

## AGREEMENT FOR THE PURCHASE AND SALE OF EQUIPMENT

ORIGINAL

THIS AGREEMENT FOR THE PURCHASE AND SALE OF EQUIPMENT ("Agreement") is made and entered into by and between the CITY OF ANAHEIM, a municipal corporation ("Purchaser"), and DOUBLETREE SYSTEMS, INC., a California Corporation, ("Seller") on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ (the "Effective Date"). Seller and Purchaser are sometimes referred to herein collectively as the "Parties" and individually as a "Party".

### RECITALS

WHEREAS, Purchaser wishes to purchase certain equipment from Seller and further wishes for Seller to assemble the equipment and to provide certain technical direction in connection with the initial operation of such equipment, and certain other services as described herein; and

WHEREAS, Seller wishes to provide such equipment and technical direction and services to Purchaser in accordance with the terms and conditions hereof.

NOW, THEREFORE, for and in consideration of the mutual promises of the Parties set forth herein and other valuable consideration, the Parties agree as follows:

#### 1. DEFINITIONS

- 1.1 "Affected Party" has the meaning set forth in Section 11.1.
- 1.2 "Agreement" means this Agreement for the Purchase and Sale of Equipment, consisting of the Terms and Conditions, Appendices A through E, and all written amendments thereto.
- 1.3 "Applicable Laws" means all laws, treaties, ordinances, judgments, decrees, injunctions, writs and orders of any court, arbitrator or governmental agency or authority and rules, regulations, orders, interpretations and permits of any national, federal, state, county, municipal, regional, environmental or other governmental body, instrumentality, agency, authority, court or other body having jurisdiction over the Facility, the Equipment, the financing of either, the Work, or either Party's obligations under this Agreement, as may be in effect from time to time.
- 1.4 "Applicable Permits" means all valid consents, waivers, franchises, variances, permits, authorizations, concessions, licenses or orders of or from any governmental agency, body, instrumentality, court or other body which are required to be obtained or maintained in connection with the Facility, the Equipment, the financing of either, The performance of the Work, or either Party's obligations under this Agreement, as may be in effect from time to time.
- 1.5 "Auxiliary Loss Guarantees" has the meaning set forth in Section 7.3.2(a).

- 1.6 "Bidder" means, as used in the Specification, Seller.
- 1.7 "Business Day" means any calendar day other than Saturday, Sunday or national holidays in the United States of America.
- 1.8 "Buydown Amounts" has the meaning set forth in Section 7.3.2(b).
- 1.9 "Combination Load Loss and No-Load Loss Guarantees" has the meaning set forth in Section 7.3.2(a).
- 1.10 "Confidential Information" has the meaning set forth in Section 17.1.
- 1.11 "Contract Price" has the meaning set forth in Section 23.
- 1.12 "CPRA" has the meaning set forth in Section 17.2.6.
- 1.13 "Delivery Point" means annum Substation, 435 N. Gilbert Street, Anaheim.
- 1.14 "Drawings" mean those drawings, schematics, diagrams, plans, descriptive literature, illustrations or other representations of the Equipment identified as in the Specifications.
- 1.15 "Drawing Delivery Schedule" means the document submittal schedule set forth in Part 4.00 of the Specifications.
- 1.16 "Facility" means the electricity generation facility in which the Equipment will be assembled, known as the Hannum Substation.
- 1.17 "Field Performance Tests" has the meaning set forth in Section 7.2.2.
- 1.18 "Final Acceptance" has the meaning set forth in Section 8.2.
- 1.19 "Guaranteed Delivery Date" has the meaning set forth in Section 2.1.1.
- 1.20 "Liabilities" means liability, monetary losses, penalties, fines, judgments, expenses (including reasonable attorneys' fees and court costs) and other damages incurred.
- 1.21 "Load Loss Guarantees" has the meaning set forth in Section 7.3.2(a).
- 1.22 "No-Load Loss Guarantees" has the meaning set forth in Section 7.3.2(a).
- 1.23 "Performance Deficiency Notice" has the meaning set forth in Section 7.2.2.
- 1.24 "Performance Guarantees" has the meaning set forth in Section 7.1.
- 1.25 "Performance Values" has the meaning set forth in Section 7.1.

- 1.26 "Personnel" means, with respect to a Party, the employees, directors, officers, agents, representatives and any third party independent contractors with whom such Party contracts.
- 1.27 "Punch-List" has the meaning set forth in Section 8.2.
- 1.28 "Purchaser Event of Default" has the meaning set forth in Section 14.3.1.
- 1.29 "QA/QC Program" has the meaning set forth in Section 4.1.
- 1.30 "Receiving Party" has the meaning set forth in Section 17.2.1.
- 1.31 "Specifications" means Specification No. **E-20**.
- 1.32 "Supplier" means any individual, firm, partnership, corporation or contractor at any tier having an agreement with Seller to perform a portion of Seller's obligations under this Agreement.
- 1.33 "Technical Direction" means any instruction, direction, information or assistance provided by Seller or its Personnel to Purchaser, either in writing or orally, concerning the initial operation of the Equipment.
- 1.34 **[INTENTIONALLY OMITTED]**
- 1.35 "Transformer" means 9-12.47 kV, 30/40/50 MVA (33.6/44.8/56 MVA @ 65 degree rise) Three-phase Transformer with Load-Tap-Changer.
- 1.36 "Warranty" has the meaning set forth in Section 9.1.1.
- 1.37 "Warranty Period" has the meaning set forth in Section 9.1.2.
- 1.38 "Work" means all work and services which Seller is to perform in connection with its fulfilling its obligations under this Agreement. The Work is further described in Part 3.00 of the Specifications.

## 2. **SCOPE OF SUPPLY**

### 2.1 Purchase, Supply, and Delivery of Equipment

#### 2.1.1 Delivery of Equipment

- (a) Pursuant to the provisions of this Agreement, Purchaser will purchase and accept at, and Seller will design, manufacture, test, pack, supply, deliver the Equipment to, the Delivery Point. Seller shall provide Purchaser at least seven (7) calendar days' written notice prior to shipment of any Equipment
- (b) Notwithstanding anything to the contrary in this Section 2.1.1, if Purchaser is not able to take delivery of any item comprising

Equipment within thirty (30) days after receiving written notification from Seller that such Equipment is ready for delivery as a result of any cause not attributable to Seller, Seller may ship and deliver such Equipment to a Purchaser-designated storage site. In such event, the following conditions shall apply: (i) title shall thereupon pass to Purchaser, if it had not already passed and risk of loss thereupon shall pass to Purchaser, if it had not already passed; (ii) any amounts otherwise payable to Seller upon delivery shall be payable upon presentation of Seller's invoices and certification of cause for storage; and (iii) all expenses incurred by Seller (which such expenses must be reasonable), such as for preparation for and placement into storage, handling, inspection, preservation, insurance, storage, removal charges and any taxes shall be payable by Purchaser upon submission of Seller's invoices and documentation therefor.

- (c) Without prejudice to Section 6.4, if any of the Equipment cannot be delivered to Purchaser when ready due to any cause attributable to Seller or Seller's Personnel, Seller shall be responsible for all costs incurred by Seller. When conditions permit, Seller shall resume delivery of such Equipment to the Delivery Point.

2.1.2 Packing. Seller shall pack the Equipment for shipment in Seller's factory standard export packing, which shall be suitable for transport, including the use of shock recording equipment and other equipment, and the taking of such precautions, as per the Specifications.

## 2.2 INTENTIONALLY OMITTED

2.3 Contract Price and Payment. In consideration for the Work and the Equipment, Purchaser will pay Seller a total amount of **Nine-Hundred Forty-Four Thousand, Five-hundred, Sixty-Eight and no/100 dollars (\$944,568.00)** (the "Contract Price"). Subject to the terms of this Agreement, Purchaser will pay the Contract Price in accordance with and subject to the provisions set forth in Appendix A. All taxes applicable to the Equipment, the Work or the Technical Direction, including without limitation all taxes related to any services provided by Seller and all sales, use, excise, property or similar taxes on the Equipment are **included** in the Contract Price. The Contract Price also includes (and Seller will bear without reimbursement) any import duties, fees or other charges incurred to perform the Work.

2.4 Materials and Workmanship: This Agreement, including the Specifications, may describe certain specific materials, processes and products of manufacturers which will be required unless equivalent materials, processes or products are specifically approved in writing by Purchaser. The Equipment shall be manufactured using only the kind, make and quality of components and materials described in this Agreement. All Equipment furnished shall be (a) new and (b)

manufactured and tested in accordance with the technical testing schedules and standards for manufacture set forth in the Specifications (including ANSI/IEEE), and where specific standards are not referenced, in accordance with the highest standards of the industry. Should Seller propose to furnish equivalent materials, processes or products, either in substitution for or as an alternate to those materials, processes and products required under the Specifications, Seller will submit full details thereof and obtain Purchaser's prior written approval, Purchaser's decision as to the suitability of any such equivalent materials, processes or products will be final, but the approval of Purchaser will not relieve Seller from its responsibility concerning the Work and will not affect the Warranty or the Performance Guarantee.

- 2.5 Compliance with Laws and Permits. Seller will, at its cost, comply with all Applicable Laws and all Applicable Permits. Seller will, at its cost, obtain and maintain any permits required for Seller to perform the Work.
- 2.6 Transfer of Title and Risk of Loss. Title (legal and beneficial ownership) in the goods comprising the Equipment shall pass to Purchaser upon delivery to the Delivery Point (or upon delivery to Purchaser-designated storage under Section 2.1.1(b), if that should occur). Risk of loss to the Equipment will remain with Seller at all times until delivery to the Delivery Point (or upon delivery to Purchaser-designated storage under Section 2.1.1(b), if that should occur), at which time it will pass to Purchaser. Notwithstanding any transfer of title or risk of loss as described herein, Seller shall at all times remain responsible for any damage to Purchaser's property or Equipment caused by Seller or its Personnel. Notwithstanding anything to the contrary in the foregoing, Seller shall retain the ownership of its studies, shop drawings and models communicated to Purchaser, or of which Purchaser may have had knowledge in fulfillment of the Agreement; provided, that Purchaser will have a right to use the same for execution of the Agreement and operation, ownership and maintenance of the Equipment.

### 3. Drawings and Submittal Requirements.

- 3.1 Submittal of Drawings. Seller will, in accordance with the Drawing Delivery Schedule and as further described in Part 4.0 of the Specifications, furnish to Purchaser all necessary Drawings, including necessary details for the design of proper supporting structures, as required and with such detail as necessary for Purchaser to be able to operate, maintain and obtain replacement parts for the Equipment. Seller will identify in such documentation the originator of the same if the originator is other than Seller.
- 3.2 Limits of Purchaser's Review. Review and comment by Purchaser of Seller's submittals will not relieve Seller of its responsibility to meet this Agreement's requirements (including schedule requirements) and to supply Equipment that interfaces with Purchaser-furnished components of the Facility and complies with the requirements of this Agreement. All Drawings will be submitted to Purchaser for comment or approval of general design, general dimensions and apparent

suitability. Purchaser's approval will not relieve Seller of any responsibility for furnishing Equipment which meets the requirements of this Agreement, and which will operate as guaranteed by Seller, nor will it relieve Seller from responsibility for detail dimensions.

4. QUALITY CONTROL, EQUIPMENT TESTING, EXPEDITING, INSPECTION AND REJECTION

- 4.1 Quality Assurance/Quality Control. As further described in the Specifications, Seller will develop a quality assurance and quality control program which shall be capable of providing assurance that design, purchasing, manufacturing, shipping, storage, assembly, testing, and examination of all Equipment, materials, and services shall comply with the requirements of this Agreement. Seller shall provide a copy of such program to Purchaser for review and approval (as approved by Purchaser, the "QA/QC Program"). Seller shall maintain the QA/QC Program during the performance of Work under this Agreement. Seller will similarly require its Suppliers to provide and maintain approved quality control systems where applicable. Seller's and/or its Suppliers' failure to provide and maintain an approved quality control program until completion of Work and Purchaser's acceptance of the Equipment may be cause for rejection of such Equipment. Seller's QA/QC Program will provide for controlling its Suppliers and for assuring that their quality control systems are appropriate for the scope of their supply and are in compliance with the requirements of this Agreement.
- 4.2 Component Testing. Seller will provide at its own expense, and will cause its Suppliers to provide at their own or Seller's expense, the equipment, facilities and personnel necessary for the performance of the tests specified in this Agreement to determine that each component comprising the Equipment conforms to the requirements of this Agreement. Purchaser will have the right, but shall not be obligated, to be present or represented during the performance of such tests. Seller shall notify Purchaser not less than thirty (30) days prior to the performance of any such tests so that Purchaser may attend and observe if it so chooses.
- 4.3 Purchaser's Right to Expedite and Inspect. All components comprising the Equipment will be subject to expediting and inspection by Purchaser and its representatives (and by third parties as may be required by Applicable Laws), prior to Purchaser's acceptance thereof. Purchaser and its representatives and such third parties may test the Equipment or have the Equipment tested in Seller's or its Suppliers' facilities to determine whether the Equipment conforms to the requirements of this Agreement. If Purchaser is required to make additional or extended inspection visits as a result of Seller's or its Supplier's non-readiness to perform scheduled tests or Seller's or its Suppliers' failure to achieve satisfactory test results, all costs and expenses incurred by Purchaser in connection therewith will be to Seller's account.
- 4.4 Access to Expedite and Inspect. Seller will provide Purchaser and its representatives (and third parties as described in Section 4.3), reasonable and safe

access to its facilities and the facilities of its Suppliers in order to allow these persons to expedite and inspect the Equipment and to test or witness tests. Seller will identify for Purchaser all facilities in which the different parts or components of the Equipment are fabricated, manufactured or assembled, and will furnish all information that may be reasonably required by Purchaser to expedite the Equipment, to confirm or verify that the Equipment conforms to the requirements of this Agreement, and to test or witness tests specified in this Agreement.

- 4.5 Limitation on Shipping; Rejection/Acceptance of Components. No component comprising the Equipment will be shipped before all shop tests and inspections have been performed in accordance with this Agreement and the results of such tests or inspections have been accepted in writing by Purchaser. Seller will transmit certified copies of the test results and inspection reports to Purchaser in accordance with the required schedule date therefor. If any component comprising the Equipment is found to be defective or not in conformance with this Agreement, Purchaser will have the right, upon giving notice to Seller, to reject or accept such component of the Equipment as follows. If Purchaser rejects any component of the Equipment, such component will be returned to Seller, at Seller's risk, for (at Purchaser's option) repair, replacement or credit, as directed by Purchaser. All costs and expenses incurred in such return will be to Seller's account. If Purchaser elects to accept a defective or nonconforming component comprising the Equipment, all costs and expenses incurred by Purchaser in connection with such election, including those incurred as a result of the modification or alteration of the Equipment necessary to make the Equipment conforming, will be to Seller's account.
- 4.6 Effect of Inspections. Any inspection or acceptance of the Equipment at Seller's or its Suppliers' facilities will not preclude subsequent inspection and/or rejection of any component of the Equipment if such component is later discovered to be defective or nonconforming or if Purchaser has reasonable grounds upon which to believe that such component may be defective or nonconforming. Any inspection of the Equipment or any component thereof or any witnessing of tests conducted by Seller or its Suppliers or any performance of testing by Purchaser or its representatives or third parties shall in no event be deemed to constitute final acceptance thereof by Purchaser and will not discharge Seller from its obligation to meet this Agreement's schedule requirements and to supply Equipment that conforms to the requirements of this Agreement. Inspection by Purchaser or its representatives shall not be deemed to be supervision by Purchaser of Seller, its Suppliers, or their agents, representatives, servants, employees or subcontractors, but shall be only for the purpose of assuring that the Equipment complies with this Agreement.

## 5. TECHNICAL DIRECTION

In consideration for the Contract Price, Seller shall provide Technical Direction to Purchaser. Such Technical Direction shall be accurate and free from errors, omissions, faults or defects. In addition to Purchaser's Warranty obligations hereunder, if Purchaser

gives Seller written notice within a reasonable time after discovery of any defective or inaccurate Technical Direction, Seller shall (at such times as instructed by Purchaser) re-perform work or make the repair or replacement necessary to remedy any nonconformity in the Equipment which is a result of defective or inaccurate Technical Direction, with the expenses thereof, including the cost of supervision and labor, to be borne by Seller. If Seller, after notice, fails to proceed promptly to correct any non-conformity in the Equipment which is a result of defective or inaccurate Technical Direction in accordance herewith, Purchaser may correct such non-conformity, or have such non-conformity corrected by others, and Seller shall be liable for all expenses so incurred. Purchaser shall, at no charge, provide reasonable facilities at the Site for office space and parking, if needed, to Seller's personnel providing Technical Direction.

## 6. DELIVERY DELAYS

- 6.1 Time is of the Essence. Time is of the essence of Seller's obligations under this Agreement, and Seller acknowledges that Purchaser relies upon Seller's timely performance hereunder. The Seller will continuously monitor, report, forecast and control the progress of the Work in accordance with the schedule set forth in this Agreement. If such activities indicate a delay or potential for delay, Seller will take appropriate corrective measures and will make all reasonable efforts to avoid such delay.
- 6.2 Notification of Delays. With the exception of delays resulting from Force Majeure events (which are governed by Section 11), in the event of any delay or anticipated delay in Seller's performance, Seller will give Purchaser notice of such delay or anticipated delay in writing within three (3) Business Days after the occurrence of the event giving rise to the delay or anticipated delay became known to, or, with the exercise of reasonable diligence on the part of Seller, should have become known to, Seller. The notice to Purchaser will include a description of the source or cause of the delay or anticipated delay and of the actions Seller intends to undertake to avoid or recover from the delay, which actions will be subject to Purchaser's approval. If Seller fails to take steps that Purchaser determines are necessary to avoid or recover from the delay or fails to bring its performance into compliance with the requirements of this Agreement, Purchaser may direct Seller to accelerate its Work by supplying additional labor, including, but not limited to, overtime or additional shifts, and/or additional supervision and equipment as Purchaser may reasonably require, in order to recover and maintain the schedule set forth in this Agreement. All costs incurred by Seller to accelerate its Work will be to the account of Seller. Purchaser's receipt of Seller's notice of delay and/or Purchaser's approval of Seller's proposed action to recover the delay and/or Purchaser's directive to accelerate the Work will not constitute a waiver of any right or remedy available to Purchaser under this Agreement or at law or in equity, nor will be deemed a waiver of any other requirements of this Agreement.
- 6.3 Late Delivery of Submittals. Purchaser will suffer large financial losses if the required Drawings are not delivered on or before the scheduled dates set forth in



the Drawing Delivery Schedule. It would be impracticable or extremely difficult to fix the actual damages resulting from such failure of delivery. Therefore, Seller will pay to Purchaser as liquidated damages and not as a penalty, the Specification contain the amounts per calendar day for each calendar day that the delivery of each Drawing identified in the Specifications is delayed beyond the specified delivery dates set forth in the Drawing Delivery Schedule; provided, that Seller will have a three (3) calendar day grace period before any such liquidated damages are assessed.

Notwithstanding the foregoing, Seller's aggregate liability for liquidated damage under this Section 6.3 shall not exceed fifty thousand dollars (\$50,000). The Parties acknowledge that the liquidated damage sums represent a reasonable endeavor by the Parties to estimate a fair compensation for the foreseeable losses resulting from late delivery of required Drawings and shall be applicable regardless of the actual losses incurred. Such amounts, or part thereof, may be deducted by Purchaser from the balance, if any, due under this Agreement.

- 6.4 Late Delivery of Equipment: Liquidated Damages. Purchaser will suffer large financial losses if any of the Equipment is not delivered to the Delivery Point on or before its respective Guaranteed Delivery Date, including by virtue of the loss of revenue to Purchaser due to the inability to transmit power and/or the loss or use of money invested in the Equipment. It would be impracticable or extremely difficult to fix the actual damages resulting from such delay of delivery. Therefore, with the exception of delays resulting from Force Majeure (which are governed by Section 11), if Seller delivers the Transformer to the Delivery Point after its respective Guaranteed Delivery Date, then Seller will pay to Purchaser, as liquidated damages and not as a penalty, the following amounts for each calendar day of such delay.

Calendar Days After Guaranteed Delivery Date	Liquated Damages per Day
1-14	\$2,000
15-21	\$4,000
>21	\$10,000

Notwithstanding the foregoing, Seller's aggregate liability under this Section 6.4 for liquidated damages for delays in delivery of the Equipment shall not exceed twenty percent (20%) of the amount that is equal to (a) the Contract Price, less (b) all shipping costs. The Parties acknowledge that the sums for liquidated damages as set forth above represent a reasonable endeavor by the Parties to estimate a fair compensation for the foreseeable losses resulting from late delivery of Equipment (but assuming delivery prior to the dates described in Section 14.2.1(a)), and

shall, without prejudice to Section 14.2, be applicable regardless of the actual losses incurred. Such amounts, or part thereof, may be deducted by Purchaser from the balance, if any, due Seller under this Agreement

## 7. TESTING AND PERFORMANCE GUARANTEE

7.1 Performance Guarantees. The Parties acknowledge that (a) Appendix E (Bidder's Response) was submitted by Seller in response to Purchaser's "Bid," which included Appendix C (Specifications); (b) in the Specifications, Purchaser outlined certain performance characteristics for the Transformer with respect to which Bidder would be required to propose guaranteed values; (c) via Appendix E (Bidder's Response), Seller (in response to the Request for Proposals) has proposed, and Purchaser has now accepted, such values (collectively, the "Performance Values," and each a "Performance Value," as the context may require). In this regard, in addition to the Warranty, Seller guarantees that each Transformer will be capable, with respect to each of the performance characteristics set forth in Section 1.06 of the Specifications, of achieving the respective Performance Value applicable thereto (collectively, the "Performance Guarantees," and each a "Performance Guarantee," as the context may require). Seller will demonstrate the Performance Guarantees during a Field Performance Test as described in Section 7.2.2. Except as set forth in Section 7.3, Seller's obligation to meet the Performance Guarantees is absolute and is not limited by any provision of this Agreement. In this regard, subject to Section 7.3, Seller shall do all things necessary or appropriate to achieve the Performance Guarantees including, without limitation, exercising each and every repair or replacement alternative, regardless of cost to Seller or difficulties associated therewith. Subject to Section 7.3, if Seller fails to cause a Transformer to meet all of the Performance Guarantees within thirty (30) days of its receipt of the Performance Deficiency Notice (or such longer period as the Parties may agree to in writing), then such failure shall constitute default of material obligation Section 14.2.1(f).

## 7.2 Performance Testing.

7.2.1 Factory Testing. Prior to shipment of each Transformer, Seller will perform tests on such Transformer at its factory that demonstrate whether such Transformer is compliant with the Performance Guarantees. Seller will provide Purchaser with at least 45 days prior notice of any such tests and will allow Purchaser and/or its representatives to be present at the factory for the same (if they so elect). In any event, Seller will provide to Purchaser a written report describing the results of such tests on each Transformer. Except as provided in the next sentence, if any such factory test indicates that a Transformer will not meet the Performance Guarantees, then Seller will not ship such Transformer to Purchaser unless and until compliance with the Performance Guarantees is demonstrated via a subsequent factory test (with report of same delivered to Purchaser). As an exception to the foregoing sentence, if a Transformer fails to achieve Performance Value for one of the Performance Guarantee

categories listed in Section 1.06 of the Specifications (i.e. equal to or less than the Performance Value), but the demonstrated performance of such Transformer only exceeds the applicable Performance Value by fifteen percent (15%) or less, then Seller may ship such Transformer to Purchaser.

7.2.2 Field Performance Testing. After assembly of each Transformer is completed and upon notification to the Seller that such Transformer is ready for testing, Purchaser (or its representatives) shall carry out comprehensive performance tests, in a manner consistent with the testing guidelines and criteria as described in the Specifications, to verify that such Transformer performs in accordance with the Performance Guarantees (such tests, collectively, the "Field Performance Test"). If a Transformer fails to so comply with any of the Performance Guarantees, then Purchaser will notify Seller in writing of this fact (such notice the "Performance Deficiency Notice"). Upon its receipt of the Performance Deficiency Notice with respect to any Transformer, except as set forth in Section 7.3, Seller shall immediately take, at its own expense, all steps necessary to correct any deficiencies in such Transformer and shall also, at its own expense, take such actions and re-perform the Field Performance Test as necessary to demonstrate compliance with the Performance Guarantees with respect to which the Transformer had previously failed to comply.

