided. The bearing surfaces of the lifting means shall be free of sharp edges. Lifting means, shall be provided for un-tanking the transformer.

Tank Centerline

Each transformer tank shall have centerline marks at the base and sides of the tank, on both axis, to facilitate accurate placement with respect to isolated phase bus and transformer foundation.

Moving Facilities

The base shall permit sliding or rolling (using pipe rollers) in the direction of both centerlines of the transformer and provision shall be made for pulling the transformer in these directions.

Jacking Facilities

Jacking provisions shall be located near the extreme ends of the junction of the base segments. The jack ports or lugs shall be so designed that the lifting members of the jack can be inserted.

5.10. Finish

After assembly, all equipment shall be thoroughly cleaned. All mill scale, weld flux, oxides, oil, etc., shall be removed. All burrs, castings scars and sharp edges shall be ground smooth and the equipment shall be given a rust preventive treatment.

The clean surfaces shall be painted with a rust-resistive prime coat and the Seller's standard finish coat unless specified otherwise. The cleaned surfaces shall be primed the same day they are cleaned. Accessories shall have the same quality of paint as the transformer. The manufacturer and trade names of the prime and finish coatings used on the transformer shall be described in the Seller's proposal.

Seller shall supply paint, matching each color used, for field "touch-up" after installation of the equipment. Two (2) one-pint cans of each color shall be supplied per transformer. The minimum paint finish thickness shall be 5.5 mil.

5.11. Transformer Identification

Each transformer shall be identified by an embossed 316 stainless steel nameplate with lettering as specified on the Purchaser Data Sheet permanently attached by non-corrosive screws. This nameplate shall be mounted next to the Seller's nameplate.

5.12. Oil Preservation System

The oil preservation system should be a sealed bladder conservator system. The system shall prevent air and moisture from contact with the oil by the use of a flexible rubber air cell in the conservator tank. A positive oil pressure must be maintained on all gaskets above the tank cover. A gas detector relay system shall be provided which collects accumulated gases at the high point of the cover. The system shall include a gauge alarm contact and a gas sampling valve located at ground level.

"Buchholz", gas/surge, "Fault Pressure" Relay - This device, complete with electrical contacts shall be mounted on the transformer tank and shall operate on a rate of pressure change; that is, the higher the rate of rise, the faster it shall operate. It shall not operate

on pressure change due to changes in transformer temperature or loading, but it shall operate on small internal short circuits. For contact rating see table in Section 9.6.

5.13. Surge Arresters

Metal oxide, station class surge arrestors, as specified in the Purchaser Data Sheets, shall be supplied.

6. DOCUMENTATION

All engineering data provided for this equipment shall show equipment as specified, ordered and fabricated. Engineering data, as listed, shall be supplied in the quantities shown and by the dates which will be supplied later.

6.1. Drawing Requirements

Typical drawings are not acceptable unless they are revised to show only the equipment being furnished. The prints and one reproducible of each drawing shall be provided for approval. Two prints and one mylar of each drawing shall be provided for certified or construction drawings. Seller drawings shall be supplied on AutoCad Release 12 or later release. The Seller shall furnish with the proposal a firm date for submitting approval and certified drawings. In general, weight and dimension data is required within six (6) weeks after receiving the order for transformers. Reproducible drawings for approval shall be supplied as follows:

a) **Structural Drawings, completely dimensioned, showing:**

Nameplate Drawing

Plan and all elevations (Transformer outline drawings)

High voltage termination method (conduit, stub-ups to potheads, switches, or terminal chambers) Bushing Outline Drawings

Low voltage termination method (flange throat, conduit stub-ups to terminal chambers, or other specified termination method)

Location of all manholes

Location of all accessories

Anchor bolt locations

Ground pad locations

Total weight of transformer

Factory Test Reports (10 certified copies to be provided)

Center of Gravity

Centerlines marked on tank

b) Elementary Diagrams

An elementary (schematic) wiring diagram shall be furnished for the control scheme of the forced air cooling equipment and the load tap changing system.