### 7.3 Transformer Loss Performance Guarantees; Buydown Amounts.

7.3.1 Exceptions to Must-Make Obligations. Notwithstanding Sections 7.1 and 7.2, if a Transformer's Field Performance Test demonstrates that such Transformer has failed to achieve a Performance Value for one of the Performance Guarantee categories listed in Section 1.06 of the Specifications (i.e. equal to or less than the Performance Value), but the demonstrated performance of such Transformer only exceeds the applicable Performance Value by fifteen percent (15%) or less, then Seller will have the option (exercisable upon notice to Purchaser within fifteen (15) days after completion of such Field Performance Test) of paying Purchaser the applicable Buydown Amounts as set forth in Section 7.3.2 below, in lieu of complying with the obligations under Sections 7.1 and 7.2 as regards curing compliance with that particular Performance Guarantee. For the avoidance of doubt, this option to pay Buydown Amounts will not be available as with respect to any failure of a Transformer to achieve a Performance Value for one of the Performance Guarantee categories listed in Section 1.06 of the Specifications where the demonstrated performance of such Transformer exceeds the applicable Performance Value by more than fifteen percent (15%).

#### 7.3.2 Buydown Amounts for Deficient Performance.

- (a) Defined Terms.
- (i) the "No-Load Loss Guarantees" comprise the Performance Guarantees for the performance criteria set forth Sections 1.06.01(e)(15)(i), (ii) and (iii) of in the Specifications (and each of them, a "No-Load Loss Guarantee");
  - (ii) the "Load Loss Guarantees" comprise the Performance Guarantees for the performance criteria set forth in Sections 1.06.01(e)(15)(iv), (v) and (vi) of the Specifications (and each of them, a "Load Loss Guarantee");
  - (iii) the "Combination Load Loss and No-Load Loss Guarantees" comprise the Performance Guarantees for the performance criteria set forth in Sections 1.06.01(e)(15)(vii),(viii), (ix), and (x) of the Specifications (and each of them, a "Combination Load Loss and No-Load Loss Guarantee"); and
  - (iv) the "Auxiliary Loss Guarantees" comprise the Performance Guarantees for the performance criteria set forth in Sections 1.06.01(e)(15)(xi) and (xii) of the Specifications (and each of them, an "Auxiliary Loss Guarantee").
- (b) Amounts Payable. If Section 7.3.1 applies to allow Seller the option of paying Purchaser the Buydown Amounts, then such "Buydown Amounts" shall be as follows, as applicable:
- (i) if a Transformer fails to meet a No-Load Loss Guarantee, then Seller shall pay to Purchaser an amount to be determined in accordance with Section 7.3.2(c); provided, that if a Transformer fails to meet more than one of the No-Load Loss Guarantees, then Seller must pay to Purchaser only such amount as with respect to the No-Load Loss Guarantee that is exceeded the most;
  - (ii) if a Transformer fails to meet a Load Loss Guarantee, then Seller shall pay to Purchaser an amount to be determined in accordance with Section 7.3.2(c); provided, that if a Transformer fails to meet more than one of the Load Loss Guarantees, then Seller must pay to Purchaser only such amount as with respect the Load Loss Guarantee that is exceeded the most;
  - (iii) if a Transformer fails to meet a Combination Load Loss and No-Load Loss Guarantee, then Seller shall pay to Purchaser an amount to be determined in accordance with Section 7.3.2(c); provided, that if a Transformer fails to

meet more than one of the Combination Load Loss and No-Load Loss Guarantees, then Seller must pay to Purchaser only such amount as with respect the Combination Load Loss and No-Load Loss Guarantee that is exceeded the most; and

- (iv) if a Transformer fails to meet an Auxiliary Loss Guarantee, then Seller shall pay to Purchaser an amount to equal to two thousand five hundred dollars (\$2,500) per kW for each kW that the auxiliary loss exceeds the applicable Auxiliary Loss Guarantee.

- (c) Calculation of Certain Buydown Amounts. If Section 7.3.2(b) applies, where a Transformer has failed to meet a No-Load Loss Guarantee, a Load Loss Guarantee or a Combination Load and No-Load Loss Guarantee (i.e., the measured loss exceeds the guaranteed Performance Value loss (but not by more than 15%)), then the Buydown Amount payable by Seller will be calculated as described below (for the applicable Performance Guarantee):

- (i) Failure to Meet a No-Load Loss Guarantee: Where a Transformer has failed to meet a No-Load Loss Guarantee as described above, the Buydown Amount will be the cumulative net present value (over a presumed 30 year service life, at 5% discount rate) of the "Annual No-Load Loss Costs Differential" over such 30 years, which is calculated (for year one) as:  $(DNLL)(8760 \text{ Hr/Yr})(\text{Energy Charge}) + (DNLL)(\text{Demand Charge})$ .

Where:

$DNLL = \text{Differential No Load-Loss} = \text{the measured loss value, minus the applicable guaranteed loss Performance Value, as measured in kW.}$

$\text{Energy Charge} = \$0.06078 \text{ \$/kWh for the first year, escalated at 3\% per year for the remaining 29 years.}$

$\text{Demand Charge} = \$58/\text{kW for the first year, escalated at 3\% per year for the remaining 29 years.}$

- (ii) Failure to Meet a Load Loss Guarantees: Where a Transformer has failed to meet a Load Loss Guarantee as described above, the Buydown Amount will be the cumulative net present value (over a presumed 30 year service life, at 5% discount rate) of the "Annual Load Loss Costs Differential" over such 30 years, which is calculated

(for year one) as:  $(DLL)(8760 \text{ Hr/Yr})(\text{Load Factor})(\text{Energy Charge}) + (DLL)(\text{Demand Charge})$ .

Where:

DLL = Differential Load Loss = the measured loss value, minus the applicable guaranteed loss Performance Value, as measured in kW.

Energy Charge = \$0.06078/kWh for the first year, escalated at 3% per year for the remaining 29 years.

Demand Charge = \$58/kW for the first year, escalated at 3% per year for the remaining 29 years.

Load Factor = .5439.

- (iii) Failure to Meet a Combination Load Loss and No-Load Loss Guarantee. Where a Transformer has failed to meet either or both of the Combination Load Loss and No-Load Loss Guarantee as described above: (A) if liquidated damages are already due by application of subclauses (i) or (ii) above, then no additional liquidated damages will be due for such failure; and (B) if no liquidated damages are already due under subclauses (i) or (ii) above, then the Buydown Amount will be calculated based on the methodology in subclause (ii) above, except that the annual costs will be based on the differential between the guaranteed combination load loss and no-load loss (kW) Performance Values and the as-measured combination load loss and no-load loss (kW) values.
- (d) Payment Timing; Buydown Amounts Reasonable. If Seller elects to pay Buydown Amounts per Sections 7.3.1 and 7.12, then Seller will so pay the same to Purchaser within fifteen (15) days after notifying Purchaser of such election. Purchaser and Seller hereby acknowledge and agree that the Buydown Amounts are fixed as liquidated damages and constitute a reasonable estimate of damages (and not a penalty), considering the actual increased costs and reduction in the value of the Equipment that Purchaser will sustain in the event of the Equipment's failure to achieve the applicable Performance Guarantees Section 1.06 of the Specifications. Such fixed amounts are agreed upon and fixed hereunder by the Parties as liquidated damages because of the difficulty of ascertaining the exact amount of such increased costs and reduction in value that will actually be sustained by Purchaser in the event of any such failure, and they shall be applicable

regardless of the amount of such reduction in value actually sustained by Purchaser.

- (e) Limitations on Technical Liquidated Damages. Notwithstanding anything herein to the contrary, in no event shall Seller's aggregate liability for Buydown Amounts payable as with respect to the performance of a Transformer under this Section 7.3.2 exceed an amount equal to ten percent (10%) of the purchase price for such Transformer, as set forth in Section 2.3.

## 8. FINAL ACCEPTANCE PAYMENT

8.1 Punch-List. At any time after delivery of a Transformer, Purchaser may provide Seller with a list of items remaining to be completed upon or in connection with such Transformer in order for Final Acceptance to occur (the "Punch List").

### 8.2 Final Acceptance.

8.2.1 Tests and Check-Outs. Once the Equipment has been assembled by Seller, Purchaser or its representative shall thereafter perform such tests and check-outs as described in the Specifications as necessary to demonstrate that the Transformer performs as represented and/or guaranteed in this Agreement.

8.2.2 Final Acceptance Criteria. Subject to Section 8.2.3, "Final Acceptance" will occur once:

- (a) Seller has, as with respect to each Transformer, demonstrated compliance with the Performance Guarantees per Field Performance Tests as per Section 7.2.2 (but subject to Seller's right to elect to pay Buydown Amounts, to the extent allowed pursuant to Section 7.3);
- (b) Seller has completed all Punch-List items; and
- (c) Purchaser has delivered to Seller a written certification that all the requirements of Sections 8.2.2(a) and (b) have been satisfied or waived.

8.2.3 Certification Process. When Seller believes that the requirements set forth in Section 8.2.2(a) and (b) have been achieved, Seller shall deliver a certificate to Purchaser indicating the same. Purchaser will within thirty (30) days following Purchaser's receipt thereof, either: (a) deliver a written certification as described in Section 8.2.2(c); or (b) notify Seller in writing that such requirements have not been achieved, stating the reasons therefor. In the event Purchaser notifies Seller that such requirements have not been met, Seller shall promptly take such action as necessary to achieve such requirements, and shall then issue to Purchaser another

certificate indicating the same. Such procedure shall be repeated until Final Acceptance is achieved.

8.2.4 Delayed Certificate. Notwithstanding the foregoing, if (a) Purchaser fails to issue a Final Acceptance Certificate within one hundred twenty (120) days of energization of the Equipment despite such Equipment's having demonstrated performance as represented and/or guaranteed and (b) the Equipment is thereafter utilized by Purchaser in its normal business operations, and (c) Seller has completed all Punch-List Items, then Final Acceptance shall be deemed to have occurred.

8.2.5 Final Payments. Upon the occurrence of Final Acceptance (or deemed Final Acceptance, as applicable), Seller will invoice Purchaser for any amounts of the Contract Price that remain unpaid. Purchaser will pay Seller such invoiced amounts within thirty (30) days of such invoice. Final payment to Seller shall not relieve Seller of its continuing obligations under this Agreement, including, without limitation, Seller's warranty and indemnity obligations.

## 9. WARRANTY

### 9.1 Standard Warranty.

9.1.1 Terms of Warranty. Seller warrants that, for the duration of the Warranty Period, the Equipment will be (a) new and of good quality, (b) free from defects in design, workmanship, manufacturing and materials, and (c) provided in accordance with the requirements of this Agreement, and in compliance with all Applicable Laws and Applicable Permits (the "Warranty").

9.1.2 Warranty Period. Subject to Section 9.1.4, the Warranty will remain in full force and effect for a period beginning on the date of Final Acceptance and ending five (5) years thereafter (such period, the "Warranty Period").

9.1.3 Warranty Obligations. If during the Warranty Period the Equipment or any portion of the Equipment fails to conform to the Warranty, then Seller will, as promptly as practicably possible (but at such times as directed by Purchaser), in the manner it deems appropriate and that is reasonably acceptable to Purchaser, take all actions necessary to cure such failure. Any such redesign, repair or replacement Work requiring the Facility to be off-line will be coordinated with Purchaser's operating personnel to minimize disruption of Purchaser's ongoing operations, such coordination to include, at Purchaser's option, around-the-clock Work, including weekends and holidays. Seller will, at Seller's expense, perform such tests as Purchaser may reasonably require and that are normal industry practice to demonstrate that the redesign, repair or replacement of defective or nonconforming Equipment complies with this Agreement. All costs



incurred to remove, disassemble, reassemble, re-install, re-construct, re-inspect and retest the Equipment hereunder (including the costs of mobilization and demobilization of Seller's Personnel) will be to the account of Seller.

9.1.4 Warranty Period Extensions. Any item of Equipment that is the subject of re-work in satisfaction of Seller's obligations in connection with the Warranty will be re-warranted by Seller pursuant to the same Warranty set forth in Section 9.1.1, and Seller will have the same obligations in relation thereto as set forth in Section 9.1.3, for a period equal to longer of (a) one (1) year from the date such re-performance, rework, repair or replacement is completed, or (b) the remaining period under the Warranty Period.

9.1.5 Warranty Exclusions. Notwithstanding anything in this Section 9.1 to the contrary, Seller shall have no warranty obligations with respect to a given condition or defect to the extent that it can demonstrate that the condition or defect constitutes or results from any of the following:

- (a) damages to the Equipment directly caused by material error or negligence of Purchaser;
- (b) failure to materially comply with the Seller's written instructions regarding the operation or maintenance of the Equipment;
- (c) normal equipment wear and tear; or
- (d) the Equipment's exposure to inclement weather, including being struck by lightning; or
- (e) vandalism to the Equipment not attributable to Seller.

9.2 Warranty of Title; Lien Waivers. Seller warrants that the Equipment will be free of defects in title and that the title to the Equipment is marketable and clear and free of any liens, charges or encumbrances whatsoever. Seller will indemnify, defend and hold Purchaser harmless for any claims, demands or Liabilities arising out of any breach of the foregoing warranty. Seller will furnish, as deemed necessary by and in format acceptable to Purchaser, partial and/or final lien waivers, affidavits, or other documents required to keep the Facility and the Equipment free from liens or claims for liens arising out of the furnishing of the Equipment. If any such lien is filed or claim is made, Seller will remove the lien or defend against any such claim. If Seller fails to remove such lien or claim within seven (7) calendar days after receipt of written notice from Purchaser, Purchaser may proceed to remove such lien or claim, and Seller will pay Purchaser any and all costs and expenses incurred by Purchaser in so doing, including reasonable attorneys' fees and court costs so incurred.

9.3 Warranty Against Infringement of Intellectual Property Rights. Seller represents and warrants that the Equipment or any portion thereof does not infringe any

patent, copyright, trademark or trade secret (as the same may be defined by applicable law).

#### 10. CHANGES

Purchaser will have the right, at any time, to make changes to the Equipment that Purchaser may deem desirable. If such change causes a material increase in Seller's cost and/or time for performance, Seller will so notify Purchaser in writing within ten (10) calendar days from the date of Seller's receipt of Purchaser's notice of change, and an equitable adjustment in this Contract Price and/or the time of performance will be mutually agreed upon in writing between Purchaser and Seller. Seller will proceed with any change when so directed by Purchaser notwithstanding any dispute regarding such mutual agreement. Agreement in writing by the Parties to such adjustment will constitute a waiver of all claims by Seller arising out of the change. If any such change or alteration results in a reduction in the Work to be performed or in the Equipment to be furnished, no allowance will be made to Seller for damages, including burden, overhead and loss of anticipated profits, on the reduction in the Work. No change will be effective in the absence of express written direction of Purchaser. Any and all such changes will be evidenced by a written "change order," and Seller will promptly comply therewith.

#### 11. FORCE MAJEURE

11.1 Definition of Force Majeure. For purposes hereof, a "Force Majeure" event means any event that (a) is beyond the reasonable control of the Party affected by such event (the "Affected Party") or its Personnel; (b) is not the fault of the Affected Party or its Personnel; (c) could not have been prevented by the Affected Party's or its Personnel's exercise of reasonable diligence. For purposes of Section 11.1(a), the following events shall be considered to be beyond the reasonable control of an Affected Party or its Personnel: war; civil insurrection; floods; hurricanes; tornadoes; typhoons; lightning strikes; landslides; earthquakes; epidemics and other Acts of God; quarantines; embargoes; riots; sabotage; malicious acts of damage; requirements of or actions or failures to act on the part of governmental authorities preventing performance (but excluding normal business acts of Purchaser relative to this Agreement); the refusal or withdrawal of any import or export licenses; and labor conflicts or lockouts (except as expressly prohibited below). For the sake of clarity, in no instance will any event that is caused by the intentional act, error, omission or negligence of Seller, its affiliates or either of their Personnel be considered Force Majeure entitling Seller to relief under this Section 11. In no instance will the following be considered events beyond Seller's reasonable control; (i) strikes or labor disturbances involving employees of Seller or its Suppliers, or (ii) price fluctuations with respect to materials, supplies or components of equipment related to the Equipment or the Work.

- 11.2 Notification and Mitigation Requirements. If a Force Majeure event occurs that will delay a Party from the performance of its obligations under this Agreement, such Affected Party will notify the other Party in writing of such condition and the cause thereof no later than three (3) calendar days after the commencement of the event of Force Majeure, describing in detail the event, the effect thereof upon the Work, and the length or potential length of delay and the measures to be taken to minimize the delay. An Affected Party will use all reasonable efforts to remedy its inability to perform under this Agreement and to minimize any delay and mitigate any damages caused by an event of Force Majeure. An Affected Party's failure to do so will prevent such Party from claiming that a Force Majeure event has occurred. Unless otherwise directed by the other Party in writing, an Affected Party will continue to perform its obligations under this Agreement so far as reasonably practical, and will seek all reasonable alternative means for performance not prevented by Force Majeure, including utilizing alternative means for performance not prevented by the Force Majeure event. To the extent not already resumed via alternative means, the Affected Party will promptly resume its performance at the cessation of the event. The Affected Party will give the other Party written notice of the cessation of a Force Majeure event within no later than three (3) calendar days after such suspension.
- 11.3 Effect of Force Majeure.
- 11.3.1 Obligations Temporarily Suspended. Neither Seller nor Purchaser will be responsible or liable for or deemed in breach of this Agreement because of, any delay in the performance of their respective obligations under this Agreement if and to the extent that such delay in performance is directly and solely caused by a Force Majeure event.
- 11.3.2 Schedule Adjustments. If Seller experiences a delay caused directly and solely by a Force Majeure event, and provided Seller has given Purchaser the written notices and has taken the prescribed actions as required under Section 11.2, the required schedule date(s) for delivery of the Equipment and any other: required dates for performance by Seller will be equitably adjusted to reflect the delay caused by such Force Majeure event. Failure of Seller to provide such written notice or to take such prescribed actions will be deemed a waiver by Seller of its right to an extension of time for its performance.
- 11.4 Extended Force Majeure. If Seller experiences an event of Force Majeure that has continued for a period of sixty (60) calendar days, then Purchaser will be entitled to serve upon Seller in writing a thirty (30) calendar day notice to terminate this Agreement. If at the expiration of said thirty (30) day period, the event of Force Majeure is continuing, Purchaser may terminate this Agreement or may elect to further equitably extend the required schedule dates set forth in this Agreement. If Purchaser elects to terminate this Agreement pursuant to this Section 11.4, Seller will be entitled to receive: (a) payment for that portion of the Equipment that conforms to the requirements of this Agreement and that has been delivered and

accepted by Purchaser and (b) the cost of materials ordered for the Equipment or for use in connection with the Equipment that has been delivered to Seller or for which Seller is legally liable to accept delivery as and to the extent such costs are approved by Purchaser. Such materials will become the property of Purchaser when paid for by Purchaser and Seller has delivered the materials to a location specified by Purchaser.

- 11.5 Limited Remedies. Except for the payments identified in Section 11.4, and notwithstanding any other provision to the contrary, Seller's sole and exclusive remedy in the event of a Force Majeure event will be limited to an equitable adjustment to the delivery schedule in accordance with this Section 11. Any additional costs incurred by Seller by reason of a Force Majeure event or in complying with the obligations of this Section 11 will be borne by Seller, without reimbursement from Purchaser.

## 12. INDEMNIFICATION

The Indemnification provisions of this Agreement are contained in Appendix D, attached hereto and incorporated herein by reference.

## 13. SUSPENSION

- 13.1 Right to Suspend. Purchaser will have the right, at any time and at its sole discretion, to direct Seller to suspend performance of the Work, in whole or in part, by giving written notice to Seller specifying the extent to which the performance of Work is suspended pursuant to this Section 13 and the effective date of such suspension. The suspension will continue for the period of time specified in the written notice. Seller will suspend performance of the Work under this Agreement, to the extent that the notice so specifies, on the effective date of the suspension, but will continue to perform any portion of the Work not so suspended.
- 13.2 Actions Upon Suspension. In the event of suspension by Purchaser under this Section 13, Seller will, at Purchaser's request, preserve and protect the Equipment committed to or purchased for the suspended Work (whether completed or in progress), pending Purchaser's instructions.
- 13.3 Affect of Suspension on Schedule. If suspension under this Section is due to causes not related to Seller's failure to perform its obligations under this Agreement, then Purchaser will equitably adjust the scheduled date(s) for Seller's performance of the suspended Work, as set forth in this Agreement, to reflect the length of the suspension, and Purchaser will reimburse Seller for the reasonable and direct additional costs incurred by Seller as a result of the suspension that are documented to the satisfaction of Purchaser and that are attributable solely to: (a) the safeguarding or storing of the Work, including Equipment at Seller's facilities or the facilities of its Suppliers, or in transit; and (b) any resultant demobilization and remobilization at the Site in connection with such suspension. Adjustment to

Seller's scheduled dates for performance and reimbursement of the costs specified in this Section 13.3 will constitute Seller's sole and exclusive remedies for any suspension directed by Purchaser. Any claim for additional time for performance or for compensation relating to a suspension of Work under this Section will be presented in writing by Seller within ten (10) calendar days after the suspended Work has been either resumed or terminated at the direction of Purchaser. The failure of Seller to submit a written claim within such period of time will constitute a waiver of Seller's right to submit a claim relating to suspension hereunder.

- 13.4 Resumption of Work. At any time after the effective date of the suspension, Purchaser may require Seller to promptly resume performance of all or any portion of the suspended Work by giving written notice to Seller authorizing resumption of such suspended Work.

#### 14. TERMINATION

##### 14.1 [INTENTIONALLY OMITTED]

##### 14.2 Termination for Seller Event of Default

14.2.1 Seller Events of Default. Upon the occurrence of a Seller Event of Default, Purchaser will have the right, at its sole discretion and without prejudice to any other remedy under this Agreement or at law or in equity, to withhold further payments to Seller and/or to terminate this Agreement, in whole or in part, after having given Seller written notice of such default, specifying the extent to which this Agreement is terminated for default. For purposes hereof, a "Seller Event of Default" means any of the following events have occurred:

- (a) if either (1) the delivery of the Transformer is delayed by more than sixty (60) days beyond its Guaranteed Delivery Date;
- (b) if the delivery of any Drawing is delayed by more than sixty (60) days beyond the deadline for the same as set forth in the Drawing Delivery Schedule;
- (c) a case or action is commenced by or against Seller under applicable bankruptcy law, or Seller makes a general assignment for the benefit of its creditors, or a receiver is appointed to take charge of Seller's assets;
- (d) Seller attempts to assign this Agreement or any part thereof without the written consent of Purchaser;
- (e) Seller fails or refuses to comply with any Applicable Law or Applicable Permit and such failure or refusal has a material impact on Purchaser;

- (f) Seller defaults in its performance of any other material obligation under this Agreement, and Seller does not cure its default in performance within a period of ten (10) calendar days after Seller's receipt of such a written notice of default from Purchaser; or
- (g) Seller's failure to maintain and provide acceptable evidence of the required insurance for the required period of coverage as set forth in Section 16.

14.2.2 Actions Upon Default. In the event of termination by Purchaser under this Section 14.2, Seller and its Suppliers will place no further orders or enter into any further agreements or other commitments for equipment, facilities or services in connection with terminated Equipment under this Agreement. Upon request by Purchaser, Seller will promptly provide Purchaser a listing of all outstanding agreements and other commitments which pertain to the performance of the Work, and will furnish Purchaser with complete copies thereof.

14.2.3 Assignment of Equipment. In the event of termination by Purchaser under this Section 14.2, Seller, if and to the extent requested to do so by Purchaser, will promptly assign to Purchaser, in form and content satisfactory to Purchaser, Seller's rights, title and interest to the Equipment (whether completed or in progress) and to those Supplier agreements and other commitments so designated by Purchaser. Purchaser, at its option and without waiving any other available remedy under this Agreement or at law or in equity, may take possession of any or all of the Equipment (whether delivered to the Delivery Point or on order), or may obtain goods similar to those ordered under this Agreement on terms and conditions that Purchaser deems appropriate, and may complete the terminated Work by whatever method Purchaser deems necessary.

14.2.4 Remedies. In the event of a termination of this Agreement under this Section 14.2, Purchaser will be entitled to all rights under law or equity. Without limiting the foregoing, if such termination results from the Seller Event of Default described in Section 14.2.1(a), in addition to any liquidated damages payable to Purchaser under Section 6.4, Purchaser may reject and/or rescind its order for the delayed Transformer (in which case, Seller may retrieve them, at its expense), and receive a full refund of the purchase price therefor, and Seller will further be liable to Purchaser for any costs in excess of such purchase price as are incurred by Purchaser in procuring replacement transformer(s).

#### 14.3 Termination for Purchaser Event of Default

14.3.1 Purchaser Events of Default. Upon the occurrence of a Purchaser Event of Default, Seller will have the right, at its sole discretion and without prejudice to any other remedy under this Agreement or at law or in equity

to terminate this Agreement, in whole or in part, after having given Purchaser written notice of such default, specifying the extent to which this Agreement is terminated for default. For purposes hereof, a "Purchaser Event of Default" means any of the following events have occurred:

- (a) a case or action is commenced by or against Purchaser under applicable bankruptcy law, or Purchaser makes a general assignment for the benefit of its creditors, or a receiver is appointed to take charge of Purchaser's assets;
- (b) Purchaser attempts to assign this Agreement or any part thereof without the written consent of Seller (to the extent so required under Section 15.2.2);
- (c) Purchaser fails to make an undisputed payment within sixty (60) days after its due date under this Agreement; or
- (d) Purchaser defaults in its performance of any other material obligation under this Agreement, and Purchaser does not cure its default in performance within a period of ten (10) calendar days after Purchaser's receipt of such a written notice of default from Seller.

14.3.2 Remedies. In the event of a termination of this Agreement under this Section 14.3, Seller will be entitled to all rights under law or equity.

## 15. SUBCONTRACTING AND ASSIGNMENT

- 15.1 Subcontracting. Except for expendable materials and minor component parts, and except for any portion of the Work for which a Supplier is specifically named in this Agreement, Seller will not subcontract all or any portion of the Work without first notifying Purchaser in writing of its intention to do so and obtaining Purchaser's written consent of the proposed subcontracting and the proposed Supplier. Any Equipment fabricated, manufactured or assembled without such consent will be subject to subsequent rejection at Purchaser's sole discretion. If Purchaser gives written consent to Seller to subcontract all or any portion of the Work, no contractual relation will exist between Seller's Supplier and Purchaser. Seller will, upon request of Purchaser, provide Purchaser with unpriced copies of Seller's purchase orders with its Suppliers. Notwithstanding such written approval, Seller will be responsible for the full and complete performance of this Agreement. Seller guarantees that its Suppliers will comply fully with the terms of this Agreement applicable to the portion of the Work performed by them, whether or not such Agreement terms include a reference to Seller's Suppliers. In the event Purchaser terminates this Agreement pursuant to Article 14, Seller will assign to Purchaser, as Purchaser may direct, any of Seller's agreements with Suppliers, as may be requested by Purchaser. Seller will ensure that all its

Supplier agreements contain provisions therein permitting assignment to Purchaser and to its successors and assigns.

15.2 Assignment.

15.2.1 Assignment by Seller. Seller will not assign this Agreement wholly or in part, voluntarily, by operation of law (including change of control), or otherwise, without first obtaining Purchaser's prior written consent.

15.2.2 Assignment by Purchaser. Purchaser reserves the right, at its sole discretion, to assign this Agreement to its affiliates or to any financial institution(s) participating in the financing of the Facility with notice to Seller. Upon its receipt of such notice, if Purchaser so requests, then Seller will execute a written release that releases Purchaser from its obligations under this Agreement. Purchaser may also assign this Agreement or any part hereof to any other third parties with the prior consent of Seller (which will not be unreasonably withheld or delayed).

15.2.3 Successors and Assigns. Subject to Sections 15.2.1 and 15.2.2, the provisions of this Agreement will extend to the benefit of and will be binding upon the successors and assigns of the Parties.

16. INSURANCE

Seller will, at its sole expense, obtain and maintain in full force and effect during the term of this Agreement the insurance described as being Seller's responsibility in, and in accordance with, and meeting the requirements set forth in, Appendix B.

17. NON-DISCLOSURE

17.1 "Confidential Information" means, with respect to a Party hereto, all information or material which either (1) is marked or identified as "Confidential," "Restricted," or "Proprietary Information" or other similar marking or identification, or (2) the other Party knew, as recipient, or under the circumstances, should have known, was considered confidential or proprietary by the Disclosing Party (as defined below). Confidential Information shall consist of all information, whether in written, oral, electronic, or other form, furnished in connection with this Agreement by one Party or its Representatives ("Representative" is defined as any elected and appointed officials, affiliate, director, officer, employee, agent, advisor or consultant of a Party or any of its subsidiaries or affiliates) to the other Party or to its Representatives, and specifically includes but is not limited to Purchaser's individually identifiable customer information, and Purchaser's customer usage data and financial data.

17.2 Seller and Purchaser shall each hold the other's Confidential Information in confidence. Neither Party shall make the other's Confidential Information available in any form to any third party or use the other's Confidential Information for any purpose other than as specified in this Agreement. The Party providing



Confidential Information ("Disclosing Party") to the other Party ("Receiving Party") shall remain the sole owner of such information. Except as provided elsewhere within this Agreement, nothing contained in this Agreement shall be construed as granting or conferring any right or license in any Confidential Information or in any patents, copyrights, software or other technology, either expressly or by implication to the other Party, or to its Representatives or to others. The term Confidential Information shall not include any of the following: (1) information already in possession of, or already known to, the Receiving Party as of the Effective Date without an obligation of confidentiality; (2) information in the public domain at the time of the disclosure, or which, after such disclosure, enters into the public domain through no breach of this Agreement by the Receiving Party or its Representative(s); (3) information lawfully furnished or disclosed to the Receiving Party by a non-party to this Agreement without any obligation of confidentiality and through no breach of this Agreement by the Receiving Party or its Representative(s); (4) information independently developed by the Receiving Party without use of any Confidential Information of the Disclosing Party; or (5) information authorized in writing by the Disclosing Party to be released from the confidentiality obligations herein.

- 17.3 By virtue of this Agreement, each Party hereto may disclose to the other Party information that is Confidential Information. This Agreement does not diminish, revoke or supersede any existing confidentiality, non-disclosure or similar agreement between the Parties that does not pertain to the subject matter of this Agreement. However, any Confidential Information, whether or not previously disclosed, that pertains to the subject matter of this Agreement shall be governed by the terms of this Section 17 which shall supersede any such previous agreement with respect to such Confidential Information and any Confidential Information relating to the subject matter of this Agreement that was exchanged under such previous agreement shall be treated as though it was exchanged under this Agreement as of the date of such exchange.
- 17.4 The Receiving Party will treat all Confidential Information of the Disclosing Party, no matter written, electronic, or oral, as confidential and proprietary, and the Receiving Party shall only use such information in furtherance of this Agreement. As such, the Receiving Party shall hold in confidence the Confidential Information of the Disclosing Party, and ensure that such Confidential Information is not disclosed to any other person or entity, except as expressly permitted by this Agreement or as authorized by the Disclosing Party. Receiving Party shall not disclose Confidential Information of the Disclosing Party received under this Agreement to any person other than its Representatives who require knowledge of such Confidential Information in furtherance of this Agreement. The Receiving Party shall inform its Representatives of the confidential nature of the Confidential Information of the Disclosing Party and advise such Representatives of the limitations on the use and disclosure and prohibition on making copies or summaries of such Confidential Information. The Receiving Party shall be responsible for any breach of this Agreement by its

Representatives. Neither Party shall use the Confidential Information of the other Party for any commercial purpose.

- 17.5 If the Receiving Party becomes legally compelled (by oral questions, interrogatories, request for information or documents, subpoena, civil investigative demand, or similar process) to disclose any Confidential Information of the Disclosing Party, the Receiving Party will provide the Disclosing Party with written notice of such an occurrence (if so permitted) as soon as possible. Thereafter, at its sole costs and expense, the Disclosing Party may seek a protective order or other appropriate remedy, or waive compliance with the provisions of this Agreement. So long as it is consistent with applicable law, the Receiving Party will not oppose action by, and the Receiving Party will cooperate with, the Disclosing Party, at the Disclosing Party's sole cost and expense, to obtain an appropriate protective order or other reliable assurance that confidential treatment will be accorded the Confidential Information. If the Disclosing Party fails to obtain such protective order or other remedy, or if the Disclosing Party waives compliance with the requirements of the preceding sentence, the Receiving Party will disclose only that Confidential Information that it is legally required to disclose, and will exercise commercially reasonable efforts, at Disclosing Party's expense, to obtain reliable assurance that confidential treatment will be accorded the Confidential Information so disclosed.
- 17.6 In the event the Receiving Party discloses, disseminates or releases any Confidential Information, except as expressly permitted by this Agreement, such disclosure, dissemination or release will be deemed a material breach of this Agreement and the Disclosing Party may demand prompt return of all Confidential Information previously provided to the Receiving Party. As soon as the Receiving Party becomes aware that it has made an unauthorized disclosure of Confidential Information, the Receiving Party shall take any and all necessary actions to recover the improperly disclosed Confidential Information and immediately notify Disclosing Party regarding the nature of the unauthorized disclosure and the corrective measures being taken. Each Party agrees that any breach of their confidentiality obligations could cause irreparable harm to the other Party, the amount of which would be extremely difficult to estimate. Accordingly, it is understood and agreed that monetary damages would not be a sufficient remedy for any material breach of this Agreement and that specific performance and injunctive relief in addition to monetary damages shall be appropriate remedies for any breach or any threat of such breach. The provisions of this Paragraph are in addition to any other legal rights or remedies the Receiving Party may have.
- 17.7 Within two (2) weeks of the termination of this Agreement or final acceptance of the Equipment, Seller will return to Purchaser any and all Confidential Information, including all originals, copies, translations, transcriptions or any other form of said material, without retaining any copy or duplicate thereof. To the extent permitted by law, and if authorized in writing by Purchaser, Seller shall promptly destroy any and all electronic and hardcopy versions of the Confidential

Information, as well as any documents consisting of excerpts or portions of the Confidential Information. Seller shall certify in writing the destruction of the Confidential Information. Purchaser may perform an audit of Seller's records to confirm the return or destruction of the Confidential Information. Purchaser shall have this audit right for three (3) years after the termination of this Agreement or final acceptance of the Equipment.

- 17.8 Notwithstanding the termination of this Agreement, this Confidentiality Section shall survive the expiration or earlier termination of this Agreement.

18. WITHHOLDINGS AND SET-OFFS

- 18.1 Withholding Rights. Purchaser may withhold payments otherwise due to Seller under this Agreement on the following grounds:

18.1.1 defective Work not remedied;

18.1.2 notice of claims or filing of liens or reasonable evidence indicating probable notice of such claims or filing of liens;

18.1.3 failure of Seller to make payments properly to Suppliers;

18.1.4 reasonable evidence that the delivery of the Transformer will not be completed by its Guaranteed Delivery Date;

18.1.5 any failure to furnish final approved Drawings and documentation, including but not limited to, quality assurance documentation, Seller erection, assembly and other required Drawings, spare parts lists, and instruction and operating manuals; or

18.1.6 any failure of the Equipment to meet any requirements of the Specifications or other requirements of this Agreement.

- 18.2 Set-Off Rights. Any and all payments due Seller hereunder may, at the discretion of Purchaser, be offset or charged against any outstanding obligations of Seller to Purchaser under this Agreement.

19. INTENTIONALLY OMITTED.

20. LIMITATIONS OF LIABILITY

- 20.1 No Consequential Damages. Neither Party shall be liable to the other Party under this Agreement, whether by way of indemnity or in contract, guarantee, tort, or otherwise for any special, incidental, indirect or consequential loss or damages, including but not limited to loss of profit, loss of production, loss of revenue or loss of use. The foregoing will not apply to (a) limit a Party's liability for liquidated damages that are expressly payable pursuant to the terms of this Agreement, (b) limit any damages under third party claims for which a party has

an indemnity obligation hereunder, (c) damages arising as a result of a breach of any non-disclosure or non-use obligations of a Party pursuant to Section 17, and (d) damages arising as a result of willful misconduct, fraud or gross negligence.

- 20.2 Caps on Liquidated Damages. Notwithstanding anything to the contrary elsewhere in this Agreement, Seller's maximum liability for liquidated damages of every kind payable by Seller to Purchaser under this Agreement shall not exceed twenty-five percent (25%) of the Contract Price.

## 21. MISCELLANEOUS

- 21.1 Priority of Documents: Interpretation. Seller will promptly notify Purchaser in writing of any real or apparent conflicts, discrepancies, errors or omissions among the documents comprising this Agreement. All documents comprising this Agreement, including any modifications or additions thereto, will be read in a complementary manner. Any Work affected by such conflict, discrepancy, error or omission performed by Seller prior to resolution of the same by Purchaser will be at Seller's risk. In the event of an irreconcilable conflict, discrepancy, error or omission, the following descending order of precedence will govern:

- (a) the Terms and Conditions; Appendix B (Insurance Requirements) and Appendix D (Indemnification);
- (b) Appendix C (Specifications);
- (c) Appendix A (Payment Schedule); and
- (d) Appendix E, Bidder's Response;

Subject to the foregoing, if any provisions in any Contract Document are in conflict with any other provisions in such Contract Document, the provision setting forth the higher standard of conduct for or more onerous obligations upon Seller will prevail. Nothing contained in the Specifications or Drawings will be construed as relieving Seller from the responsibility for designing, fabricating, manufacturing or assembling the Equipment to meet the requirements specified in this Agreement. Seller undertakes full responsibility and liability for the consequences of its failure to comply with all Agreement requirements.

- 21.2 Severability. The invalidity or unenforceability of any provision of this Agreement will in no way affect the validity or enforceability of any other provision hereof. Any invalid or unenforceable provision will be enforced to the greatest extent permitted by law. If any such provision is unenforceable, then such provision shall be deemed severed from this Agreement, and the balance of this Agreement will be reformed and construed in such a manner as to effect to the maximum extent possible the original intent of the Parties.

- 21.3 Notices. All notices permitted or required to be given under this Agreement shall be in writing and shall be deemed duly given when sent by telefacsimile

transmission, by overnight courier, by personal delivery or on the seventh (7th) day following the date on which such notice is deposited in the mail, postage prepaid, certified, return receipt requested. "Electronic mail" shall not be considered a "writing" for purposes hereof. All notices shall be delivered or sent to the Parties at their respective address(es) or number(s) shown below or to such other address(es) or number(s) as a Party may designate by prior written notice given in accordance with this provision to the other Party:

If to PURCHASER: ANAHEIM Secretary/City Clerk  
City of Anaheim  
200 S. Anaheim Boulevard, 2nd Floor  
Anaheim, California 92805  
FAX No. (714) 765-4105

With copies to: Marcie L. Edwards  
Public Utilities General Manager  
City of Anaheim  
201 S. Anaheim Blvd., Suite 1101  
Anaheim, CA 92805  
FAX No. (714) 765-4138

21.4 To Seller: Doubletree Systems, Inc.  
4030 Moorpark Ave, Suite 222  
San Jose, CA 95117  
Attention: Jim Cai  
Telephone No.: (408)850-1416

21.5 Section Headings. The Section headings herein have been inserted for convenience of reference only and shall not in any manner affect the construction, meaning or effect of anything herein contained nor govern the rights and liabilities of the Parties. References to "Sections" in these Terms and Conditions shall mean the Sections of these Terms and Conditions unless otherwise expressly noted.

21.6 Duties and Remedies Not Limited. The duties and obligations imposed by this Agreement and the rights and remedies available thereunder shall be in addition to, and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law or in equity.

21.7 English Language. Seller hereby represents that it has sufficient knowledge of the English language to fully understand this Agreement. This Agreement is in the English language and all documentation related hereto, including without limitation, any documentation and Drawings to be provided by Seller or its Suppliers will also be in the English language. Seller will bear all costs of translation and assumes all risk of such translation.

- 21.8 Governing Law: Choice of Forum. The laws of the State of California shall govern this Agreement and all matters relating to it and any action brought relating to this Agreement shall be adjudicated in a court of competent jurisdiction in the County of Orange.
- 21.9 No Waiver of Rights. Except as may be specifically agreed in writing, the failure of Purchaser or Seller to insist in any one or more instances upon the strict performance of any one or more of the provisions of this Agreement or to exercise any right herein contained or provided by law or equity, shall not be construed as, or constitute in any way, a waiver, modification or relinquishment of the performance of such provision or right(s), or of the right to subsequently demand such strict performance or exercise such right(s), and all such rights shall continue unchanged and remain in full force and effect. "Electronic mail" shall not be considered a "writing" for purposes hereof.
- 21.10 Amendments. No amendments or modifications of this Agreement shall be valid unless evidenced in writing and signed by a duly authorized representative of the Party against which enforcement is sought "Electronic mail" shall not be considered a "writing" for purposes hereof.
- 21.11 Relationship of the Parties. Nothing in this Agreement shall be deemed to constitute either Party a partner, agent or legal representative of the other Party, or to create any fiduciary relationship between the Parties. Seller is and shall remain an independent contractor in the performance of this Agreement, maintaining complete control of its Personnel, suppliers, workers, subcontractors and operations required for performance of the Work.
- 21.12 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.
- 21.13 Entire Agreement. This Agreement constitutes the complete, integrated agreement between the Parties relating to the Equipment, superseding all other prior agreements or undertakings regarding the subject matter hereof.

**[SIGNATURES ON FOLLOWING PAGE]**

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed on the dates hereinafter respectively set forth.

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

CITY OF ANAHEIM,  
a municipal corporation

By: \_\_\_\_\_  
Carole Ayuso, Purchasing Agent

DATE: May 17, 2013

DOUBLETREE SYSTEMS, INC.,  
a California Corporation

By: \_\_\_\_\_  
Title: \_\_\_\_\_ - president  
Print Name: \_\_\_\_\_ Jim Y. Cai

APPROVED AS TO FORM:  
MICHAEL R.W. HOUSTON, INTERIM CITY ATTORNEY

By:  5/20/13  
Daniel A. Ballin, Deputy City Attorney

CAO# 95347

## **APPENDIX A**

### **PAYMENT SCHEDULE**

Released upon delivery to site	60%
Released after completion of field testing	30%
Released after completion of punch list and final drawing approval	10%

All payments are due net 30 days from date of invoice



## APPENDIX B

### INSURANCE REQUIREMENTS

Without limiting Purchaser's right to indemnification, it is agreed that Seller shall secure and maintain, during the term of this Agreement, insurance coverage as follows:

Workers' Compensation Insurance as required by California statutes and Employers Liability in an amount not less than \$1,000,000 per occurrence.

Commercial General Liability Insurance, including coverage for Premises and Operations, Contractual Liability, Personal Injury Liability, Products/Completed Operations Liability, and Independent Contractor's Liability, in an amount not less than \$20,000,000 per occurrence, \$20,000,000 annual aggregate, written on an occurrence form. Such insurance shall be written on a primary basis (i.e., without a self-insured retention), but may include a deductible of not more than \$10,000 per occurrence, provided that such deductible is disclosed to Purchaser, in writing, at the inception of this Agreement.

Comprehensive Automobile Liability Coverage including – as applicable – owned non-owned and hired autos, in an amount not less than Ten Million Dollars (\$10,000,000) per occurrence, combined single limit.

Each insurance policy required by this Agreement shall contain the following clause or shall otherwise provide for the following conditions:

“This insurance shall not be cancelled or non-renewed until after five (5) business days prior written notice has been received by the City of Anaheim.” If Seller's insurer will not commit to this requirement, then Purchaser shall assume the obligation of notifying Purchaser of such pending development(s) within the stated time frame.

Each insurance policy required by this Agreement, except policies for Workers' Compensation, shall contain the following clauses or shall otherwise provide for the following conditions:

“It is agreed that any insurance maintained by Seller pursuant to this Agreement shall be primary to, and not contribute with, any insurance or self-insurance maintained by the City of Anaheim.”

“The City of Anaheim, its officers, agents, employees, and representatives are added as additional insureds as respects the acts, omissions, operations, and activities of, or on behalf of, the named insured, in regard to products supplied, or work or services performed for the City of Anaheim.”

At the earlier of (i) thirty (30) days after the execution of this Agreement, or (ii) the first date by which payment is due Seller, Seller shall deliver to Purchaser insurance certificates confirming the existence of the insurance required under this Agreement, including the applicable clauses and/or provisions referenced above. Also, Seller shall provide Purchaser (i) endorsements to the insurance policies which add to these policies the applicable clauses referenced above, or (ii) in

lieu of said endorsements, documentation acceptable to Purchaser evidencing that the coverage, terms, and conditions set forth in the above-referenced clauses are otherwise provided for in said insurance policies.

Insurance required hereunder shall be placed with insurers (i) admitted to write insurance in California and (ii) possessing an *A. M. Best* rating of A VII or higher, or (iii) otherwise acceptable to Purchaser (but only with prior written permission from Purchaser). In the event that a claim or other legal action is filed against Purchaser, and if Purchaser, in its good faith opinion, believes it may have coverage under any of the insurance required herein, then Purchaser has the right to demand, and to receive within a reasonable time period, copies of the insurance policies related to such required insurance; provided; however, that this provision shall not apply if the parties agree that Seller shall fully defend, hold harmless, and indemnify Purchaser against any such claim or other legal action.

In addition to other remedies Purchaser may have if Seller fails to provide or maintain any insurance policies or policy endorsements to the extent and within the time herein required, Purchaser may, at its sole option:

- A. Order Seller to stop work under this Agreement and/or withhold any payment(s) which become due to Seller hereunder until Seller demonstrates compliance with the requirements hereof;
- B. Terminate this Agreement.

Exercise of any of the above remedies, however, is an alternative to other remedies Purchaser may have and is not the exclusive remedy for Seller's failure to maintain insurance or secure appropriate endorsements.

The insurance limits stated herein are minimum requirements only, and their existence shall in no way limit any rights Purchaser may have under Seller's insurance policies, including but not limited to Purchaser's status as an additional insured as required herein.

Nothing contained in this Insurance Section shall be construed as limiting in any way the extent to which Seller may be held responsible for payments of damages to persons or property resulting from Seller's, (or Seller's contractors/subcontractor, if any) performance of the work covered under this Agreement.

Purchaser's Risk Manager is hereby authorized to reduce the requirements set forth herein in the event he determines that such reduction is in Purchaser's best interest.

**APPENDIX C**  
**SPECIFICATIONS**  
**[ATTACHED BEHIND THIS PAGE]**



**CITY OF ANAHEIM**  
**PUBLIC UTILITIES DEPARTMENT**  
**SUBSTATION ENGINEERING**

**SPECIFICATION NO. E-20**

**69KV-12.47KV**  
**30/40/50 MVA (33.6/44.8/56 MVA @65° rise)**  
**THREE-PHASE POWER TRANSFORMER**  
**WITH LOAD-TAP-CHANGER**

**March 2013**  
**(REVISED: 03-29-13)**

**SPECIFICATION E-20A**  
**POWER TRANSFORMER**  
**PART 1.00**  
**INTRODUCTION**

**1.01 DEFINITION OF TERMS**

1.01.01 Wherever used in this Specification, the word "ANAHEIM" shall mean the City of Anaheim; "Bidder" is the company that is submitting a bid in response to ANAHEIM's Request for Bids (RFB); "Manufacturer" is the company that is manufacturing the requirements of these specifications; "Contractor" is the successful bidder who will be supplying the requirements of these specifications; "Equipment" is used herein to include the apparatus, equipment, materials, and supplies as described herein, together with all usual and appropriate fittings, attachments, appurtenances, and appliances.

**1.02 EQUIPMENT COVERED BY THIS SPECIFICATION**

1.02.01 This Specification covers the electrical and mechanical features of an outdoor, single tank, 60 hertz, mineral oil immersed three-phase power transformer complete with oil.