CT Saturation Curves.

c) Detailed Connection (wiring) Diagrams showing:

Interconnecting wiring of all components of the forced air cooling equipment and the load tap changing system.

Wiring of all devices with switches or electrical connections, including current transformers.

Identification of terminal blocks and all connections to be made by Purchaser.

Transformer Control Schematic and Wiring Diagrams showing purchaser's CT and control connection points.

6.2. Spare Parts List

Complete spare parts list as provided for in AGREEMENT.

6.3. Installation, Operating and Maintenance Instructions

Installation, operating and maintenance instructions shall be shipped ninety (90) days before transformer shipment and shall cover all the equipment furnished (10 copies to be provided).

7. TESTING AND INSPECTION

7.1. Transformer Tests

Standard factory tests shall be done for each transformer. The Certified Transformer Test Report shall be submitted for each transformer. The tests shall be performed in accordance with the IEEE C57.12.90 and shall include:

- a) Resistance measurements of all windings on the rated voltage tap of each transformer and at the tap extremes.
- b) Ratio tests on the rated voltage connections and on all tap connections.
- c) Phase-relation and polarity tests on the rated voltage connections.
- d) No-load losses and exciting current at rated voltage on the rated voltage connections.
- e) Impedance and load losses at rated current on the-rated voltage tap of each transformer, and at the tap extremes.
- f) Applied potential and induced potential tests.
- g) Regulation and efficiency at rated load and rated voltage.
- h) Insulation resistance test (high voltage to ground, low voltage to ground, high voltage to low voltage). (Temperature rise test shall precede dielectric tests.)
- i) The transformer zero sequence impedance shall be, determined.
- j) Lightning impulse test.
- k) The high voltage winding shall also be tested for switching impulse voltage.
- l) Doble power factor test (maximum 1.0%).

7.2. Temperature Tests

- a) Temperature rise test or tests shall be made on one unit only of an order covering one or more transformers of a given rating, provided that test data is not available from records of temperature tests on a duplicate or essentially duplicate transformer by the same Seller.
- b) A gas-in-oil analysis shall be made before testing begins and after testing is completed. The results shall be included in the test report.

Seller shall provide advance notice, in accordance with AGREEMENT, in writing to advise Purchaser of testing at the factory so the Purchaser or the Purchaser's representative can witness the testing.

7.3. Loss Evaluation

- a) The transformer Seller shall specify with his quotation guaranteed no load, full load, and total losses. Total losses shall be for the self-cooled or base rating.
- b) Losses at base load will be evaluated in accordance with AGREEMENT.
- c) If the certified tests of the transformer show total losses to be greater than guaranteed values, the transformer purchase price shall be reduced by an amount equal to the product of the excess kW losses in accordance with AGREEMENT.

7.4. Inspection

All materials used in the manufacture of the specified equipment and all work done, shall at all times be subject to inspection and the approval of the Purchaser or his authorized representatives in accordance with AGREEMENT. These actions shall not release the Seller from any responsibility or liability hereunder.

The Purchaser shall be immediately notified of any unusual damage occurring during construction of the equipment and of all tests which do not meet specified or standard values. The Purchaser shall be permitted at his option, to inspect such damage and/or test failures.

These tests may be witnessed by the purchaser's personnel on a non-interference basis. Tests certificates are required on each transformer without additional costs in accordance with AGREEMENT.

7.5. Notification

Seller shall provide written notice to the Purchaser, in accordance with AGREEMENT, of when the material or equipment is ready for inspection or testing.

8. SHIPPING AND HANDLING

The method of packing shall be suitable to protect the tank, radiators, core and coils, bushings and another auxiliary devices or accessories against corrosion, dampness, breakage or vibration injury that might reasonably be encountered in transportation and handling.

All auxiliary equipment shall be shipped in weatherproof packages unless identified otherwise for indoor storage only. Outdoor packing material shall be such that it will provide weatherproof protection for the period of one year in outdoor storage areas. Seller shall specify the additional cost of this packing if not normally provided.