1.02.02 Elevation and temperatures: The transformer shall be installed in Anaheim, California, Orange County (U.S.A.) at a mean elevation of 220 feet above sea level. The average relative humidity is 61%.

(a) All equipment furnished shall be capable of satisfactory installation, and maintenance under the following environmental, seismic and other service conditions.

- (1) Elevation: Sea level to 3300 feet
- (2) Ambient temperature Range: -15 to 50°C
- (3) Humidity: 0 to 100%
- (4) Seismic Zone 4
- (5) Utilize the existing concrete transformer pad and space limitations in an existing substation.

1.02.03 The transformer ratings are specified in Part 3 of this Specification.

**1.03 BIDDER QUALIFICATIONS**

1.03.01 Contractor must provide at least three references with which the bidder has done similar work in the past three years.

1.03.02 Contractor must be capable of providing the required services per these specifications.

**1.04 INSTRUCTIONS TO BIDDERS**

1.04.01 Bidders shall bid firm-fixed prices on Equipment exactly as required by this Specification. No alternate proposals shall be considered without a base Proposal on the Equipment exactly as specified.

1.04.02 Bidders shall state the guaranteed efficiencies and losses listed in section 1.04.04. All bids will be evaluated on a total annual owning cost (TAC) basis as follows:

#### TABLE OF CONSTANTS

1.	CC=CAPITAL RECOVERY (FACTOR) – (5.00% FOR 30 YEARS)	0.065
2.	DC=DEMAND CHARGE (\$/kW)	55.0
3.	EC=ENERGY CHARGE (\$/kWH)	0.04020
4.	LF= LOAD FACTOR	0.5288

#### TABLE OF COMPUTED CONSTANTS

1.	CRC [ <i>CAPITAL RECOVERY CHARGE</i> ] = (\$BID/UNIT)(0.065)
2.	LDC [ <i>LOAD DEMAND CHARGE</i> ] = (TOTAL LOSSES)(55 \$/kW)
3.	NLC [ <i>NO LOAD LOSS COST</i> ] = (NO LOAD LOSSES)(ENERGY CHARGE .0402)(8760HR/YR)
4.	LLC [ <i>LOAD LOSS COST</i> ] = (LOAD LOSSES)(8760HR/YR)(LOADFACTOR)(ENERGYCHARGE)
5.	TAC [ <i>TOTAL ANNUAL COST</i> ] = CRC + LDC + NLC + LLC

- 1.04.03 ANAHEIM reserves the right to witness the factory transformer testing and loss tests (all travel costs borne by the Contractor for two COA employees to attend the factory test) and conduct independent tests after delivery to the jobsite. In the event any loss (es) exceed(s) the guaranteed value(s), ANAHEIM will deduct an amount equal to ANAHEIM's calculated present worth of the cumulative difference between the guaranteed loss(es) and the actual measured loss(es) over the projected 30-year service life of the transformer from the purchase price and pay only the remainder, or ANAHEIM will seek reimbursement from Manufacturer for the same amount plus all costs incurred.
- 1.04.04 Bidders shall submit its Bid on the form "Manufacturer Quoted Items" on page 7 of this specification in accordance with these specifications and the terms and conditions of the Request for Bids.
- 1.04.05 The Contractor/Manufacturer is responsible for providing transformers that meet the specified load rating, after any de-rating due to firewalls, location, cooling, etc. This requirement is to ensure the overall rating of each transformer (after de-rating) is not less than 56.0 MVA at a 65°C temperature rise.

### **1.05 DRAWINGS AND INFORMATION FURNISHED WITH BID**

- 1.05.01 The following drawings and information shall be included in each Bidder's response to the RFB. Any missing information or drawings may cause the bid to be deemed non-responsive. The IEEE standard sheet may be used for submittal.
- 1.05.02 **Bushing Drawings:** Each Bidder shall attach a full set of detailed drawings of the bushings to the eBid. The drawings shall include the current rating and the creepage distance.
- 1.05.03 **Outline Drawings:** Each Bidder shall attach a full set of outline drawings of the transformers to the eBid. The outline drawings shall include the following:
- (a) Projected plan view of the transformer, including radiators, expansion tank and bushing overhang.
  - (b) Height of transformer from base to top of highest appurtenance.
  - (c) Height of transformer from base to the top of low voltage and high voltage bushings.
  - (d) Height of transformer from base to top of tank.
  - (e) Height above floor necessary to untank.
  - (f) Weight of core and windings.
  - (g) Weight of tank and radiators.
  - (h) Number of gallons of oil and total weight of the oil.
  - (i) Total weight of the assembled transformer including oil.
  - (j) Power requirements for all control and auxiliary equipment.

- (k) Shipping weight of tank, core, windings, and oil.
- (l) Proposed base dimensions of the transformer.
- (m) Approximate center of gravity with oil, and without oil.
- (n) Dimensions of transformer base projected beyond and around its tank wall.
- (o) Thickness of transformer base and dimensions of the supporting skid.

## **1.06 PRODUCT PERFORMANCE REQUIREMENTS**

1.06.01 Each Bidder shall furnish the information requested below to the eBid. The Bidder guarantees that the performance of transformer furnished shall be equal to or better than that shown herein.

- (a) Class of transformer, catalog number and/or type: \_\_\_\_\_
- (b) High voltage rating and taps: \_\_\_\_\_
- (c) Low voltage rating: \_\_\_\_\_
- (d) Base MVA rating: \_\_\_\_\_
- (e) All guaranteed values shall be corrected to 75°C (based on a 55°C rise) and 85°C (based on a 65°C rise) respectively. All load losses should be corrected to the 75°C and 85°C respectively. No load losses should be measured at 20°C ambient and reported at an uncorrected reference temperature of 20°C.
  - (1) Guaranteed efficiency at 56,000 kVA and 1.0 power factor, including all fan loads.
  - (2) Guaranteed efficiency at 50.0MVA and 1.0 power factor, including all fan loads.
  - (3) Guaranteed efficiency at 44.8MVA and 1.0 power factor including all fan loads.
  - (4) Guaranteed efficiency at 40.0MVA and 1.0 power factor, including all fan loads.
  - (5) Guaranteed efficiency at 33.6 MVA and 1.0 power factor, without fans.
  - (6) Guaranteed efficiency at 30 MVA, and at the following values:
    - i 1.0 Power Factor, without Fans
    - ii 25% ONAN Rating
    - iii 50% ONAN Rating
    - iv 75% ONAN Rating
    - v 100% ONAN Rating
  - (7) kW load of all cooling equipment at the highest ONAF rating.
  - (8) Guaranteed percent regulation at 30 MVA and 1.0 power factor.
  - (9) Guaranteed percent regulation at 30 MVA and 0.80 power factor.
  - (10) Guaranteed percent regulation at 56 MVA and 1.0 power factor.
  - (11) Guaranteed percent regulation at 56 MVA and 0.80 power factor.
  - (12) Guaranteed primary exciting current at 100% voltage.
  - (13) Guaranteed primary exciting current at 110% voltage.
  - (14) Guaranteed percent impedance at following values:
    - i Center-tap- high side
    - ii Highest tap- high side
    - iii Lowest tap- high side

- iv Resistance Drop 100% base rating
  - v Reactance Drop 100% base rating
  - vi Impedance Drop 100% base rating
- (15) Guaranteed Losses
- i No load (core) loss 100% voltage Tap Changer on neutral.
  - ii No load (core) loss 105% voltage Tap Changer on neutral.
  - iii No load (core) loss 110% voltage Tap Changer on neutral.
  - iv Load (copper or I<sup>2</sup>R) loss 100% rating, 30 MVA, Tap Changer on neutral.
  - v Load (copper or I<sup>2</sup>R) loss 110% rating, Tap Changer on neutral
  - vi Load (copper or I<sup>2</sup>R) loss 100% rating, 56 MVA, Tap Changer on neutral.
  - vii Total no load (core) and load (copper or I<sup>2</sup>R) loss 100% rating, 56 MVA, Tap Changer on neutral.
  - viii Total no load (core) and load (copper or I<sup>2</sup>R) loss 100% rating, 30 MVA, Tap Changer on neutral.
  - ix Highest no load (core) and load (copper or I<sup>2</sup>R) loss 100% rating 30 MVA at worst-case Tap Changer position or positions.  
Specify tap: \_\_\_\_\_
  - x Highest no load (core) and load (copper or I<sup>2</sup>R) loss 100% rating 56 MVA at worst-case Tap Changer position or positions.  
Specify tap: \_\_\_\_\_
  - xi Total cooling fan loss at rated fan motor volts, at both 55°C and 65°C rise.
  - xii Total auxiliary losses, including cooling, for all stages of cooling fans, space heaters and other ancillary equipment at both 55°C and 65°C rise.
- (16) Guaranteed maximum audio sound levels of transformer in decibels at HVC tap and the LTC on the tap settings producing the highest sound level, bidder shall state the LTC tap position(s) producing the highest sound level:
- i At the ONAN rating at both 55°C and 65°C rise.
  - ii At the ONAF rating with all fans running at both 55°C and 65°C rise.
- (17) Weights
- i Core and Windings (main): \_\_\_\_\_
  - ii Series / booster transformer / preventative autotransformer (if applicable): \_\_\_\_\_
  - iii Tank and fittings: \_\_\_\_\_
  - iv Fan equipment: \_\_\_\_\_
  - v Oil (including LTC, and radiator oil): \_\_\_\_\_
  - vi Total gross weight of transformer: \_\_\_\_\_
  - vii Total shipping weight: \_\_\_\_\_
- (18) Type of oil preservation system: \_\_\_\_\_
- (19) Method of mounting radiators; removable or integral with the tank: \_\_\_\_\_
- (20) BIL - High voltage and low voltage windings, including the neutral.



- (21) State types of transformer gasket materials to be used.
- (22) Detailed description of Tap Changers
- (23) State required minimum distance in linear feet to the any fire and sound walls.
- (24) State X/R ratio @ 30 MVA, 55°C rise.
- (25) State X/R ratio @ 44.8 MVA, 65°C rise.

**1.07      MANUFACTURER PRODUCT INFORMATION**

1.07.01 All Manufacturer's shall (i) own/operate a high voltage transformer repair facility which is capable of diagnosis, repair, and restoration of the transformer to its full capability as delineated in the specification, or (ii) have an established current agreement with a facility owner/operator of a high voltage transformer repair facility which will permit manufacturer to diagnosis, repair, and restore the transformer to its full capability as delineated in the specification during the 5 year warranty period. The shipping time to this repair facility cannot exceed 10 working days.

1.07.02 State the company name; contact person's name, phone, email; address of assembly plant where transformer is to be constructed, and location and address of high voltage test facility to perform dielectric tests if different from assembly plant. Also, state the location of the transformer repair facility.

- (a) Assembly Plant: \_\_\_\_\_
- (b) Test Facility: \_\_\_\_\_
- (c) Repair Facility: \_\_\_\_\_

1.07.03 Users of similar product

- (a) Each Bidder shall furnish as part of the Proposal, a list of users of similar product, including the unit capacity, voltage, rating, year of manufacturing, and client's name and phone number.

1.07.04 Each Bidder shall furnish as part of the Proposal a brochure that shows the plant, its location, capacity, years of manufacturing the similar products and any other information to make ANAHEIM familiar with the Bidder's capabilities.

**1.08      DELIVERY TIME**

- (a) Delivery is required by the date specified in the eBid documents including time for drawing approval and tests/measurements.

## **LINE ITEMS for BIDDING**

**REQUIRED ITEMS:** costs for everything necessary to provide these items in accordance with the E20 Specifications.

- Item 1: TRANSFORMER: a complete and fully functional transformer in full accordance with the E20 Specifications.
- Item 2: DELIVERY: to deliver the Transformer and all required items to FOB Anaheim CA.
- Item 3: OFF-LOADING and PLACEMENT: to offload and set the Transformer on the mounting pad; ready for final welding and connections.
- Item 4: ASSEMBLY: to assemble the Transformer and all required appurtenances to complete Transformer.
- Item 5: OIL TRANSFER: all labor and materials to complete oil transfer.
- Item 6: FIELD-TESTING and ADJUSTMENTS: cost Field-testing of and required Adjustments to the transformer at the jobsite to ensure it is prepared to go online..

**OPTIONAL ITEMS:** costs for everything necessary for these items; City, at its discretion, may choose all, some, or none of them; however, if chosen, they will be considered in the evaluation of all bids:

- Item 7: TECHNICAL SUPPORT: for Morgan Schaffer to provide a technical support specialist to perform a technical assessment of all 12 different Calisto monitors at various substations located in Anaheim. The assessment is expected to take two days and shall include:
  - i. Download the instrument databanks and event logs and to send them to Morgan Schaffer for performance evaluation.
  - ii. Note any repairs to be made to specific models and provide and install parts to effect repairs at a later date.
  - iii. Provide and install firmware upgrades.
  - iv. Provide and install software upgrades.
  - v. Perform annual maintenance as suggested by manufacturer.After the technical assessment has been performed, Morgan Schaffer shall provide an on-site technical support specialist for one day to make repairs to any of the 12 different Calisto monitors at various substations located in Anaheim.
- Item 8: One (1) 69 kV bushing complete w/ gaskets.
- Item 9: One (1) 15 kV low-voltage bushing complete w/ gaskets
- Item 10: One (1) Extra Gaskets, complete set, as required for all cover and tank openings, manholes and hand-holes.
- Item 11: One (1) transformer fan w/ motor
- Item 12: One (1) Contacts and coils, complete set, for each type of contactor/relay furnished on transformer, load tap changer.
- Item 13: Tools necessary for erection or maintenance of transformer. (Any items that are regularly furnished w/ this class of equipment, or are necessary for the satisfactory operation thereof, which are not specified herein.)

**SPECIFICATION E-20A**  
**POWER TRANSFORMER**

**PART 2.00**

**TERMS & CONDITIONS**

**PLEASE SEE DOCUMENT TITLED**

**“AGREEMENT FOR THE PURCHASE AND SALE OF EQUIPMENT”**

**SPECIFICATION E-20A**  
**POWER TRANSFORMER**

**PART 3.00**

**TECHNICAL SPECIFICATIONS**

**3.01 EQUIPMENT LOCATION**

3.01.01 The Equipment specified hereunder will be installed in one of ANAHEIM's Substations.

**3.02 MATERIALS, DELIVERY, TESTING AND WORK INCLUDED**

3.02.01 The Contractor shall furnish everything necessary for providing a three-phase, 69 kV-12.470kV, delta-ground wye, 60 hertz, outdoor, single tank, oil immersed, step down transformer with high side and low side tap changers in accordance with this Specification.

- (a) Contractor shall deliver, the transformer complete with oil, controls, bushings and accessories, Delivery Duty Paid (DDP, Incoterms 2000) ANAHEIM, Hannum Substation, 435 N. Gilbert St., Anaheim California USA 92801.
- (b) Contractor shall deliver, the transformer, FOB foundation.
- (c) Contractor is responsible to off load, assemble, hot oil fill and field-test the transformer at the job-site. All the cost related to delivery, unloading to the foundation, assembly, field testing, and other costs as stated in this specification, are to be paid by Contractor.
- (d) Contractor shall provide the necessary certified factory-trained personnel including Service Engineer(s) for technical supervision of the off-loading, assembly, hot oil filling, installation, and acceptance field testing of the transformer at the jobsite.
- (e) Contractor must provide required documents and procedures to off load, assemble, oil fill and field test the transformer at the jobsite.
- (f) Contractor must furnish all drawings, documents and instruction manuals as specified in Part 4.00.
- (g) Contractor must provide a competent Transformer Design Engineer during the design review period to attend mutually agreed upon face to face meetings held at Anaheim CA, USA. The Transformer Design Engineer will provide a complete design review of transformer, existing foundation, specification, factory testing, and quality assurance.
- (h) Contractor must include in the price of the bid, all travel, food and lodging costs for two of ANAHEIM's personnel to witness the pre-tanking inspection, factory acceptance tests (FAT) and all heat run tests.

3.02.02 Contractor must install the transformer at ANAHEIM's Hannum Substation and will be connected to 69 kV and 12kV switchgear.

3.02.03 ANAHEIM will accept, energize and place the transformer in service in accordance with its approved procedures.

3.02.04 The cost for storage of the transformer for up to thirty (30) calendar days after required delivery date shall be included in the unit cost price of the transformer. The cost for storage beyond thirty (30) days shall be indicated in item "E" of the "Optional Manufacturer Quoted Items".

**3.03 CONFORMANCE TO NATIONAL STANDARDS**

3.03.01 Except as otherwise specified herein, all work for providing power transformers shall conform to the latest applicable sections of:

- (a) Standards:
  - (1) IEEE C57.12.00 – Standard latest revision; General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers

- (2) IEEE 4 – Standard latest revision; Techniques for High-Voltage Testing.
- (3) IEEE C57.12.10 – Standard latest revision; IEEE Standard Requirements for Liquid-Immersed Power Transformers.
- (4) IEEE C57.12.90 – Standard latest revision; Test Code for Distribution, Power, and Regulating Transformers.
- (5) IEEE C57.91 – Standard latest revision; Guide for Loading Mineral Oil Immersed Power Transformers
- (6) IEEE C57.98 – Standard latest revision; IEEE Guide for Transformer Impulse Tests
- (7) IEEE C57.119 – Standard latest revision; Recommended Practice for Performing Temperature rise tests on oil immersed Power Transformers at Loads beyond Nameplate Ratings
- (8) IEEE C57.120 – Standard latest revision; IEEE Loss Evaluation Guide for Power Transformers and Reactors
- (9) IEEE C57.131 – Standard latest revision; IEEE Standard Requirements for Load Tap Changers
- (10) IEEE C57.19.01 – Standard latest revision; IEEE Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings
- (11) IEEE C76.2 – Standard latest revision; Electrical, Dimensional, and Related Requirements for Outdoor Apparatus Bushings
- (12) IEEE C62.22 – Standard latest revision; IEEE Guide for the Application of Metal-Oxide Surge Arresters for Alternating-Current Systems
- (13) NEMA Standards Publication – TR1 Transformers Regulators and Reactors
- (14) ASME Boiler and Pressure Vessel Code (BPV), 2001 Edition
- (15) ASME B1.1-2003 American National Standard for Unified Inch Screw Threads (UN and UNR Thread Form)
- (16) ANSI/CGA V-1-1994 Compressed Gas Cylinder Valve Outlet and Inlet Connections
- (17) IEEE 693 – 2005 Standard latest revision; Recommended Practice for Seismic Design for Substations
- (18) IEC 60076-7, 2005 Power transformers. Loading guide for oil-immersed power transformers

### **3.04 TRANSFORMER RATINGS AND CONDITIONS OF SERVICE**

#### **3.04.01 Ratings (at sea level):**

- (a) Type - outdoor, single tank, oil-immersed, three-phase, power transformer.
- (b) Windings - 69,000V, delta connected primary winding to 12,470V (phase-to-phase), wye connected secondary winding with the neutral of the secondary winding brought out to a full voltage neutral bushing. The rated high and low voltage of the transformer shall be the mid tap voltage of 69-12.47kV.
- (c) MVA Rating - the transformer shall have base MVA ratings of 30/40/50 MVA, ONAN/ONAF/ONAF, with a 55°C winding temperature rise. The transformer shall have 33.6/44.8/56 MVA ratings with a 65°C winding temperature rise measured by the resistance method. Performance characteristics shall be based on the mid tap voltage except for transformers with load tap changer. The losses to be evaluated shall be the sum of the losses at the extreme tap positions divided by two. These ratings shall be accomplished after all required deratings due to the transformers installation.

- (d) Cooling - ONAN/ONAF/ONAF
- (e) Frequency - 60 Hertz
- (f) All taps shall be full capacity taps, whether load-tap-changing or no load-tap-changing
- (g) Impedance. The impedance of the transformer with or without load-tap-changer shall be 10% based on the 55°C ONAN rating. The tolerances for impedance shall be provided in IEEE standard C57.12.00 latest revision.
- (h) Angular Displacement. The angular displacement between the voltages of the high voltage and low voltage windings shall conform to IEEE Standard C57.12.00. ANAHEIM's electric system phase rotation is A-C-B counter-clockwise and 12.470 kV leads 69 kV by 30 degrees.

#### 3.04.02 Temperature Rise

- (a) The average winding temperature rise at any tap position and at maximum rated MVA shall not exceed 65°C when measured by the resistance method.
- (b) The hot spot temperature rise shall not exceed 70°C at the maximum rated MVA and an ambient temperature of 50°C.
- (c) The hot spot temperature at any tap position and at maximum rated MVA shall not exceed 120°C at a maximum ambient temperature of 50°C specified.

#### 3.04.03 Top Oil Temperature

- (a) The top oil temperature at any tap position and at maximum rated MVA shall not exceed 105°C at the 50°C maximum ambient temperature specified.

#### 3.04.04 Transformer Loading Capability

- (a) Transformers furnished under this specification shall be capable of emergency overload conditions per IEEE Standard C57.91 latest revision and the following.
- (b) Following a pre and post load condition of a 24-hour period of continuous operation at 100% of the maximum MVA, the transformer's short term overload capacity shall be capable to carry 133% rated max MVA @ 65°C for a period of two (2) hours with less than 1% loss of life. The top oil temperature in the emergency (2) hour rating shall not exceed 110°C.
- (c) Following a pre and post load condition of a 24 hour period of continuous operation at 100% of the maximum MVA, the transformer's long term overload capacity shall be capable to carry 115% rated max MVA @ 65°C for a period of twenty four (24) hours with less than 1% loss of life. The top oil temperature in the emergency (24) hour rating shall not exceed 110°C.
- (d) Heat run tests shall be performed per IEEE C57.119 and may be witnessed by ANAHEIM personnel. A copy of the test results shall be submitted to ANAHEIM for review and approval within 14 days after the factory test are completed. Cost of the report shall be included in unit cost of the transformer.
- (e) The required long and short term overload current carrying capabilities shall be limited only by the capacity of the core and coils, NOT by appurtenances such as bushings, bushing leads, winding leads, and tap changers. It is understood that there will be some loss of life associated with this overload condition. The loss of life should be approximated using IEEE Standard C57.91 latest revision.

#### 3.04.05 Limiting Parameters for All Overloading

- (a) Top oil temperature < 110°C
- (b) Winding Hot-spot temperature < 140°C

- (c) 50°C maximum ambient temperature specified

#### 3.04.06 Transformer Cooling

- (a) The transformer location may include fire walls that will restrict the air circulation to the transformer radiators for cooling. The supplier shall be required to review the distance in linear feet to the fire and sound walls and build the transformer so the results in the de-rating of the transformer will not affect the MVA rating.

#### 3.04.07 Through-Fault Withstand

- (a) Transformers furnished under this Specification shall be capable of withstanding, without damage; the mechanical and thermal stresses caused by short-circuit currents limited only by the impedance of the transformer. System impedance shall be considered equal to zero. System pre-fault voltage shall be equal to the voltage rating of the maximum tap or 1.05 times the principal tap, whichever is greater.
- (b) The external short circuits shall include three-phase, single line-to-ground, double line-to-ground, and line-to line faults on any one set of terminals at a time.
- (c) Short circuit withstand shall be calculated utilizing Finite Element Analysis (FEA) and shall consider all combinations of DETC and LTC tap positions for single line to ground faults, double line to ground faults, line to line faults and other fault conditions to determine the tap position combination resulting in the highest stresses for transformer windings.

#### 3.04.08 Conditions of Service

- (a) The transformer will be used to supply power to a four-wire, effectively solidly grounded neutral distribution system. The low side neutral bushing will be directly grounded with two 4/0 bare copper conductors. The high side of the transformer will be connected to a completely delta connected transmission system.
- (b) The Transformer shall be capable to perform within an operating voltage range of 95% to 105% of rated voltage.

#### 3.04.09 Windings

- (a) Winding conductors shall be copper electrolytic tough pitch (Cu ETP), free from scale, cracks, burrs, and splinters. No joins shall be made in the conductor after it is drawn. Permanent current carrying joints or splices shall be welded/brazed using resistance welding/brazing tools, properly formed, finished, and insulated, except that compression type fittings may be used outside of the core winding. All compression fittings to be ductored. Conductors shall be designed so that eddy current losses are kept as low as practicable, and so that the mechanical strength is ensured. All conductor joints shall be welded/brazed using resistance tools.
- (b) The transformer high and low voltage windings shall have uniform insulation. Conductors shall be uniformly insulated with thermally upgraded high dielectric strength insulating materials capable of withstanding, without degradation, 110% of the maximum hottest-spot temperatures possible with operation under the most severe combinations of load; ambient temperature and voltage conditions specified in Section 3.04.02
- (c) The transformer, including all core and coil assemblies, shall be power class, round core/circular coil design and construction. High voltage and low voltage windings for the main core/coil assembly shall be either disk or helical construction; layer/barrel windings are not acceptable. All windings shall be copper (ETP) conductor and either rectangular magnet wire or continuous transposed cable. All transformer windings shall be designed and wound with maximum short circuit strength as a primary criterion. All winding leads shall be readily accessible from a manhole in the tank cover.
- (d) Insulation on all conductors used in the coil winding process shall be thermally upgraded high density Kraft cellulose insulating paper. It shall be wound onto the conductor employing a spinning process. The paper insulation shall be applied in single or multiple

strands such that a minimum of 30% of the paper surfaces are overlapped to provide for a continuous insulating surface. Sufficient tension shall be maintained on the paper strands so that as to prevent loose wraps. If clamping rings are utilized in the transformer design, full circumference rings shall be used.

- (e) The core and coil of the transformer shall be dried by a vapor phase drying system. This process involves the introduction of kerosene vapors into a heated vacuum tank (130°C) containing the core and coil assembly. A vacuum cycle is maintained until no more than 10cc of water per hour per ton of insulation is returned. The final cycle involves oil impregnation, by flooding the vapor phase tank with oil to submerge the core and coil assembly.
- (f) Insulation class of windings and BIL ratings shall be as follow:

<u>Winding</u>	<u>Insulation Class</u>	<u>BIL</u>	<u>Rated Voltage</u>
High Voltage	69kV	350kV	69kV
Low Voltage	15kV	110kV	12.47kV
Neutral	15kV	110kV	12.47kV

#### 3.04.10 Secondary Wiring

- (a) All control, auxiliary power and alarm circuits shall be completely wired at the factory, ready for installation and connection by others. All wires and cables shall be labeled at both ends. The labels for each conductor shall include both destination and designation information on each end. The destination information shall refer to the termination location of the opposite end of the conductor of which it is terminated.
- (b) All secondary and control wiring or connections shall be made with a minimum size wire of No. 12 AWG stranded tinned copper control cable covered by a heat, flame, moisture and oil resistant polyethylene insulation Type SIS 90°C or equal, and rated for 600 volts.
- (c) Insulated Ring-tongue terminals with copper insulation grips shall be used for all secondary wiring. Spade, slotted spade, flanged spade, and hook terminals are not acceptable. Ring-tongue terminals shall be sufficiently strong to prevent breakage or wire pullout under conditions of vibration inherent to the equipment in which they are installed.
- (d) Ring-tongue terminals made by 3M, or ANAHEIM approved equal, are acceptable. For stranded wire, 3M locking fork tongue, insulation support and grip terminals are typical.
- (e) Terminals shall have insulated ferrules. To assure positive electrical connections and to avoid damage to the ferrule, it is mandatory that proper crimping tools be used in accordance with instructions of use for each wire size.
- (f) Sufficient fuses, fuse blocks, terminal blocks, lugs, etc., shall be furnished for proper connection to external wiring. Terminal blocks for current transformer incoming leads shall be provided with short-circuiting devices to permit removing and/or testing wiring without opening the current transformer circuits. Terminal blocks shall be provided for all connections leaving the panels and shall have marking strips, approved by the City to accommodate the owner's internal number identification system as well as that of the Manufacturer. Terminal blocks shall have screw terminals, barriers between terminals, high flame retarding properties, mechanical roughness and high electrical strength. Each conductor shall be identified at each end with "Quick File" wire making system from Brady.

#### 3.04.11 Conduits and Fittings

- (a) Rigid galvanized or flexible liquid-tight metallic conduit shall be used to support and protect interconnecting cables.



- (b) Conduit connections shall be made either at the bottom or sides of the control cabinet, utilizing watertight conduit fittings. Condulets with gasket covers shall be used at bends. In lieu of conduits, structural channels on the tank may be used for wireways. Water tight, clamp-type bushings shall be used for cables entering conduits and wire ways.
- (c) Cable without conduit may be used at devices to facilitate maintenance and reduce vibration; however, the cable shall be multi-conductor type with an overall jacket and the length of mechanically unprotected cable shall not exceed two feet.

#### 3.04.12 Boxes & Enclosures

- (a) Junction boxes with gasketed covers shall be provided where required to make connections between devices and the control cabinet or terminal box. The cover gaskets shall be reusable, weatherproof and watertight. Splices in conduits or condulets are not acceptable to be used as junction box.
- (b) Control cabinets which contain relays, switches or contactors shall be provided with a heater controlled by a thermostat, and an electrical convenience outlet and a light controlled by a door-activated switch.
- (c) All enclosures shall be designed to prevent the accumulation of standing water.

#### 3.04.13 Terminal Blocks

- (a) All terminal blocks for low voltage control, power, current, and instrumentation shall be General Electric Company Type CR151B or ANAHEIM approved equal, No. 10 size or larger, screw-type terminal blocks rated 600 volts shall be provided for all wiring.
- (b) Short circuiting-type terminal blocks shall be used for current transformer circuits.
- (c) Terminal blocks shall be fastened in position with a minimum of two bolts.
- (d) All terminals shall be identified.
- (e) No more than two wires shall be terminated at one terminal.
- (f) A minimum of 20% spare, unused terminals shall be provided in the terminal blocks within the main control cabinet.
- (g) Terminal blocks used within junction boxes shall have the construction characteristics mentioned above, with the exception that they may be physically smaller in size and of a lower current rating.

#### 3.04.14 Auxiliary Systems

- (a) The transformer cooling fans shall be controlled automatically from a winding temperature sensing device and the circuit shall have an external auto-manual switch.
- (b) All auxiliary relays and devices required shall be furnished by the Manufacturer. The cooling equipment control device shall have one output contact closed when the fans are running, for each stage of cooling including second ONAF rating, rated for switching a 136V D.C., 1 AMP min.
- (c) The space heaters shall operate on single phase 240 volt A.C., 60 hertz power.
- (d) A weather-proof fan control station shall be provided and physically located on the low voltage side of the transformer.
- (e) The leads for the fan and oil pump motors shall be enclosed in liquid tight, flexible conduit. As an alternate, the connections to the supply circuits may be made by means of watertight plugs and receptacles provided the interconnecting cables are mechanically protected by use of ducts or flexible conduits. Flexible conduit shall be sunlight resistant.
- (f) Provisions shall be provided for the installation of a Morgan Schaffer Calisto 2 Transformer monitoring system.

### 3.04.15 Accessories

Accessories to be furnished with the transformer in addition to those described elsewhere shall include, but shall not be limited to, the following:

- (a) Each transformer shall be furnished with a permanently etched, non-corrosive, stainless steel nameplate, attached with stainless steel hardware. The nameplate shall contain the information specified in IEEE Standard C57.12.00 latest revision. Nameplates shall show transformer ratings in MVA for operation at temperature rise of 55°C and 65°C, guaranteed or measured sound level, and the measured zero sequence impedance. Stick-on labels or painted-on information, such as core ground location are not acceptable.
- (b) Reinhausen-Messko dial-type indicating thermometer with two independent alarm contacts, mounted on the tank wall not more than six feet above ground level, for the purpose of indicating the temperature of the hottest oil. The alarm contacts shall be as specified in IEEE C57.12.10 latest revision.
- (c) Bottom (drain) valve with built in sampling valve and top (filter press connection) valve.
- (d) Globe type, 2 inch valve for filling the transformer from the top, not more than three (3) inches from the top edge of the tank, and as far as possible from the top filter valve.
- (e) Tank covers manhole(s) to facilitate internal inspection.
- (f) Primary bushing pocket hand-holes, as required facilitating installation.
- (g) Two (2) grounding pads shall be provided for attaching ANAHEIM's ground wire connectors to opposite corners of the tank.
- (h) Flat copper bar ground buses of adequate ampacity shall be furnished and installed for interconnecting the surge arresters and all three-phase transformer neutral ground leads with the grounding grid at the transformer base.
- (i) Lifting eyes on the tank cover, lifting lugs near the tank top, and, lifting lugs with provisions for jacking complete transformer on four corners of bottom section.
- (j) One top vent plug, one bottom drain valve and two lifting eyes on each cooler unit (transformers with removable radiators).
- (k) Magnetic type liquid level indicator, Reinhausen-Messko MTO type, with 2 low-level, alarm contacts suitable for 136 volts D.C.
- (l) One three-stage reducing valve equipped on the high side with a pressure gauge to indicate nitrogen cylinder pressure. The gauge shall have 2 low-pressure alarm contacts conforming to IEEE Standard C57.12.10, latest revision.
- (m) One compound gauge with 2 alarm contacts for transformer pressure indication which conforms to IEEE Standard C57.12.10, latest revision.

### 3.04.16 Safety Devices:

- (a) Reinhausen-Messko MPreC Pressure-relief device – self resetting mechanical type rapid-pressure relay with alarm assembly containing two S.P.D.T. switch suitable for switching 136 volts D.C, 0.5 AMP min with oil directed cover for the Transformer.
- (b) Sudden pressure or fault pressure Buchholz relay.
  - (1) A sudden pressure relay shall be mounted on the transformer tank for detection of abnormal increase in transformer operating pressure when inert gas-pressure system is used. Relay shall have three separate initiating “C” contacts, suitable for 136 volts D.C., ABB relay model No. 4432A95G02 is preferred to be located on top, in approximate center of cover.

- (2) In conservator-expansion tank system, a fault pressure Buchholz relay installed in the pipe between the tank and conservator shall be used. Relay shall have three "C" contacts for alarm and trip.
- (c) Reinhausen-Messko compact MT-ST160WRM type Thermal Relay– A relay and/or conductor for controlling auto cooling equipment, providing overload protection and thermal load indication. The relay shall be separate from the comprehensive transformer monitoring system and provide 4 analog contacts wired in parallel to the monitoring system to provide fully redundant cooling control and alarms systems. The MT-ST160WRM requires a 2A input. For nominal CT currents below 2A & above 2A up to 5A a multi-ballast transformer (BA2093) shall be used. Relay shall have four 136 volt DC circuit closing contacts for initiating:
  - (1) Stage one and two fans as required by transformer winding temperature.
  - (2) Alarm circuit for high transformer winding temperature.
  - (3) Trip circuit for dangerous high transformer winding temperature.
- (d) Transformer Manufacturer shall provide and install all necessary piping, valves and hardware to accommodate, integrate and install the transformer monitoring system as explained in section 3.01.14.

#### 3.04.17 Fans

- (a) All fan motors shall be three-phase 240 VAC., 60 hertz power.
- (b) No capacitors shall be used in construction of fan motors.
- (c) Manufacturer shall furnish transformer with fan guards in accordance with State of California Division of Industrial Safety, General Industry Safety Order, Article 37 Section 3994, Guard Clearance, Paragraph (a).

#### 3.04.18 Finish

- (a) Before painting, all surfaces shall be thoroughly cleaned and made free of all mill scale, corrosion and foreign substances.
- (b) The transformer shall have at least one corrosion inhibiting prime coat and one finish coat with a total paint thickness averaging 4 mils. The exterior finish shall be ANSI sky gray, number 70.
- (c) One (1) gallon of paint shall be supplied for touch-up after field erection.
- (d) To minimize damage to the paint, all paint applied by the Manufacturer shall be thoroughly dry before shipping the Equipment. In addition, the Manufacturer shall take necessary measures to assure that the paint finish will not be damaged as a result of normal handling and ordinary transportation hazards.

#### 3.04.19 Oil and Oil Preservation System

- (a) Insulating oil for complete filling shall be furnished with each transformer. The oil shall not contain polychlorinated biphenyls (PCBs) and shall be Type II, inhibited with 0.15% to 0.30% by weight of DBPC (2-6 ditertiary butyl paracresol) per ASTM Test D-2668. The transformer main nameplate shall state that the oil is inhibited and contains no detectable PCBs (<1 ppm) at the time of manufacture.
- (b) The electrical insulating mineral oil shall be new, unused oil. In addition to meeting the requirements of the applicable national and international industry standards, the oil shall contain less than 10 ppm water, and shall test at least 50kV breakdown strength when tested in conformance with ASTM D877, upon receipt at the delivery point.
- (c) Oil shall be shipped by bulk container, such as a tanker or a large flexible tank designed specifically for such use. Shipment in drums is strongly discouraged, and the proposed shipment methods are subject to the ANAHEIM's approval. Each shipping container shall

have its oil tested for dielectric integrity and hot oil processed prior to being installed in the transformer.

- (d) When shipping weight permits, the transformer shall be shipped oil-filled. If the transformer is shipped without oil, then it shall be shipped pressurized with dry air or nitrogen. A pressure vacuum gauge shall be provided to monitor dry air or nitrogen pressure during shipment.
- (e) Each transformer and its equipment shall be designed and delivered capable of full vacuum filling in the field. The Manufacturer's recommended assembly and filling procedures shall be submitted for ANAHEIM's review, prior to shipment.
- (f) Oil furnished by the Manufacturer shall meet the requirements of ASTM and have the following characteristics:

<u>Characteristic</u>	<u>Limiting Value</u>
Dielectric Strength (kV)	50 (min.)
Power Factor (% at 20° C)	00.1 (max.)
Interfacial Tension (dynes/cm)	40 (min.)
Specific Gravity at 60/60° F	00.900 (max.)
Pour Point (°C)	-40 (max.)
Flash Point (°C)	143 (min.)
Viscosity, (SSU/100° F)	60 (max.)
Color (ASTM Scale)	00.5 (max.)
Neutralization Number	0.03 (max.)(milligrams KOH/gram)
Corrosive Sulfur, ASTM D 1275B	2 (max.)(classification)
Water (soluble) by Fischer	10 (max.) (ppm)
Inorganic Chlorides, Sulfates	None
Free Sulfur	None
Sludge Value (% after 164 hours)	0.05 (max.)
PCB EPA 8082	Non Detect less than 1 ppm

- (g) ANAHEIM reserves the right to use any oil which meets the above requirements and this shall not affect any transformer Manufacturer guarantees or warranties.
- (h) Any required nitrogen bottle(s) and associated regulating equipment shall be furnished by the Manufacturer and shall be contained in a weatherproof, steel cabinet, the top of which shall be not more than 6 feet above the base level of the transformer tank. The cabinet shall be supported with flexible mountings designed to keep normal transformer vibrations from reducing the life of the instruments. The nitrogen piping shall be supported to prevent resonant vibration of the pipe. The cabinet shall be provided with a glass window to facilitate inspection of the pressure gauges and shall contain one nitrogen cylinder with standard AIRCO valve for O.P. nitrogen. The inlet is 0.903 inches, with a 14 L.H. male thread. The bottle is approximately 51 inches long, 9 inches in diameter, and with the centerline of the valve handle 54-3/4 inches from the bottom of the bottle.
- (i) The oil preservation system may be conservator expansion tank system equipped with an auto recharging dehydrating breather with an integrated heater that drives moisture out of the desiccant and is engineered to recharge automatically, or an inert gas-pressure system. All dehydrating breathers used shall be self-drying type.

- (j) The system shall be designed with an oil temperature range of -25° C to 110° C. Unless specified, the Contractor/Manufacturer will have the option of furnishing, an automatically maintained inert gas pressure system, or a sealed bladder conservator system. Based on this choice, the appropriate following paragraph shall be applied:
- (1) Inert Gas Pressure System. An alarm device with 2 alarm contacts for remote indication of low gas supply shall be furnished. Valves shall be provided to permit purging the gas space and testing the seal on the tank by admitting dry nitrogen under pressure. The gas control equipment, including adequate space for nitrogen bottles, shall be protected by an easily accessible weatherproof enclosure mounted on the transformer. Sufficient nitrogen gas shall be furnished for the initial flushing, filling, and operation.
  - (2) Sealed Bladder Conservator System. The system shall prevent air and moisture from contact with the oil through 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 that collects accumulated gases at the high point of the cover. The system shall include a gauge alarm contact and a gas sampling valve at ground level.

#### 3.04.20 Base

- (a) The transformer base shall be designed for rolling or skidding in a direction parallel to either center line. Each transformer base and tank shall be constructed to permit jacking and lifting without any permanent structural deformation when the transformer is assembled and filled with oil.
- (b) Each transformer base shall be structurally capable of withstanding sliding or rolling in any direction parallel to the center lines with the transformer fully assembled and full of oil.
- (c) Provisions shall be made for anchoring the transformer to the foundation by anchor bolts or welding the base to steel embedded in the foundation. Anchorage design shall meet the requirements of the American Society of Civil Engineers (ASCE) Substation Structure Design Guide.

#### 3.04.21 Cores

- (a) The core shall be constructed of the high quality, non-aging, cold-rolled, grain-oriented, stress free, silicon-steel laminations having high permeability and low hysteresis loss. The steel shall be properly annealed and have smooth surfaces at the edges. Each sheet shall have an insulated surface which is impervious to hot transformer oil. The core shall be rigidly clamped and blocked to prevent deteriorating vibrations, interference with oil circulation, short circuits, objectionable noise levels, and shipment distortions. Any internal blocking or bracing used which is to be removed from the transformer at its destination shall be painted a bright color, such as yellow or red.
- (b) Each transformer shall be factory processed during fabrication to remove all absorbed and surface moisture from each core and coil assembly and from each completed moisture-degradable shipping assembly. Coils shall be dried before assembly on core. All bolts and nuts in the core winding must be retorqued after the drying process.
- (c) The core shall be grounded at one point only through a removable connection, and that point shall be externally accessible to facilitate testing of the core insulation. The core ground shall be brought out through a bushing to an external ground. When the connection is removed, the insulation resistance between the core and ground shall not be less than one hundred megaohms. A 15 kV class, 110 BIL outdoor apparatus type bushing as per IEEE 24, complete with copper stud to pad connector and flexible strap connector shall be used to connect the transformer core ground to the transformer main tank ground. This bushing shall be located in a sealed well with a nameplate clearly stating "CORE GROUND".

- (d) The cores shall be clamped and braced to resist distortion caused by short circuit stresses or transportation handling. Nuts and bolts of the clamping structures shall be secured so that they will not be loosened by vibration incident to transportation and operation.
- (e) Wound and rectangular transformer cores are not acceptable.

#### 3.04.22 Tanks, Covers and Radiators

##### (a) General

- (1) Each transformer tank shall be fabricated of hot-rolled steel plates and in accordance with IEEE C57.12.10
- (2) Transformer tanks, covers and manhole covers shall be of substantial construction and capable of withstanding, without damage, the stresses incident to shipment and operation. Tanks shall be capable of withstanding the forces resulting from full vacuum.
- (3) All tank seams shall be double welded (inside and outside), oil and gas tight and shall be a minimum of six (6) inches from the corners. Corner welds are not acceptable.
- (4) Seal welding shall be utilized to minimize accumulation of moisture within cavities or pockets.
- (5) During welding of the transformer cover, an inorganic gasket will be permanently located between the cover and the tank flange to prevent the entrance of weld splatter into the tank. Transformer cover shall have a nonskid surface.
- (6) All external tank supports or stiffeners shall be box beam construction and continuously welded.
- (7) Tanks, bases, radiators, covers, junction boxes, and any other attached compartments fabricated from steel shall withstand normal transportation, installation, and service stresses without distortion or damage. The complete tank shall be designed to withstand full vacuum and at least 125% of the maximum operating pressure of the oil preservation system furnished per IEEE C57.12.10, Article 19.5. The tank cover shall be sloped or domed to shed water and shall be welded at the factory. Bolted covers are not acceptable. Field installation shall not require any welding. The base shall allow skidding or moving on rollers in any direction. Lifting lugs and jacking pads shall be provided for lifting and jacking the completely assembled transformer. The jacking pads must be located near each of the four corners.
- (8) The tank shall be designed so that all current transformers can be removed easily, without removing the main transformer tank cover.
- (9) The transformer shell shall be of welded steel plate construction. The shell shall be 100% oil and gas tight with all fittings in place.

##### (b) Covers and Access Ports

- (1) The covers of all transformers shall have hand holes or manholes, or both, to afford adequate access to the internal parts. The diameter of the manholes shall be not less than 24 inches. All covers and adapters shall be bolted to the tank either by means of a raised boss welded to the tank with holes drilled and tapped or by a flange welded to the tank having slots wide enough to accommodate bolts with nuts. Threaded studs (Nelson studs) welded to the tank are not acceptable. Manhole covers shall have at least two handles for lifting.

##### (c) Fall Protection (Tether Pole)

- (1) A removable device (tether pole) suitable for mounting in the approximate center of the tank cover and capable supporting hardware including harnesses utilizing gravity brakes shall be provided.

- (2) All personal fall arrest, personal fall restraint and positioning device systems shall be labeled as meeting the requirements contained in ANSI A10.14-1991 American National Standard for Construction and Demolition Use, or ANSI Z359.1-1992 American National Standard Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components. Anchorages for attachment of personal fall arrest equipment shall be capable of supporting at least 5,000 pounds per employee attached, or shall be designed, and installed as a part of a complete personal fall arrest system which maintains a safety factor of at least two.

(d) Gaskets

- (1) All gaskets shall be Nitrile rubber, or approved equal and single-piece. In areas where single-piece gaskets cannot be provided, ANAHEIM approval is required. Metal surfaces to which gaskets are applied shall be smooth, and shall have sufficient rigidity to assure proper compression of the gaskets. All flange surfaces shall have a gasket groove on one surface, and the nitrile gasket must compress approximately 33% in height and have the same cross section area as the gasket groove so that over compression of the gaskets cannot occur. All seams and joints in the transformers shall be oil and gas tight. Gasket flanges to be raised  $\frac{3}{4}$  of an inch above the cover.
- (2) "O" ring type gaskets are not allowed.

(e) Tanks

- (1) Transformer tanks shall be clean and free of all mill scale, corrosion and foreign substances.
- (2) Suitable means shall be provided to facilitate tanking and untanking without damaging the windings, cores or tanks. Securing devices shall prevent movement of the core assembly in transit and during seismic disturbances.
- (3) Transformer covers, tanks, core and coil assemblies, and radiators shall be provided with means for lifting and handling. The use of open S-hooks for lifting core and coil assemblies is not permitted.
- (4) Both ends of the tanks shall be provided with eyes for pulling the fully assembled transformer in either direction. Proper clearances shall be provided between the pulling eyes and radiators and other appurtenances so as not to interfere with pulling cables. Material for pulling eyes shall be of sufficient material to prevent elongation of the hole during use.
- (5) Jack ports shall be provided on all tanks and shall conform to IEEE Standard C57.12.10. The minimum dimension between the floor line and the jacking point shall be 18 inches.

(f) Radiators

- (1) Radiators shall be galvanized panel steel 18 gauge minimum.
- (2) Radiators shall be fully hot dipped galvanized, corrosion-resistance, braced to withstand the vibrations and impacts which occur during shipment and operation. If radiators are removable, each radiator shall be supplied with shut-off valves on top and bottom. Shut-off valves shall be designed so that packing glands can be serviced without removing the valves. Clear indication of the open and closed position is required.
- (3) Radiators shall be pressure tested and flushed with transformer oil to remove any contaminants and prevent corrosion during shipment. The radiators shipped separately or shipped with transformers without oil shall be sealed to avoid contamination during shipment. Provide required packing such as cushioning strips to avoid any damage to radiators during shipment.