All conduits and auxiliary equipment mounting positions shall be sealed and/or covered to prevent water damage during storage.

Transformer may be shipped filled with oil. All valves, shipping covers, etc., shall be sealed and effectively crated to prevent tampering or removal while in transit. If the transformer is shipped without oil it shall be pressurized with nitrogen and the oil will be shipped to the site separately.

If the transformer is shipped by rail, the Seller shall furnish a two-way (horizontal and vertical) impact recorder for each transformer shipped. Recorder shall be attached to the carrier on which transformer is shipped. Upon arrival, and before unloading the transformer, the impact recorder tape will be removed and inspected by Purchaser and the Carrier's Agent. If in the opinion of the Purchaser and the Carrier's Agent or both that the impact recorder tape indicates rough handling during shipment, the Seller will be notified immediately. The recorder tape will be retained by the Purchaser for study and shall be returned to the Seller when studies are completed. Seller shall furnish with the shipping instructions, the manufacturer, tape and model number of the impact recorder he proposes to use. Seller shall also state the maximum limit the recorder can register both vertical and horizontal before the Seller considers the transformer may have been damaged during shipment. The Seller shall furnish the necessary information for releasing and returning the impact recorder. If Seller provides truck shipment as means of carrier, use of impact recorder is not required.

Upon arrival the transformer will be inspected by the purchaser or his authorized representative for visual damage and internal pressure before unloading. If any damage is found or suspected, the carrier and Seller shall inspect the transformer and advise as to what corrective action needs to be taken before proceeding with unloading.

Shipment of transformer shall be made so that the transformer complete with all accessories will arrive at its destination simultaneously.

Each item, crate or package shall be clearly marked or tagged showing an item number, equipment description and Seller identification number.

9. PURCHASER DATA SHEETS - 115/230 kV, 64/85/106 mva ABB Design HU-Enron-1C

9.1 GENERAL

Customer	Enron North America Corp.	
Elevation Feet above MSL	<3300 feet	
Minimum/Maximum Ambient Temperature (°C)	18.33/40	
Humidity	100%	
Wind Velocity	100 mph	
Sound Level (64/85/106 MVA)	80/82/83 dBA	
Application	Generator Step Up	
Atmospheric Pollution	N.A.	
Seismic Zone (per UBC - 1997)	2	
Color if other than Vendors Standard	ANSI 70 Light Gray	
Number of Units	6 (Six)	
Equipment Number	N/A	
Service Engineer (See Section 2) - (Yes-No)	Yes	
Power for Auxiliary Devices		
Fans:	Volts/Phase	230 1
Pumps	Volts/Phase	230 1

Aux. Volts/Phase

120

1

Heaters Volts/Phase

120

1

9.2 RATINGS

MVA (at 65°C rise)

H:64/85/106
X,Y:32/42.5/53

Type

Oil Filled

Type (Cooling)

OA/FOA/FOA

High Voltage, kV

115X230

Low Voltage, kV

13.8, 13.8

Number of Phases

3

Frequency, Hertz

60

Oil Preservation System (Sealed tank, Inert gas, Conservator)

Conservator

Insulation/Coolant (Mineral oil, askarel)

Mineral Oil

Impedance - % on OA base (H-X,Y 64 MVA)

10 %

Impedance will be rated at the listed percentage at rated (MVA) voltage and self-cooled MVA.