### 3.04.23 Integrated Transformer Monitoring System - Monitoring, Control and Communication

Transformer shall be equipped with a Morgan Schaffer Calisto 2 with no exception as described below. The Calisto shall be installed and tested at the factory in accordance with manufacture instructions:

- (a) Calisto 2 with the following accessories
  - (1) IEC 61850 Ethernet communication kit
  - (2) Quick-connect dust plug
  - (3) Calisto MultiTrack software
  - (4) Extended warranty
  - (5) Precision Oil Temperature Probe
  - (6) Custom cut Stainless Steel Braided Flex Lines
- (b) Services from Morgan Schaffer
  - (1) A complete set of wiring diagrams for the monitoring system which defines the I/O assignments and all wiring connections shall be provided.
  - (2) Following the drawing approval, the control shall be assembled, wired, programmed and tested prior to shipment to the site.
  - (3) Programming of the SCADA point list will be completed by Morgan Schaffer prior to commissioning. Any necessary technical support required to assist the customer with testing the SCADA communication shall be included.
  - (4) Morgan Schaffer shall provide an on-site technician to assist with the final testing and commissioning of the system prior to energizing the transformer. Typically 1 day on site will be sufficient.
  - (5) Independent from the commissioning, Morgan Schaffer shall provide an 8-hour onsite training class for the system and user interface. Cost of the commissioning and training class shall be included in the Manufacturer bid price.
- (c) The transformer supplier shall provide the following provisions for the transformer monitoring system which shall be comprised of the following:
  - (1) Added Valves for the On-line DGA System – The DGA/Moisture-in-oil sensor shall be the Calisto 2 sensor manufactured by Morgan Schaffer. The valves shall have a minimum diameter of 1.3 cm (½ in.), and be located near the monitor. The ideal configuration for this device is to have two additional valves added to the main transformer tank, 1/2" diameter valves, located nearby the monitor are appropriate, one valve located about 6" below the low oil level at the top of the transformer tank; the second valve located about 12" above the bottom of the tank. Both valves should be on the same side of the transformer adjacent to the control cabinet. To ensure representative sampling of the transformer oil, it is important that the oil inlet and outlet valves on the transformer be distant as stated in the following section, to prevent oil re-circulation.
  - (2) RTD Thermal Wells – Two RTD thermal wells shall be installed for the temperature measurements needed of the top and bottom oil in the main tank. One RTD thermal well will be installed for the temperature measurement of the LTC. Two thermal wells (dry type) shall be installed for the Reinhausen-Messko top oil and winding temperature gauges. Thermal wells must be located such that they do not present any electrical clearance issues.
  - (3) Tap Position Sensor – An Incon receiver (model 1250B display) shall be mounted on the control panel. (if applicable)



### **3.05 TRANSFORMER AUDIBLE SOUND LEVELS**

- 3.05.01 The average sound level of the transformer shall not exceed values specified in NEMA TR1, latest issue and shall be measured per IEEE C57.12.90, latest revision.
- 3.05.02 Average audible sound level with all fans on at 65°C shall not exceed 74 dBA at the tap position (s) producing the highest sound level.
- 3.05.03 Each transformer's nameplate and test report shall provide the measured sound level in decibels.

### **3.06 TRANSFORMER LOSSES**

- 3.06.01 Manufacturer shall state in Proposal the guaranteed transformer losses as outlined in section 1.04.04 of this document.
- 3.06.02 In addition, the guaranteed power required for auxiliary cooling shall be stated at all applicable ratings.
- 3.06.03 All guaranteed values shall be measured on finished product and conform to manufacture proposed values.

### **3.07 TRANSFORMER SHORT CIRCUIT CAPABILITY**

- 3.07.01 The transformers shall be capable of withstanding, without damage, the mechanical and thermal stresses caused by short circuits on the external terminals of any winding or windings, in accordance with IEEE Standard C57.12.00 latest revision.
- 3.07.02 In determining the maximum short circuit current, only the impedance of the transformer will be considered.

### **3.08 TRANSFORMER DIMENSIONS**

- 3.08.01 The maximum height and width of the transformer shall be approved by ANAHEIM prior to award.
- 3.08.02 The transformer will utilize an existing foundation at the substation.
- 3.08.03 City will provide a plot plan of the site and foundation details to the Contractor to provide insight to any space limitations.

### **3.09 SEISMIC WITHSTAND REQUIREMENTS**

- 3.09.01 Manufacturer, shall provide seismic withstand test report per requirement of IEEE 693-2005. The cost for providing the test report shall be included in the bid price.
- 3.09.02 General Requirements
  - (a) Bidder must attach an outline drawing of the Equipment, locating the centers of gravity and weights of major components and the location and size of hold-downs to the eBid.
  - (b) Bidder must describe the maximum vertical and horizontal forces and the upsetting moments which the foundation shall be capable of sustaining in meeting the seismic requirements of this Specification within 60 days after contract award.
  - (c) Bidder must provide certified calculations approved by Professional Engineer (California) verifying the transformers meet the requirements of Seismic Zone 4 within 60 days after contract award.
  - (d) Bidder must attach documentation regarding the portion of the Equipment that requires an integral pad, and the portion(s) which may be mounted on independent foundations in the eBid.
  - (e) Bidder must state the expected maximum displacement of electrical terminals and other points of interconnection between the Equipment and other equipment on an outline drawing which shall be furnished with the Proposal in the eBid.
  - (f) The transformer shall have no loss of function and no device or accessory shall spuriously operate during or after the seismic loading defined in this Specification as the maximum vibratory ground motion produced by the design basis earthquake.

- (g) The maximum vibratory ground motion is defined herein as one having a maximum acceleration of 0.5g in any horizontal direction (g is the acceleration due to gravity) and a vertical acceleration that shall be considered to be 75% of the maximum horizontal acceleration.
- (h) The two acceleration components shall be considered to act simultaneously in a direction that produces the most severe loading of the apparatus.
- (i) Bidder must submit as a part of their proposal a description of the proposed method for determining the natural frequencies of the equipment and the damping values in the eBid.
- (j) Seismic design adequacy for this equipment shall be demonstrated by providing seismic performance test results or analytical data of static analysis or dynamic analysis, as required. Equipment shall be mounted as it will be mounted in service. Seismic tests shall be performed by subjecting the equipment to vibratory motion that conservatively simulates the mounted equipment. The stresses and displacements due to the dynamic response of the apparatus to seismic motion shall be considered in the apparatus design. Dynamic response is defined as the vibratory motional response, with respect to the ground, of the apparatus due to the seismic motion of the ground.
- (k) For example, the smoothed maximum dynamic response of a spring-mass system (one degree of freedom) subjected to the horizontal ground motion is given by the response spectra shown in Figure 1 of IEEE Specification 693-2005 for different amounts of equivalent viscous damping.
- (l) A measurement of the natural frequencies of vibration and damping of the prototype apparatus, appendages, and accessories, when mounted in the service configuration and with all accessories installed, shall be reported in the proposal.

### **3.10 DEFINITIONS**

#### **3.10.01 Design Earthquake**

- (a) That earthquake producing the maximum vibratory ground motion that the apparatus is designed to withstand without functional impairment.

#### **3.10.02 Natural Frequency**

- (a) The frequency(s) at which a body vibrates due to its own physical characteristics (mass, shape) and elastic restoring forces brought into play when the body is distorted and then released, while restrained or supported at specified points and distorted in a specified direction.

#### **3.10.03 Response Spectrum**

- (a) A plot of the maximum response of single-degree-of-freedom bodies, at a damping value expressed as a percent of critical damping, of different natural frequencies, rigidly mounted on the surface of interest (that is, on the ground for the ground response spectrum or on the floor of a building for that floor's floor response spectrum) when that surface is subjected to a given earthquake's motion.
- (b) Note – The response spectrum is not the floor motion or the ground motion.

#### **3.10.04 Ground Acceleration**

- (a) The acceleration of the ground resulting from a given earthquake's motion.
- (b) The maximum ground acceleration can be obtained from the ground response spectrum as the acceleration at high frequencies.

#### **3.10.05 Sine Beats**

- (a) A continuous sinusoid of one frequency, amplitude modulated by a sinusoid of a lower frequency. As used herein, the amplitudes of the sinusoids represent acceleration and the modulated frequency represents the frequency of the applied seismic stimulus.

- (b) Note – Beats are usually considered to be the result of the summation of two sinusoids of slightly different frequencies with the frequency within the beats as the average of the two, and the beat frequency as the difference between the two. However, as used here, the sine beats may be an amplitude-modulated sinusoid with pauses between the beats.

### **3.11 SUPPORT FRAMES**

- 3.11.01 Steel support frames furnished by the Manufacturer shall be designed and fabricated in accordance with the AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Building" as last revised.
- 3.11.02 Aluminum support frames furnished by the Manufacturer shall be designed and fabricated in accordance with "Specifications for Structures of Aluminum Alloy 6062-T6" Journal of the Structural Division, ASCE, Vol. 82, No. ST3, Proceedings Paper 3341, December 1962. Other specifications are 6063-T5 and 6063-T6, Paper 3342, December 1962.

### **3.12 SAFETY FACTORS**

#### **3.12.01 Rated Strength**

- (a) The rated strength of porcelain elements, in their most probable mode of failure, shall be not less than 3.0 times the working stress.
- (b) The rated strength for steel and aluminum shall be not less than 1.33 times the working stress.
- (c) Nonmetallic materials such as wood, fiberglass, etc., shall have a rated strength of not less than 2.5 times the working stress.

- 3.12.02 The design of the apparatus shall include an analysis of the probable modes of ultimate failure that will cause loss of function. The probable modes of failure shall be described in the Manufacturer's proposal. The safety factors used shall be included in the analytical data furnished with the Manufacturer's proposal. The design may incorporate features such that deformation of one component will not cause collapse of the entire piece of apparatus. The specified seismic environment shall be considered in the design. In addition reserve strength and reserve operational limits may be provided by one or a combination of the following methods:

- 3.12.03 Provide ductile elements such that the mode of structural failure due to a response greater than the design response shall be ductile in nature. Care shall be exercised to assure that brittle components are protected by yielding elements. The ductility factor of the system, defined as the ratio of the maximum displacement to the yield displacement, shall be equal to or greater than 3.0. The ductility factors used shall be indicated in the analytical data provided with the eBid.

- 3.12.04 Provide structural redundancy such that failure of any one element does not cause failure of the entire apparatus. The adequacy of the seismic design of the apparatus shall be demonstrated by providing test results and analytical data in accordance with one of the following methods:

#### **(a) Static Analysis For Rigid Equipment**

- (1) Apparatus and its appendages whose fundamental frequencies of vibration are found by test or analysis to be greater than 25 cycles per second may be considered rigid and therefore designed to withstand inertial forces resulting from an acceleration of the apparatus base equal to the maximum ground motion accelerations. Each Bidder shall furnish a description of the method he used to determine that the fundamental frequency(s) of the apparatus are greater than 25 cycles per second.

#### **(b) Dynamic Analysis For Equipment With Many Degrees of Freedom (Modal Analysis Technique)**

- (1) A dynamic analysis shall be performed if the apparatus cannot be considered as being of a rigid body. The apparatus may be modeled as a series of discrete mass points connected by mass-free members, and with sufficient mass points to assure an adequate representation. The apparatus shall be mounted as it will be mounted in service. The resulting system may be analyzed using the Modal Analysis Techniques.

- (2) The maximum modal response shall be determined using the horizontal response spectra shown in Figure 1 of IEEE Specification 693-2005. The vertical response spectra shall be three-fourths of the horizontal spectra. The resultant modal response shall be determined by the square root of the sum-of-the-squares techniques.

### **3.13 CONTROL CABINET**

- 3.13.01 There shall be only one control cabinet to which the ANAHEIM's wiring is to be connected.
- 3.13.02 The door of the cabinet shall swing in a horizontal plane. The door shall have a device for keeping it open during working at the cabinet by a workman. The door shall have a compartment for holding the instruction manual. The door shall be locked at closing position through a three latch lock with pad lock option. No bolts shall be used to keep the door closed.
- 3.13.03 The cabinet shall be at a convenient working height from the base of the transformer. The cabinet shall be weatherproof. The cabinet shall include:
- (a) Terminals for all ANAHEIM-provided sources such as AC and DC power. ANAHEIM will provide 136 Vdc / 120 Vac control power and 3-phase, 3-wire, 240 Vac power for transformer fans. No single-phase fans, pumps, etc. shall be used. All electric motor driven equipment shall be three phase unless approved by ANAHEIM. If approved by ANAHEIM, single phase motors shall be connected such that the loads are balanced as closely as practicable on all three phases.
  - (b) Shorting terminal blocks for all current transformer leads.
  - (c) All alarm terminals brought to terminal blocks.
  - (d) Sudden-pressure seal-in relay and lockout relay or Buchholz relay for conservator type transformer.
  - (e) Cooling equipment control devices.
  - (f) Two 120VAC, lights with a switch and a 120 Vac GFCI duplex outlet, both protected by a 20 Amp breaker.
  - (g) Thermostatically-controlled heater for humidity control.
  - (h) With the exception of the rapid pressure rise relay, all control devices and all abnormal condition signaling devices shall provide at least two (2) electrically separate switches. The rapid pressure rise relay shall be furnished with three (3) electrically separate switches. Each switch shall be single-pole, double-throw suitable for 136-volt dc operation. All contact terminals shall be wired to control cabinet terminal blocks. One (1) switch of each abnormal condition sensing device shall be used for the transformer monitoring device when specified. The remaining switches shall be for use by others.
  - (i) All other accessories named in this specification which are to be located in the control cabinet.
- 3.13.04 All terminals and equipment shall be legibly and indelibly identified. The labels for each conductor shall include both destination and designation information on each end. The destination information shall refer to the termination location of the opposite end of the conductor of which it is terminated.
- 3.13.05 The cabinet shall have a 3/8-inch round x one-inch long threaded stud welded inside the cabinet on one sidewall for safety grounding connections.
- 3.13.06 Terminal blocks for ANAHEIM connections shall be accessible to the ANAHEIM's control cables (multi-conductor #10 AWG copper wire) entering the bottom of the cabinet without overlapping other control components in the cabinet.
- 3.13.07 Field experience has shown that ambient temperatures of +60°C can be expected in the control cabinet. Therefore, the equipment in the compartment shall be designed to operate at this ambient level. Use of forced-draft ventilation is not allowed.

3.13.08 The bottom of the cabinet shall consist of a bolt-in steel plate, with minimum dimensions of 15 inches x 12 inches and of a gauge similar to that of the main cabinet that can be removed so ANAHEIM can cut sufficient number and size of conduit holes for the connection of the ANAHEIM's wiring.

3.13.09 The cabinet as a whole shall be rain tight per NEMA 3R, when the door is locked at closed position.

### **3.14 BUSHINGS**

#### **3.14.01 Bushings**

- (a) High Voltage transformer bushings including phase and neutral bushings shall be rated at 1200A, 350kV BIL and placed in segment 3. They should be upright mounted vertically on top of the tank.
- (b) Low Voltage bushings including phase and neutral bushings shall be rated at 3000A, 150kV BIL mounted in segment 1. They should be upright mounted vertically on top of the tank. Neutral bushing to be identical and interchangeable with phase bushings.
- (c) All bushings shall be in accordance with ANSI-70 Munsell gray color one piece porcelain.
- (d) The bushings shall be tested separately from transformer in accordance with IEEE Standard 21 and 24, latest revision.
- (e) High voltage bushings shall be in accordance with IEEE C76.1 and C76.2 latest revision standard design for transformer/circuit breaker interchangeable bushings of 350kV BIL (LAPP/ PCORE type B-89593-70 bushing).
- (f) Neutral and low voltage bushings shall be in accordance with IEEE C76.1 latest revision standard design for transformer bushings of 150kV BIL ABB type bushings or as approved by ANAHEIM.
- (g) Bushing phase labeling shall be permanently and clearly stamped or welded on the transformer.

#### **3.14.02 Connections**

- (a) Manufacturer shall equip the low voltage bushing with 3" diameter silver-plated copper bushing rods.
- (b) Manufacturer shall equip the high and low voltage bushings with ANAHEIM approved stud to NEMA four-hole spade connectors. Stud connectors shall be rated at 3000 Amp. Dossert type SCB300-3/4F-4NF-T12-AG-F stud connectors with 4-inch by 4-inch pad shall be furnished for low voltage bushings.
- (c) All Stud connector pads shall be silver plated and finished on both sides.

### **3.15 CURRENT TRANSFORMERS**

- (a) **All bushings shall be furnished with current transformers manufactured by Meramec and as explained below:**
  - (1) Each high voltage bushing shall be furnished with one 600/5A multi ratio, C800 accuracy class current transformer (CT). The CT shall meet the requirements of IEEE Standard C57.13 Standard latest revision.
  - (2) Each low voltage bushing shall be furnished with one 3000/5A multi ratio, C800 accuracy class current transformer. B phase will be equipped with an additional 4000/5 CT for the transformer monitoring system. The CT shall meet the requirements of IEEE Standard C57.13 Standard latest revision.
  - (3) The neutral bushing shall be furnished with one 1200/5A multi ratio, C800 accuracy class current transformer. The CT shall meet the requirements of IEEE Standard C57.13 Standard latest revision

- (4) The accuracy class of all CTs shall be C800 with Continuous Thermal Current Rating Factor on all CTs to be 3@55°C, unless otherwise stated.
- (5) The CT's shall meet the requirements of IEEE Standard C57.13 Standard latest revision
- (6) The CTs shall be installed with their polarities away from the transformer.
- (b) The Manufacturer shall size and supply any internal CTs needed for thermal devices. CT location and ratio shall be shown on the nameplate. CT nameplate information shall be in compliance with the IEEE C57.13 Standard latest revision.
- (c) The manufacturer shall provide lead wire suitable for the intended application. All secondary leads of CTs shall be brought to a common outlet box near the cover and then to the main weatherproof control cabinet where each lead shall be terminated on a shorting type terminal block. There shall be one terminal block for each multi-ratio CT.
- (d) The CT secondary lead interface block, if on the side of the tank, shall be above the top oil level (at operating temperature) to minimize the possibilities of oil leaks.
- (e) Electrical characteristics for all CTs, including excitation curves at all tap positions, shall be provided with the approval drawings.
- (f) Test reports for every CT provided shall show lab testing and acceptance criteria in a tabular format and listed by serial number. All CTs to be individually tested installed.
- (g) The tank shall be designed so that all CTs can be removed easily, without removing the main transformer tank cover.

### **3.16 TAP CHANGERS**

#### **3.16.01 High Voltage No Load-Tap Changers**

- (a) In addition to the LTC on the low side of the transformer, a 3 phase, gang-operated, no load-tap changer with five (5) full-capacity steps to cover a minimum tap range of +/- 5% range is to be installed at high voltage winding of the transformer. The full capacity shall include the emergency rating of the transformer. The center voltage tap is 69KV. The ranges are 72.45kV, 70.73kV, 69kV, 67.3kV, 65.55kV respectively. Only externally operated no load-tap changer designs are acceptable. Taps shall be located in the high voltage windings. The tap changers shall be capable of carrying the full transformer short circuit current without damage or contact separation. The operating handle shall have padlock provision and its location shall be easily accessible by a 5'-0" man standing at the transformer base. A three-phase, gang-operated, no load-tap changer with five (5) full-capacity steps to cover a minimum tap range is to be installed at the high voltage winding of the transformer base.

#### **3.16.02 Low Voltage Tap Changer**

The transformer shall have a full capacity load tap changer conforming to IEEE C57.12.10 Section 6 suitable for full current operation through all taps at 44.8 MVA @ 65°C. Load tap changing equipment shall be placed in low voltage winding and shall provide +/-10% automatic adjustment of the low voltage winding voltage in approximately 0.625% steps with sixteen (16) above and sixteen (16) steps below, for a total of thirty three steps, rated nominal winding voltage. There shall be a constant voltage variation between steps over the full tap range. Neutral voltage tap is 12.470KV.

- (a) The load tap changing apparatus shall be only the reactance vacuum type and conform to IEEE 131 latest revision and IEEE C57.12.10, latest revision, except as otherwise specified herein. The load tap changer and operating mechanism shall be installed on the side of the transformer tank. Only Reinhausen type RMV-II load tap changer rated at 2500 Ampere, designed to handle transformer full emergency capacity, is acceptable.
- (b) The load tap changer shall be capable of performing not less than 500,000 load operations at rated current and at rated step voltage without replacing or rebuilding any of its components.

- (c) For each load tap changing apparatus, a type test certificate shall be provided to ANAHEIM as verification of the above specified capabilities.
- (d) The load tap changing apparatus, including all selector and transfer switches, shall be in separate, oil filled compartments that are attached to the main tank. The barrier between the load tap changer compartments and the main tank shall be capable of withstanding the forces imposed by the full vacuum filling of the main transformer tank. Internal inspection within the tap changer compartment shall not require lowering the oil level in the main tank.
- (e) The load tap changer shall be capable of both automatic and manual operation under load and shall meet IEEE Standard C57.12.30 latest revision. The load tap changer shall have a pressure relief device with mechanical flag (that can easily be seen from ground level) and alarm contact wired to the cabinet terminal block.
- (f) The automatic control equipment for the LTC shall be provided in the Reinhausen type MD-II motor drive and including among others the following features:
  - (1) Reinhausen TAPCON 250 automatic voltage regulating relay with the paralleling option allowing LTC potentiometer position input and DNP3.0 level 2 protocol communications to SCADA via fiber optic installed in Reinhausen MD-II type motor drive.
  - (2) MANUAL-AUTOMATIC transfer switch.
  - (3) Voltage testing terminals.
  - (4) All necessary switches and relays for manual, automatic and remote controlled LTC operation.
  - (5) Reversing selector switch.
  - (6) Digital line drop compensator.
  - (7) RS-232, RS-485 and Fiber Optic ports for communication to a SCADA System via DNP 3.0.
  - (8) Separate front mounted RS-232 port for controller configuration.
  - (9) Reinhausen-Messko Maintenance free dehydrating breather DB 100 RM
  - (10) A tap-position indicator shall be mounted on the transformer, with all necessary controls to electrically reset the MIN/MAX drag hands with a 120V voltage supply. References to "raise" and "lower" shall be relative to the low-voltage side.
- (g) Manufacturer shall utilize the LTC controller's fiber optic ports for communication back to the Substation Automation system.
- (h) All tap-changer motor controls and tap-position indicator controls shall be capable of operating with a 208/240V, 60Hz, single-phase circuit. The use of other voltages is subject to approval by ANAHEIM.
- (i) The tap-changer controls on the transformer include the hand crank for manual operation, and shall be operable from the ground. The tap-position indicator shall be visible from the operating position.
- (j) The Manufacturer shall provide a MR1 MU transducer and a potentiometer with following characteristics:
  - (1) Range: 350 Ohms
  - (2) Output: 4-20mA (for interfacing to M-2025)
  - (3) Power supply: 48-368VDC, 48-260VAC 60Hz
- (k) The motor for the load-tap-changing mechanism shall be noted for 60Hz operation and rated at 208/240VAC, single-phase. Other options are subject to approval by ANAHEIM.

- (l) Provide hand crank provisions for maintenance operation of LTC. Hand crank shall be stored within LTC control cabinet.

### **3.01 FACTORY TESTS**

- i. Factory tests as outlined shall be witnessed by the owner's representatives. The manufacturer shall notify ANAHEIM two (2) weeks prior to the date the tests are to be performed.
- ii. Except as otherwise specified herein, all tests and measurements for shall be for a type II transformer and conform in accordance with the latest applicable sections of:
  - (a) IEEE C57.12.00 – Standard latest revision; Standard General Requirements for Liquid-Immersed Distribution Power & Regulating Transformers
  - (b) IEEE C57.12.10 – Standard latest revision; Standard Requirements for Liquid-Immersed Power Transformers
  - (c) IEEE C57.12.90 – Standard latest revision; Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers
  - (d) IEEE C57.98 – Standard latest revision; IEEE guide for transformer impulse tests
  - (e) IEEE C57.100 – Standard latest revision; IEEE standard test procedure for thermal evaluation of liquid-immersed distribution and power transformers
  - (f) IEEE C57.109 – Standard latest revision; IEEE guide for liquid-immersed transformer through –fault-current duration
  - (g) IEEE C57.113 – Standard latest revision; IEEE guide for Partial Discharge Measurements in Liquid-Filled Power Transformers and Shunt Reactors
  - (h) IEEE C57.123 – Standard latest revision; IEEE Guide for Transformer Loss Measurement
  - (i) IEEE C57.127 – Standard latest revision; IEEE Guide for the Detection and Location of Acoustic Emissions from Partial Discharges in Oil-Immersed Power Transformers and Reactors

3.01.01 Prior to shipment, Manufacturer shall perform the following tests and measurements, as defined in IEEE Standards C57.12.00 and C57.12.90, for a class two (2) power transformer, latest revision; and supply ANAHEIM with five copies of certified test reports. Reports shall be forwarded to Larry Davis, City of Anaheim, 201 S. Anaheim Blvd., Suite 701, Anaheim CA 92805 prior to shipment of transformer. Manufacturer will review the test results with ANAHEIM to obtain approval prior to shipping.

- (a) The Manufacturer shall notify the ANAHEIM of any unusual event or damage occurring during the fabrication of the transformer and of all tests which do not meet the specified or guaranteed values. ANAHEIM reserves the right to inspect such damages or test failures. Corrective measures to overcome such damage or failure shall be reviewed with ANAHEIM.
- (b) Prior to vacuum and oil filling. Test and verify all fiber optic probes are reading correctly. If a probe is found to be not reading; all internal fiber tank connections to be verified and checked for tightness. Retest and verify all fiber optic probes are reading correctly post vacuum and oil filling.
- (c) Design tests shall be made to determine the adequacy of the design of a particular type, style, or model of transformer or its component parts.
- (d) Routine tests shall be made on every transformer to verify that the product meets the specification.
- (e) Load Loss, No load Loss and other losses shall be measured as guaranteed under section 1.04.04.
- (f) Transformer Percent Regulation at 1.0 and at 0.80 P.F. lagging at 30 MVA and 56 MVA as guaranteed under section 1.04.04.



- (g) Measure Efficiencies at different stage of transformer loading as guaranteed under section 1.04.04.
  - (h) Measure Audible Sound Level in accordance with for all ratings as guaranteed under section 1.04.04.
  - (i) Dielectric tests as defined in latest IEEE Standards C.57.12.90 and C57.12.00 under routine tests shall also include:
    - (1) Chopped-wave test.
    - (2) On all full-wave tests, oscillograms shall be made of the impulse voltage; and of the current in the grounded end of the winding both at reduced and full specified voltages.
    - (3) On all chopped-wave tests, oscillograms shall be made of the impulse voltage; however, oscillograms of the current in the grounded end of the winding are not required.
    - (4) Oscillograms which show any irregularities shall be reported and explained to ANAHEIM before shipment of the transformer.
    - (5) Certified copies of the oscillograms of all impulse tests made on the transformer shall be furnished with the certified test reports.
    - (6) Lightning impulse and chopped wave tests are required as routine tests on line and neutral terminals of all transformers, except that the chopped wave test is not required on the neutral terminals.
- 3.01.02 In addition to the routine tests, tests shall be made to determine the zero-phase-sequence impedance voltage of all delta-wye, three-phase transformers.
- 3.01.03 The bushings that the Manufacturer intends to furnish with the transformer shall be those bushings used during testing of the transformer.
- 3.01.04 The Manufacturer shall furnish insulation resistance and power factor values taken on the windings immediately after dry-out. Values shall be taken with the core and coils under oil, and also with the core and coils out of oil. The insulation resistance values shall be taken high to low, high to ground, and low to ground; the power factor values shall be taken high to low and ground, low to high and ground, and high and low to ground. Perform Power Factor (Doble) tests on bushings, windings, and lightning arresters including C-1 and C-2 tests pursuant to IEEE STD C57.12.90 method II Section 10.10. The testing Manufacturer shall use the Doble Test Assistant software, latest version and revision and provide ANAHEIM with the DTA results prior to shipment.
- 3.01.05 When completely assembled with all bushings, the transformer shall be pressure tested over 48 hours and made free of all oil and gas leaks.
- 3.01.06 Perform sweep frequency Response Test utilizing Doble M52-5300 test set. One test is to be performed in the shipped condition and one in the assembled condition. Factory is to use the Doble SFRA user's guide to establish test procedures. This test is to compare factory and field tests to identify any damage to the core during shipping. Transformer shall be equipped with test bushings on the bushing shipping covers to allow performing the SFRA test when received without requiring opening the shipping covers.
- 3.01.07 Perform Doble high voltage TTR (@10kV) per Doble method.
- 3.01.08 Perform single phase excitation current tests per Doble methodology on all taps.
- 3.01.09 Perform three phase and single phase impedance testing per Doble method.
- 3.01.10 Measure Winding resistance.
- 3.01.11 Perform CT saturation and insulation resistance tests (saturation and insulation resistance tests may need to be performed after concluding vacuum oil fill).
- 3.01.12 Perform current transformer ratio, polarity and excitation measurements.

3.01.13 Perform Wheatstone bridge testing of all CT leads to confirm that low resistance connections have been made.

3.01.14 Inject primary through current transformers to ensure ratio and polarity.

3.01.15 In addition to all tests dictated by and described above or mentioned in the appropriate standards, the following tests and calculations are also required:

- (a) **Overexcitation Tests** – Each transformer specified herein shall be subjected to a 12 hour overexcitation test. Top oil temperature shall be recorded during the test. Gas-in-oil tests shall be performed before starting and after finishing each 12 hour run.
  - (1) For units conforming to IEC standards, the unit shall be subjected to 110% rated voltage at 100% frequency on the input terminals.
  - (2) For units conforming to IEEE standards, the core induction level equal to 110% rated voltage, at 100% rated frequency, on the output terminals under no-load conditions shall be calculated. This value shall be compared to the core induction level with 105% rated voltage, at 100% rated frequency, on the output terminals at maximum rated load at 0.8 power factor. Whichever condition results in the greatest value of core induction shall be simulated for this test. Determine the Primary Exciting Current at 100 and 110% voltage as guaranteed under section 1.04.04.
- (b) **Megger Tests** – Insulation resistance and core megger tests shall be performed, with resistance measurements corrected to 20°C.
- (c) **Insulation Power Factor Tests** – The maximum acceptable value for insulation power factor is 0.5% when corrected to 20°C. Capacitance measurements shall also be made between windings and from windings to ground. Insulation power factor and insulation resistance tests should be done after drying and after oil filling.
- (d) **Gas-in-Oil** – Dissolved gas-in-oil analysis shall be made before testing begins, before and after temperature rise tests, and after overexcitation tests (totaling four times).
- (e) **Impedance** – The positive and zero sequence impedances shall be measured on all tap positions for units fitted with de-energized tap changers. In addition, percent impedances and resistances shall be measured as guaranteed under section 1.04.04-14 of this Specification.
- (f) **Temperature Test (Heat Run)** – A full temperature rise test shall be performed on each transformer and ONAN, ONAF and 2 hour overload ratings specified herein. The hottest spot temperature rise calculation shall be performed using the "maximum eddy-current watt loss method". ANAHEIM shall witness the Heat Run Test.
- (g) **Induced Overvoltage Tests** – An induced overvoltage withstand test with partial discharge measurements shall be performed as a routine test on all transformers regardless of voltage class. The apparent charge shall not exceed 500 pC at 1.5 times maximum line-ground voltage. The partial discharge measurements shall be simultaneously recorded in microvolts and shall not exceed 100 volts during the test.
- (h) **Applied Voltage Tests** – A short duration (1 minute) power frequency voltage test shall be performed as a routine test on all line and neutral terminals.
- (i) **Leak Test** – An oil leak test shall be performed on each completely assembled transformer, using a test pressure that is 25% greater than the normal operating pressure for a minimum of 24 hours.
- (j) **Control Wiring** – All auxiliary equipment, current transformer circuits, and control wiring must be tested to verify proper connections. Current transformer ratio and polarity must be checked. The insulation of the control circuits must be verified by applying a power frequency test voltage of 1500 volts for 1 minute or 1800 volts for 1 second with all of the circuits tied together.

- (k) Auxiliary Cooling Losses – Fan and pump auxiliary power requirements shall be measured and recorded.
- (l) Short-Circuit Tests – ANAHEIM reserves the right to request short-circuit withstand tests at any time prior to the completion of final testing of the assembled unit at the contract price adder stated. If short-circuit withstand tests are performed, standard routine factory tests and all additional tests specified shall be repeated following the short-circuit tests. A transformer may be rejected by ANAHEIM if it has been materially altered or damaged by the tests so that tested tolerances are exceeded, or if the Manufacturer cannot prove that the transformer has not been adversely affected by the tests.

3.01.16 Partial discharge (PD) and radio influence voltage (RIV) tests shall be performed.

- (a) The PD tests shall be performed after all other electrical tests have been completed (except final core ground test).
- (b) PD and RIV measurements shall be made at each hold period and at five minute intervals during the one hour test. All sudden increases in PD levels other than momentary rises due to known external influences shall be recorded with respect to time, duration and level. The PD levels shall not exhibit any steady increasing trend during the one hour test
- (c) Maximum allowable RIV shall be 75 microvolts for the 1-hour test and 200 microvolts for the enhancement test.
- (d) Maximum allowable PD shall be 500 picocoulombs for the 1-hour test.

3.01.17 The cost for performing all tests mentioned above shall be included in unit cost price of the transformer.

### **3.02 SURGE ARRESTERS**

3.02.01 Station class surge arresters shall be provided and mounted immediately adjacent to the HV and LV bushings. The top terminal of the arrester shall be on the same level as the top terminal of the bushing to which it connects.

3.02.02 The surge arrestors shall have counters and analogue leakage current meters to count the surges occurred in a surge arrester and to measure the leakage current that flows through the surge arrester. The analogue shall meter provide a means of monitoring the current through the arrester and the leakage current over the surface of the housing.

3.02.03 Arresters shall be metal-oxide varistor (MOV) type. The arresters shall be on high side and low side to provide the insulation switching surge, full wave and chopping wave protective ratios recommended by IEEE. Surge arresters shall be ANSI #70 Sky Gray in color. Arresters shall be polymer-housed.

3.02.04 The surge arresters furnished on the transformer shall be solidly grounded through the shortest path directly to the ground grid. The grounding of surge arresters shall follow the methods recommended in IEEE Standard No. 80.

### **3.03 QUALITY ASSURANCE PROGRAM**

3.03.01 The Manufacturer shall have in effect at all times a documented QA/QC program which clearly establishes the authority and responsibility for the work and the QA/QC program. The program shall be capable of providing assurance that design, purchasing, manufacturing, shipping, storage, testing, and examination of all equipment, materials, and services shall comply with the requirements of project documents. The QA/QC documents shall be available for review by ANAHEIM upon request.

#### **(a) Photographs**

- (1) Three sets of 14 mega pixel digital and color photographs of each core and coil assembly shall be furnished with the instruction books. The photographs shall be taken just prior to placing the completed core and coil assembly into the tank. All photographs shall be 8 inch by 10 inch (200 mm by 250 mm) glossy prints labeled with the transformer

manufacturer's name and serial number. Five different views shall be provided as follows: top view, front view, left side view, right side view, and rear view.

- (2) The Manufacturer shall advise sufficiently in advance in order to witness, and conduct a pre-tank inspection.

(b) Loss Evaluation

- (1) The guaranteed transformer losses shall be stated as requested in this Specification and shall be at the reference temperature of 75° C and 85° C, respectively as specified in section 1.04.04. The reference temperature for the no load losses shall be 20° C.
- (2) The bids will be evaluated based on the cost of ownership to ANAHEIM for a period of thirty years based on the formula presented in Part 1 of this Specification.

**3.04 TRANSFORMER FIELD TESTING REQUIREMENTS**

3.04.01 All field testing will at the minimum, be in accordance with the latest revision of NETA Acceptance Testing Specifications for liquid filled transformers and the following tests and inspections.

3.04.02 The factory testing and field testing will serve as a benchmark for the maintenance data base and be compared to determine if there has been any damage to the transformer in shipment.

3.04.03 Testing Organization

- (a) The testing organization shall be an independent, third party entity which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment or systems being evaluated.
- (b) The testing organization shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.
- (c) The testing organization shall use technicians who are regularly employed for testing services.
- (d) An organization having a designation of "NETA Accredited Company" issued by the International Electrical Testing Association meets the above criteria.

3.04.04 Testing Personnel

- (a) Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make a judgment on the serviceability of the specific equipment.
- (b) Technicians shall be certified in accordance with ANSI/NETA ETT-2000, Standard for Certification of Electrical Testing Personnel. Each on-site crew leader shall hold a current certification, Level III or higher, in electrical testing.

3.04.05 Test Reports

- (a) The test report shall include the following:
  - (1) Summary of Project
  - (2) Description of equipment tested
  - (3) Description of tests
  - (4) Test data and electronic DTA test results
  - (5) Analysis and recommendations
  - (6) The test data records shall include all NETA recommended minimum requirements

- (7) The testing organization shall furnish copies of the complete report to the owner as specified.

### **3.05 VISUAL AND MECHANICAL INSPECTION**

- 3.05.01 Compare equipment nameplate data with drawings and specifications.
- 3.05.02 Inspect physical and mechanical condition.
- 3.05.03 Test dew point of tank gases.
- 3.05.04 Inspect impact recorder prior to unloading and document the results to SCCPA
- 3.05.05 Perform internal and external inspection:
- (a) An internal inspection shall be made for displacement of parts, broken or loose connections, loose blocking, core and coil movement, dirt or foreign materials, and the presence of water or moisture.
  - (b) Check oil level indication lever(s) (during internal inspection).
  - (c) Verify electrical connections are tight and no foreign objects in cavity (during internal inspection).
- 3.05.06 Inspect anchorage, alignment and grounding
- 3.05.07 Verify the presence of PCB content labeling.
- 3.05.08 Verify 100% of all wiring point to point using an Ohm meter. Wires must be consistent with the schematics and wiring diagrams. All wires and cables shall be labeled at each end of the wire. The labels for each conductor shall include both destination and designation information on each end. The destination information shall refer to the termination location of the opposite end of the conductor of which it is terminated.
- 3.05.09 Verify removal of any shipping bracing after placement.
- 3.05.10 Verify bushings are clean and undamaged and have correct liquid levels.
- 3.05.11 Verify that alarm, control, and trip settings on temperature and level indicators are as specified.
- 3.05.12 Verify operation of alarm, control, and trip circuits from temperature and level indicators, pressure relief device, gas accumulator, and fault pressure relay. Confirm all transformer alarms and indicating devices from actuating device on the transformer to Scada
- 3.05.13 Verify that cooling fans operate correctly and have appropriate overcurrent protection.
- 3.05.14 When completely assembled verify transformer is oil and gas tight with no leaks.
- 3.05.15 Verify the accuracy of the top oil temperature and winding temperature gauges using an oil bath or other approved device.
- 3.05.16 Test dielectric integrity of oil in tankers prior to insertion to transformers. (See electrical tests).
- 3.05.17 Verify connection of cables and proper functioning of the protecting and control accessories.
- 3.05.18 Verify the operation of the thermostat.
- 3.05.19 Verify proper functioning of the tap changer.
- 3.05.20 Perform inspections and mechanical tests as recommended by the manufacturer.
- 3.05.21 Verify de-energized tap changer is left as specified.
- 3.05.22 Verify output from monitoring package to SCADA and metering.
- 3.05.23 Record data per checklists

### **3.06 ELECTRICAL TESTS**

- 3.06.01 The Manufacturer shall use the Doble Test Assistant software using latest version and revision. The DTA Test data is to be obtained from the factory tests and compared. Nameplate information is to be

completely filled out on the DTA software as it is the intent of ANAHEIM to use this as the database.

- (a) Perform sweep frequency Response Test utilizing Doble M52-5400 test set. One test is to be performed in the shipped condition using the spark plug bushings prior to unloading. The second test in the fully assembled condition. Compare factory and field tests to identify any damage to the core during shipping.
- (b) Perform core ground test upon transformer arrival on car/truck and on pad
- (c) Perform turns-ratio test on all positions.
- (d) Perform insulation resistance tests, winding-to-winding and each winding to ground. Apply in accordance with manufacturer's published data. Calculate polarization index.
- (e) Perform Power Factor (Doble) tests on bushings, windings, and lightning arresters including C-1 and C-2 tests pursuant to IEEE STD C57.12.90 method II Section 10.10. The testing contractor will use the Doble Test Assistant software using the latest version and revision and compare with factory tests.
- (f) Perform Hot Collar Tests per Doble method.
- (g) Perform winding resistance of each high-voltage winding in each no-load tap changer position. Measure the resistance of each low-voltage winding on all taps.
- (h) Perform Doble high voltage TTR (@10kV) on all taps per Doble method.
- (i) If core strap is removable, remove and measure core insulation resistance at 500 volts dc.
- (j) Perform excitation current tests per Doble methodology on all taps
- (k) Perform three phase and single phase impedance testing per Doble method. (AKA leakage reactance test)
- (l) Current Transformer ratio, polarity and excitation measurements
- (m) Functional check of unit control cabinet.
- (n) Oil tests upon receipt from refinery, prior to filling of transformer and after filling of transformer. Transformer oil not passing the corrosive sulfur test is not acceptable.
  - (1) Dielectric Breakdown voltage: ASTM D 877
  - (2) Acid neutralization number: ASTM D 974
  - (3) Specific gravity: ASTM D 1298
  - (4) Interfacial Tension: ASTM D 971
  - (5) Color ASTM D 1500
  - (6) Visual Condition ASTM D 1524
  - (7) Moisture content ASTM D 1533
  - (8) Power factor ASTM D 924
  - (9) PCB
  - (10) Particle Count
  - (11) Corrosive Sulfur ASTM D 1275 B
  - (12) Dissolved gas analysis

### **3.07 CURRENT TRANSFORMERS**

3.07.01 The following testing is to be performed on current transformers located in the Transformer and copies of the results provide to Anaheim within 14 days of testing.

- (a) Test set must be a Vanguard EZCT-2000 digital current tester or newer.
- (b) Record and verify nameplate data.
- (c) Perform insulation resistance test.
- (d) Perform ratio test to confirm ratio of all taps. Verify all secondary taps by low-voltage tap progression.
- (e) Perform polarity test.
- (f) Perform saturation test. Plot log to saturation curves.
- (g) Perform Demagnetization: Always demagnetize CT's once testing is complete, and specifically following micro-ohmmeter (Ductor) and saturation tests.
- (h) SHORT and GROUND ALL UNUSED CT's using ring tongue lugged #10 jumpers (shorting screws are not acceptable).

3.07.02 Current circuit testing (applicable to all current circuits):

- (a) Verify make before break characteristics of all shorting switches and all relay current plugs.
- (b) Verify wire size is #10 (internal) and #8 (external), or larger is indicated on design prints.
- (c) Perform continuity testing (lamping) with a phase angle meter at all termination points.
- (d) Verify the correct current tap connection.
- (e) Measure DC resistance using a Wheatstone bridge of each isolated CT.
- (f) Measure burden.
- (g) Confirm single point grounding. Verify the presence of one and only one ground point on any relay circuit, in particular where multiple current transformers supply a single circuit.
- (h) Verify proper polarity of all elements (relay and metering) in the circuit.
- (i) Verify phasing and polarity of test switches and all relaying (functionally verify CT secondary circuit is correct per schematic).
- (j) Perform Thru-Fault Testing and Bus/Switchgear High Current Testing to inject current as a final test to verify correct ratio and polarity.
- (k) Verify magnitude and phase angle to known reference at all current points after livening.
- (l) Verify the continuity of all current circuits by passing current through individual circuits on a per phase basis, testing the current magnitude and phase angle in relay circuits and at test blocks.

**3.08 HIGH VOLTAGE BOLTED CONNECTIONS**

3.08.01 Perform resistance measurements through all bolted connections with a low-resistance ohmmeter.

**3.09 CABLES, LOW-VOLTAGE, 600-VOLT MAXIMUM**

3.09.01 Compare cable data with drawings and specifications.

3.09.02 Inspect exposed sections of cable for physical damage and correct connection in accordance with the single line diagram.

3.09.03 Verify tightness of terminal block electrical connections by calibrated torque-wrench.

3.09.04 Inspect compression-applied connectors for correct cable match and indentation.

3.09.05 Inspect for correct identification and arrangements.

3.09.06 Inspect cable jacket insulation and condition.

**3.10 PERFORM ELECTRICAL TESTING AFTER INITIAL ENERGIZATION:**

3.10.01 Verify voltage phasing at primary against a known source.

- 3.10.02 Verify voltage phasing at the secondary of bus potential transformers against a known source.
- 3.10.03 Perform in-service testing under load recording all voltage, current, and phase angle checks at all available locations (test switches, relay terminals, and solid-state relay event reports).
- 3.10.04 Take oil sample to perform Dissolved Gas Analysis (DGA) of oil after 24 hours of operation and every 7 days for the first six weeks.

**3.11    THERMOGRAPHIC SURVEY**

- 3.11.01 Perform thermographic survey when load is applied (maximum possible loading) to the system in accordance with NETA Acceptance Testing Specifications.
- 3.11.02 Remove all necessary covers prior to thermographic inspection. Use appropriate caution, safety devices, and personal protective devices.
- 3.11.03 Perform a follow-up thermographic survey within 12 months of final acceptance of the owner.
- 3.11.04 Provide a report which includes the recommended NETA requirements and recommended actions.



**SPECIFICATION NO. E-20**

**POWER TRANSFORMER**

**PART 4.00**

**4.01 DRAWINGS AND INFORMATION TO BE FURNISHED**

- 4.01.01 All drawings shall use English language. All dimensions and units of measurements shall be in US Standard units and shall conform to the latest revision of IEEE Standard Drafting Practices.
- 4.01.02 Drawing nomenclature and graphic symbols shall conform to ANAHEIM's standards or in the absence of an ANAHEIM standard, with the latest version of ANSI/IEEE standards. ANAHEIM may require the Manufacturer to submit a legend drawing showing all nomenclature and symbols used on the Manufacturer's drawings.

**4.02 DRAWINGS TO BE FURNISHED FOR APPROVAL**

- 4.02.01 See Attachment C.
- 4.02.02 Within twenty working days after their receipt, ANAHEIM will return to the Manufacturer, with or without comments, one set of the drawings furnished for review. Comments, if any, will be in writing.
- 4.02.03 The review of drawings may be waived by ANAHEIM.
- 4.02.04 The review or waiver of review of drawings shall in no way relieve the Manufacturer of its obligation to furnish Equipment in conformance with this Specification.

**4.03 FINAL DRAWINGS AND INSTRUCTION BOOKS AFTER APPROVAL**

- 4.03.01 See Attachment C.

**4.04 DRAWING AND FILE ACCEPTABLE FORMAT**

- 4.04.01 The drawings and information shall be made available in electronic file format on a CD. The drawings shall be drawn in the latest version AutoCAD. The text or data shall be transmitted in the latest version of Microsoft Word.
- 4.04.02 Paper brown lines or electrostatic photocopies will not be accepted.
- 4.04.03 All drawings shall be drafted on 24"X36" paper.
- 4.04.04 All outline drawings shall be drafted to scale.
- 4.04.05 For the purpose of establishing elapsed time between ANAHEIM's notification to the Manufacturer of award of Contract and the date by which drawings for review are to be furnished, ANAHEIM will consider the date of first oral or written notification of award of Contract. If the Manufacturer has any reason why such notification shall not constitute an award of the order, the Manufacturer shall state the conditions how the acceptance date is to be determined.
- 4.04.06 Any changes to these drawings during the construction of the transformer shall be forwarded to ANAHEIM for approval immediately.
- 4.04.07 The transmittal of all drawings for review shall be made directly to Public Utilities Department Electrical Engineering Division, Attn: Larry Davis and Robert Briggs, 7th Floor, 201 S. Anaheim Blvd., Anaheim, California 92805. ANAHEIM requires 30 days to review and approve and/or provide comments on any such submittals.

**4.05 MANUALS**

- 4.05.01 Manufacturer shall submit three (3) complete instruction manuals, including parts lists, for the transformers and all devices and equipment furnished with the transformers.
- 4.05.02 The manuals shall give complete and detailed instructions for erection, installation, operation, adjustment and maintenance.
- 4.05.03 Copies shall be submitted as specified in Attachment C.

4.05.04 Also, one instruction manual shall be located in a pocket attached to the inside of the control cabinet door.

#### **4.06     TEST REPORTS**

4.06.01 Manufacturer shall submit certified test reports for all specified tests.

4.06.02 Copies shall be submitted as specified in Attachment C.

#### **4.07     WARRANTY**

4.07.01 All equipment and material furnished in accordance with this specification shall be warranted against material and manufacturing defects for a period of five (5) years from date the equipment is initially energized. Manufacturer shall replace, free of all expense to ANAHEIM, any defective work during the warrantee period within thirty (30) days or within such reasonable time approved in writing by ANAHEIM.