System Fault Current RMS Symmetrical, kA

ANSI C57.12.00
Sec 7.1.5

Grounding

HV Winding

Grnd Wye

LV Winding

Delta

Insulation: The winding terminal insulation classes and withstand test for which they are designed shall be as follows:

	<u>High H Line</u>	<u>Low X,Y</u>	<u>(Ho) Neutral</u>
Class KV	<u>230</u>	<u>15</u>	<u>15</u>
Full Wave BIL (kV) (Bushing/Winding)	<u>900/750</u>	<u>110/110</u>	<u>110/110</u>
Temp. Rise (°C)	<u>65</u>	<u>65</u>	<u>65</u>
Number of Windings	<u>3</u>	<u>3</u>	<u>1</u>

9.3 WINDINGS

9.3.1 High Voltage

Rated Line Voltage, kV	<u>230X115</u>
Connection (Delta, Wye, etc)	<u>Grnd Wye</u>
Insulation Level (BIL) kV	<u>750/550</u>
Taps	
Number	<u>4</u>
Step Size - %	<u>2.5</u>
Number (Below and above normal, full capacity)	<u>+2 & -2</u>
Tap Changer	<u></u>

Type (Manual or Automatic)

Manual

Operation (Energized-LTC or de-energized)

De-energized

No load taps shall be removed

N/A

9.3.2 Low Voltage

Rated voltage, Kv

13.8/13.8

Connection (Delta, Wye, etc.)

Delta

Connection brought out through bushings (Yes/No)

No

Terminal Board for Wye or Delta operation

N/A

Terminal Board for Series or Multiple connection

N/A

9.3.3 Neutral

Connection

Direct Grounding (Yes/No)

Yes, Bushing

Resistance Grounding

N/A

Resistance, ohms

Time, sec.

Voltage, volts

Current, amps.

9.3.4 Angular Displacement

ANSI Standard

9.4 CONNECTIONS

9.4.1 High Voltage

Overhead Line	<u>Yes</u>
Underground Cable	<u>N/A</u>
Bus	<u></u>
Location	<u></u>
Top	<u>Yes</u>
Sidewall	<u></u>
High voltage line bushings will be located:	<u>Top</u>
ANSI Segment	<u>3</u>
HV bushing material	<u>Porcelain</u>

9.4.2 Low Voltage

Overhead Line	<u></u>
Underground Cable	<u></u>
Bus	<u>Non Seg Phase Bus</u>
Location	<u>Segment 1</u>
Top	<u></u>
Sidewall	<u>Yes</u>
LV Bushing Material	<u>Porcelain</u>

9.4.3 Neutral Location of:

	High Voltage Neutral Bushing	Low Voltage Neutral Bushing
On transformer cover	Yes	Not Applicable
Neutral Bushing Material	Porcelain	

9.4.4 High, low, and neutral bushings shall be located as previously described, be porcelain and rated as follows:

Terminals	H	X & Y	(Ho)
Number	3	3	1
KV Class	230	15	15
BIL (KV)	900	110	110
Amperes	*	*	*
Creepage Distance (in)	Later	Later	Later

(All transformer bushings shall have bronze threaded studs. Terminals will be furnished by others).

* Vendor to determine.

9.4.5 Cable Data – To be supplied Later	N/A
9.5 ACCESSORIES	
9.5.1 Phase Current Transformers - (Yes/No)	Yes

Item	HV	LVX	LVY
Relaying	3 per phase 1200:5,MR,C800	2 per phase 4000:5,MR,C800	2 per phase 4000:5,MR,C800

Metering

Trans. OL Protection

_____	_____
_____	_____
_____	_____

9.5.2 Neutral Current Transformers - (Yes/No)

Yes

If yes, Ratio:

1 x 1200:5,MR

Accuracy Class

C800

9.5.3 Sudden (Fault) Pressure Relay (63) (Buchholz) Required

Yes

9.5.4 Thermal Relay (49) Required - (Yes/No)

Yes

9.5.5 Surge Arrestor Required - (Yes/No)

Yes

Rating

144 kV MCOV

Type

Metal-Oxide

9.6 ALARM CONTACT RATINGS

Non-grounded alarm contacts shall be suitable for interrupting:

- 1) 0.02-ampere direct-current inductive load
- 2) 0.20-ampere direct-current non-inductive load
- 3) 2.5-ampere alternating-current non-inductive or inductive load
- 4) 250 volts maximum in all classes
- 5)