4.07.02 The switchgear Manufacturer shall be responsible for the warranty of all components, assemblies and accessories regardless of who the manufacturer of the component material or equipment may be.

#### **4.08     INSPECTION AND TEST PLAN**

4.08.01 Manufacturer shall submit a detailed inspection and field testing plan that ANAHEIM or a contract inspector can use in inspecting and assembling the Equipment. This plan shall be detailed enough to ensure conformance to the Specification, design drawings, and appropriate national standards.

4.08.02 The inspection and test plan shall be in the form of a data checklist and shall include acceptance values.

4.08.03 The test plan and Equipment drawings are required by ANAHEIM within sixty (60) days after notice of award of Contract, allowing sufficient time for ANAHEIM concurrence and approval.

4.08.04 The plan shall include the following:

- (a) Inspection and test witness points during the manufacturing, assembly, and testing activities for the Equipment (including subcontracted components).
- (b) All inspection and test procedures including:
  - (1) Title of inspection or test procedure.
  - (2) Identification of Equipment being inspected or tested.
  - (3) Inspection or test objectives.
  - (4) Detailed listing of components to be inspected or tested of any IEEE, ASTM or other national standard test procedures used.
  - (5) Criteria for inspection or test acceptance and rejection.
  - (6) Test configuration.
  - (7) Description of testing facility.
  - (8) Test prerequisites.
  - (9) Authorities and responsibilities for conduct of tests and approval of test results.
  - (10) Description of test equipment.
  - (11) Listing of all data to be observed and recorded.

#### **4.09     DESIGN LIFE**

4.09.01 The Equipment shall be designed to have a life expectancy of at least 30 years and shall be designed for operation in an ambient temperature of 50°C maximum, 30°C average over a 24 hour period per IEEE Standards (unless noted differently on the Data Sheets).

4.09.02 All transformer parts shall be adequately sized, insulated and braced to meet the short circuit requirements of IEEE standard C57.12.00 latest revision and to withstand the short circuit test code as defined in IEEE Standard C57.12.90 latest revision.

#### **4.10 ACCEPTANCE**

4.10.01 Acceptance of the completed work, pursuant to General Conditions shall include, but not be limited to, conformance to the Purchase Contract and this Specification, receipt by ANAHEIM of all deliverable Documentation and all Material, Engineer's approval of Documentation, test reports, tests, phases of Work and demonstrated conformance with the requirements of the Specification.

#### **4.11 LIQUIDATED DAMAGES FOR DOCUMENTS**

4.11.01 For Manufacturer failure to meet schedule below , ANAHEIM will assess Liquidated Damages to the Manufacturer by the amount shown in the following table for each business day past the scheduled delivery date.

<b><u>Description</u></b>	<b><u>Liquidated Damages/Day</u></b>
Engineering Schedule	\$100
Production Schedule	\$100
Recommended Erecting Sequence In Detail	\$100
Specified number of Instruction Manual	\$100
Copies of Certified Test & Inspection Reports	\$100
Quality Assurance Manuals	\$100
Final Outline Drawings and Required Information	\$100
Final Skid & Anchorage Drawings	\$200
Current Transformer Curves	\$100
Heat Run Test	\$200
Ratio Test, Polarity Test, Other Tests	\$200
Seismic Foundation Calculation	\$100

4.11.02 Delays caused by having to resubmit drawings which have been returned unapproved due to excessive errors, shall not constitute grounds for an extension of the time limits allowed in Attachment C. Liquidated damages are assessed as an incentive to prompt delivery of drawings and equipment.

## **ATTACHMENT "A"**

### **Clarification to Technical Specifications**

1. Sudden Pressure Relay – If the lead from the device is not continuous a junction box having an approved terminal block may be used to terminate the lead; however, the maximum length of the lead shall not exceed 24 inches.
2. With the exception of the sudden pressure rise relay, all control devices and all abnormal condition signaling devices shall provide at least two (2) electrically separate switches. The rapid pressure rise relay shall be furnished with three (3) electrically separate switches. Each switch shall be single-pole, double-throw suitable for 136-volt dc operation. All contact terminals shall be wired to control cabinet terminal blocks. One (1) switch of each abnormal condition sensing device shall be used for the transformer monitoring device when specified. The remaining switches shall be for use by others.
3. Independent dial type, top oil and winding temperature gauges shall be included regardless of other monitoring or control devices. The dial type, top oil and winding temperature gauges shall have analog contacts and wired in parallel with the monitoring system, providing fully redundant cooling control and alarm systems.
4. All wires shall be tinned copper.
5. Corrosion resistant, stainless steel or brass (no plastic), plug-type, threaded, water tight connectors shall be used at the cooling fans and all other locations.
6. The use of plastic tie-wraps on the inside and outside of the transformers is not acceptable.
7. Inspection and test plans together with approval drawings must be submitted per Proposal submittal and as revised.
8. Conduit connections shall be made either at the bottom or sides of terminal boxes. Conduits shall not have bends. Conduits with gasket covers shall be used at bends.
9. Terminal blocks – only approved terminal blocks as listed in this Specification will be accepted.
10. Temperature Indicators – The liquid temperature indicator shall cover a range 0°C to 160°C. The winding hot spot temperature indicator shall cover a range of 0°C to 220°C.
11. Valves – The 2" vacuum valve must be within two to three inches from the top edge of the tank wall.
12. Valves – Each drain valve near ground level shall have a mechanical shield to prevent damage to the valve. Removable shields are acceptable.

**ATTACHMENT "B"****Transformer - Technical Requirements****Performance and Design Requirements****Applicable Standards:** IEEE C57 Series and All Reference Documents**Ratings**

MVA Rating at 55°C		Rated Voltage (kV)	Line BIL (kV)	Neutral BIL (kV)	Connection
High Voltage, HV	30/40/50	69	350		Delta
Low Voltage, XV	30/40/50	12.470	110	110	Wye Solid Ground
Frequency:	60 Hz		Application:	Outdoor	
Number of Phases:	3		Transformer Type:	Step-down, Two Windings	
Cooling Class:	ONAN/ONAF/ONAF		Winding Material:	100% Copper	
Phase Rotation:	A-C-B, counter-clockwise				
Vector Group:	LV leads HV by 30°		Altitude for Design:	Below 3300 ft (1000 m)	
Temperature Rise:	55°C/65°C				
Ambient Temperature for Design:			30° C Average/50°C Maximum for any 24 hour period		
Max Winding Hot Spot Rise: 70°/80°C					
Oil Preservation System:			Per ANAHEIM Specification E-20B		
Seismic Ground Acceleration Level:			Seismic Zone 4 - High Severity  1.2g horizontal, 0.9 vertical acceleration (per IEEE 693)		
Audible Sound at Maximum MVA (dBA):			74 DbA @ tap (position or positions with the highest sound level)		

**Impedances**

Windings	Impedance (%)
H-X	10.0 @ 30 MVA, 55°C

**Tap Changers**

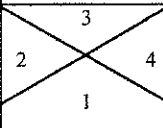
Regulated Winding	Type	Tap Changer Control	Number of Steps		Total %	Total %
			Plus	Minus	Above	Below
					Rated kV	Rated kV
High Voltage, HV	De-Energized	Manual Hand Crank	2	2	5	5
Low Voltage	Energized	Automatic	16	16	10	10

**High Voltage Taps**      **2 taps above at 72.45KV and 70.73KV**  
**2 taps below 67.3KV and 65.55KV**  
**69,000 Volts Center Tap**

**Low Voltage Taps**      **16 taps above +/- 10% approximately**  
**16 taps below +/- 10% approximately**  
**12.470 Volts Center Tap**

## Transformer - Technical Requirements (Continued)

### Bushings

				Cable Termination		Segment
	BIL (kV)	Termination Compartment?	Termination Flange?	Termination Type		
HV	350	No	No	Cable to bushing stud	Top of tank	3
X0	150	No	No	Cable to bushing stud	Top of tank	1
XV	150	No	No	Cable to bushing stud	Top of tank	1
The Physical Arrangement and Terminal Identification Shall Be X0-X1-X2-X3 from Left to Right When Facing XV Side, and H1-H2-H3 from Right to Left When Facing HV Side. XO bushing shall be interchangeable and identical with line bushings						

Connection Point	Method	Ohms	Amperes	KV	Time Duration	Mounted on Transformer?
X0	Solid	N/A	N/A	N/A	N/A	yes

Current Transformers; Continuous Thermal Current Rating Factor on all CT's Shall be 2. Manufacture shall be Meramec

Location	Ratio*	Accuracy Class	Position on Bushing	Quantity per Bushing	Total
HV bushings	600:5 MR	C800		1	3
X0 Bushing	1200:5 MR	C800		1	1
LV Bushing	3000:5 MR	C800		1	3
B Phase	4000:5 MR	C800		1	1

### Paint System and Colors

Tank and Accessories Color:

ANSI 70, Gray

Painting System:

Manufacturer's Standard

Color:

All exposed parts

### Power Supplies

	Nominal Voltage	No. of Sources
Auxiliary Power	208/240V Three Phase	2
Control DC	136V	1
Control AC	120V Single Phase	
Convenience Outlet	120V Single Phase	

Note: Provide stud connector for all the bushings

## ATTACHMENT "C"

### Schedule of Submittals

The following documents or notices shall be required as deliverables per below schedule:

Submittal Item (to be received no later than...)	Calendar Days	Event/Date	Liquidated Damages Apply
<b><u>General Submittals</u></b>			
<b>16151 - Power Transformers Submittals:</b>			
Engineering Schedule	15 After	Contract Award	<input checked="" type="checkbox"/>
Production Schedule	30 After	Contract Award	<input checked="" type="checkbox"/>
Shipping Schedule	30 After	Contract Award	<input checked="" type="checkbox"/>
Complete Bill of Materials	30 After	Contract Award	<input checked="" type="checkbox"/>
Material Safety Data Sheets	45 After	Contract Award	<input type="checkbox"/>
Shipping Notice	15 Before	Shipment	<input checked="" type="checkbox"/>
Notice of Pre-Shipment	5 Before	Shipment	<input checked="" type="checkbox"/>
Notice of Revision or Termination of Insurance Policies	30 Before	Effective Date of Revision or Termination	<input type="checkbox"/>
Information and Estimated Delay Related to Labor Dispute	5 After	Occurrence of Dispute	<input type="checkbox"/>
Estimated Force Majeure Delay	5 After	Commencement of Force Majeure Event	<input type="checkbox"/>
Recommended Erection Sequence in Detail	120 Before	Shipment	<input checked="" type="checkbox"/>
Certificates of Warranty	0 Upon	Shipment	<input type="checkbox"/>
Proof Copy of Instruction Manuals	90 Before	Shipment of Equipment	<input checked="" type="checkbox"/>
Specified Number of Instruction Manuals	14 Before	Shipment of Equipment	<input checked="" type="checkbox"/>
Notice of Factory Inspection and Test Plan	60 After	Contract Award	<input type="checkbox"/>
Insurance Certificates	30 After	Effective Date of Agreement	<input type="checkbox"/>
Copies of Certified Test and Inspection Reports	14 After	Test or Inspection	<input checked="" type="checkbox"/>
Quality Assurance Manuals	30 After	Contract Award	<input checked="" type="checkbox"/>
Final Outline Drawing Containing the Following as a Minimum:	30 After	Contract Award	<input checked="" type="checkbox"/>
- Weights			
- Locations of major equipment			
- Overall Dimensions			
- Oil Volume			
- Iso-Phase Flange Details			
Final Skid Drawing Anchoring Drawings	60 After	Contract Award	<input checked="" type="checkbox"/>
Schematic & Physical Wiring Diagrams	60 After	Contract Award	<input type="checkbox"/>
Nameplate Drawings	60 After	Contract Award	<input checked="" type="checkbox"/>
Design Data & Transformer Performance Curves	30	Prior to shipment	<input checked="" type="checkbox"/>
Including:			
- Over excitation Capability (% vs. time)			
- MVA Capability vs. Average Ambient Temperature			
- I <sup>2</sup> t Damage Curves			
Current Transformer Curves	30	Prior to shipment	<input checked="" type="checkbox"/>
Typical Short-Circuit Withstand Type Data	30 After	Contract Award	<input checked="" type="checkbox"/>
Heat Run Test	30	Prior to shipment	<input checked="" type="checkbox"/>
Ratio Test, Polarity Test and other tests	30	Prior to shipment	<input checked="" type="checkbox"/>
Seismic Foundation Calculations	60 After	Contract Award	<input checked="" type="checkbox"/>



City of Anaheim  
**FINANCE**  
Purchasing

**ADDENDUM #1: March 29, 2013**

**BID # 7894-POWER TRANSFORMER: 3-PHASE: w/LOAD-TAP-CHANGER: (Spec E-20)**

**THE CITY HAS ISSUED IMPORTANT CHANGES TO THIS BID, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:**

1. **A contractor's license is NOT required.** The previous specification for an A or C10 license has been eliminated. The transformer supplier will perform delivery, off-loading, site assembly, field-testing and start-up only. The City or other contractors will perform any site preparation that may be needed.
2. **The Purchase and Sale Agreement has been revised.** Changes include; removing references to installation, addition of a payment schedule, removal of the termination for convenience clause, revisions to the liquidated damages sections, and corrections of typographical errors.
3. **Specification E-20 and the other bid documents have been updated to be consistent with the changes mentioned above.**
4. **Requests for exceptions:** Any requests for exceptions to the City's specifications, terms or conditions, must be submitted in writing no later than **5:00 PM, April 10, 2013**, using the Q & A tab in the online bid system. Please attach a file to your request, citing the document, page number, paragraph number, include the original text, and underneath that include the requested change. Bidders must provide all information necessary to enable the City to review and respond to the request for exception. Failure to submit the information as aforementioned may disqualify the request from further consideration. **PLEASE NOTE:** Requests for substantive changes to the City specifications, terms and conditions may be denied, and any bids received with changes that have not been pre-approved, may be deemed non-responsive by the City and not considered for further evaluation or award.
5. **Critical dates have been revised:**
  - a. Final date for bid questions and/or requests for exception to specs, terms or conditions is now **April 10, 2013 by 5:00 PM, PDT.**
  - b. The City will attempt to respond to any questions or requests for exceptions which are received by the above deadline by issuing an addendum **on or about 5:00 pm April 17, 2013.**
  - c. The final due date for all electronic bids is now **2:00 pm April 24, 2013.**

**This addendum answers all bidders questions submitted to date. All bidders are requested to review and download the updated bid documents before preparing and submitting their bids.**

There are no other changes, additions, or deletions by issuance of this addendum.

**IMPORTANT:** If you have submitted a bid before this addendum was issued, your bid will be invalidated. After you have reviewed the addendum, your pricing, you must resubmit your bid acknowledging receipt of this addendum.

  
Neil Groom, Buyer II

3-29-13

DATE





City of Anaheim  
**FINANCE**  
Purchasing

**ADDENDUM #2: April 8, 2013**

**BID # 7894-POWER TRANSFORMER: 3-PHASE: w/LOAD-TAP-CHANGER: (Spec E-20)**

**THE CITY HAS ISSUED IMPORTANT CHANGES TO THIS REQUEST FOR BIDS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:**

**Answers to Questions posted online (like questions may be consolidated):**

1. *In E20-Spec.docx, page 27, section 3.16.02 low voltage tap changer it states: The transformer shall have a full capacity load tap changer conforming to IEEE C57.12.10 section 6 suitable for full current operation through all taps at 44.8MVA @ 65 degrees C. We believe this is a typo and should read "the maximum MVA will be 56MVA @ 65 degrees C." The current LV will be 2881. The spec requests RMV II 2500, but RMV II 2000 can meet the requirement and we recommend using this instead of RMV II 2500. Please confirm if this is acceptable.*

**ANSWER:** The specification in section 3.16.02 now reads 56 MVA @ 65 degrees C. We require the RMV II 2500 to meet this load requirement.

2. *We would like to design the transformer with the RMV II 2000 along with a series transformer to reduce the current, which would allow the RMV II 2000 to meet the requirement. Will this be acceptable to the City of Anaheim?*

**Answer:** No. The RMV II 2000 would not meet the load requirement of the transformer at 56 MVA.

3. *Please confirm whether installation is required for this project. Also, are there any size requirements, such as a pad that exists?*

**Answer:** No, installation is not required; however, assembly of the transformer and field testing is included in the RFB. The new transformer will be offloaded at the time of delivery and be set in place on a new foundation, which City will have installed prior to the delivery of the new transformer based on the new transformer's size and weight.

4. *We would like to request an extension to ask bid questions and/or requests for exception to specs, terms or conditions to at least April 15, 2013.*

**Answer:** Keep in mind that City is attempting to respond to questions or requests for exceptions by April 17, 2013 to allow prospective bidders enough time finalize and submit their bids by the bid deadline of 2:00 pm, April 24, 2013. The Q&A deadline is extended to 2:00 pm, April 15, 2013.

5. *Request for Bid #7894, Section D.2.A, Packaging and Delivery, Page 3 of 6. Bid calls for delivery no later than Dec 14, 2014. Considering that the proposal will be submitted April 24, 2013 and City of Anaheim will take approximately 90 days, PO should be received by late July, 2013. Based on that, we are looking on a delivery cycle of 72 weeks, approximately, which is above current industry practices. Would the City accept bids who propose an earlier delivery? What would be the earliest delivery the City of Anaheim could handle?*

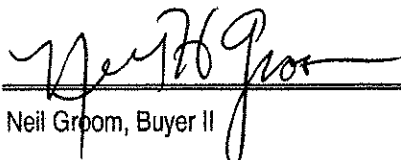
**Answer:** The City is unable to take the existing transformer out of service during the summer months. We then have to remove the existing foundation and pour a new foundation including oil containment. This is the reason for the December delivery. However, the transformer can be delivered to the job site any time as long as it has heaters installed and placed on temporary mats. The warranty period would not change and would be five years from completion of testing on the new transformer foundation. City will not pay any additional charges for accommodating an early delivery and Payment Schedule would still apply.

6. *Specification E-20, Item 1.04.02, Instructions to Bidders, Page 3 of 44. Please refer to the calculation of NLC and LLC. According to the instructions on the top of the referred page, NLC and LLC are calculated as follows:  $NLC = (\text{No load losses}) * (8760\text{HR/YR}) * (0.0402)$ ;  $LLC = (\text{Load Losses}) * (8760\text{HR/YR}) * (0.0402) * (0.5288)$ ; My question is: do I need to multiply the 8760 hours per the total of years of operation (30), in order to find the correct \$ charge per kW? My interpretation is that we do need to multiply by 30, therefore, the No load losses and Load losses would be multiplied, respectively.. Will LLC be calculated based on losses at base rating (30MVA) or full rating (56MVA) and in what tap position?*

**Answer:** The No Load Losses and the Load losses are calculated for 30 years at the 30MVA base rating in the neutral tap position. You need to report the actual losses and we will do the calculations.

There are no other changes, additions, or deletions by issuance of this addendum.

**IMPORTANT:** If you have submitted a bid before this addendum was issued, your bid will be invalidated. After you have reviewed the addendum, your pricing, you must resubmit your bid acknowledging receipt of this addendum.

  
\_\_\_\_\_  
Neil Groom, Buyer II

4-9-13  
\_\_\_\_\_  
DATE



**ADDENDUM #4: April 26, 2013**

**BID # 7894-POWER TRANSFORMER: 3-PHASE: w/LOAD-TAP-CHANGER: (Spec E-20)**

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**THE CITY HAS ISSUED IMPORTANT CHANGES TO THIS REQUEST FOR BIDS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:**

**Answers to Questions posted online (like questions may be consolidated):**

1. *Question: Can the City of Anaheim supply the Agreement for Purchase and Sale of Equipment file as a Word document?*

**ANSWER:** No. This document is in PDF format to help ensure its integrity.

2. *Question: Regarding page 27 - if the emergency overload switch current is less than 1500 amps, can supplier quote a 1500 amp RMV-II load tap changer? Because this particular transformer is rated at 56mva, LV at 12470 Y volts with full mVA capacity at tap 16L- rated current is 2881Amps. So with emergency overload of 133% we need to add a series transformer to reduce the switch current. With the series transformer, the switch current will be under 1000Amps.*

**ANSWER:** The tap changer is to be the Reinhausen RMV-II-2500 without a series transformer.

3. *Question: Is the intent of the specification on page 12, section 3.04.09.d to require paper overwrap of CTC cables for helical windings or just for disc type windings? Our standard practice for disc windings is to have thermally upgraded paper wrapping on the conductors. However, the low voltage winding is a very high current application and a disc winding is not applicable. We will use a helical winding per section 3.04.09.c The helical winding has each turn separated by thermally upgraded cellulose spacers. The LV conductor is CTC where the cable strands have enamel insulation and there is no paper covering. The insulation between turns is provided by the thermally upgraded spacers. Insulating the CTC cable with paper for helical windings would greatly increase the space required for the LV winding with increases in losses, size and cost. Therefore paper insulation on the CTC cables for helical windings would not be a very efficient design and is not a standard practice.*

**Answer:** Insulation on all conductors whether primary or secondary are to have Kraft cellulose insulating paper wound on the conductor employing a spinning process. The paper insulation shall be applied in single or multiple strands such that a minimum of 30% of the paper surfaces are overlapped.

4. *Please find attached Bidder's Requests for Exceptions, set forth pursuant to Addendum #1, item 4.*

**Please see answers to all Agreement related questions below:**

- A. Reference Agreement for the Purchase and Sale of Equipment, Page 12, Section 7, part 7.3.2, subpart (b). In (i), last sentence, insert the word "to" between the words "respect" and "the".

**Answer:** Approved

- B. Reference Agreement for the Purchase and Sale of Equipment, Page 31. Delete the word "Consultant's" and replace with the word "Seller's". Add a space between the letter "a" and the word "corporation" in the "Type of Entity" line.

**Answer:** Approved

- C. Reference Agreement for the Purchase and Sale of Equipment, Page 6, Section 4, part 4.1. Bidder does not operate such a QA/QC Program at this time. However, Seller is ISO:9001 Certified, and can supply evidence thereof.

**Answer:** Approved so long as Seller is able to demonstrate to the Buyer's reasonable satisfaction that the ISO:9001 Certification is a comparable program to the QA/QC Program.

- D. Reference Agreement for the Purchase and Sale of Equipment, Page 7, Section 4, part 4.5. Add the following sentence to the end of the paragraph: "Seller's obligations under this paragraph are subject to the limitations on warranty coverage described in Seller's warranty, and set forth in Section 9, Warranty."

**Answer:** Denied – City requires that all Bidder's abide by City's warranty requirements to ensure continuity of warranty for all bids and for bid evaluation purposes.

- E. Reference Agreement for the Purchase and Sale of Equipment, Page 8, Section 6, part 6.3. In the sentence following the table of liquidated damages beginning with the words "Notwithstanding the foregoing," delete the words "fifty thousand dollars (\$50,000)" and replace with "five percent (5%) of the price of the purchase price for such Transformer."

**Answer:** Denied – we require a specific dollar amount and not a percentage for total liquidated damages. There is very little difference between the \$50,000 and 5%.

- F. Reference Agreement for the Purchase and Sale of Equipment, Page 9, Section 6, part 6.4. In the table of liquidated damages, delete each of the dollar figures in the "Liquidated Damages per Day" column and replace each, respectively, with \$200. In the sentence following the table of liquidated damages beginning with the words "Notwithstanding the foregoing," delete the words "twenty percent (20%)" and replace with "five percent (5%) of the purchase price for such Transformer." Add a period at the end of the last sentence.

**Answer:** Denied – the standard lead time on this product is 9 months and we are allowing 18 months for delivery. Due to loading requirements, we cannot take this transformer out of service except for a very limited period of time. Any delay in delivery of the transformer will have substantial impact on the operation of the electric system. 5% would not adequately reimburse the COA for the cost associated with making a corrective fix. Approval only to add a period at the end of the last sentence of Section 6.4.

- G. Reference Agreement for the Purchase and Sale of Equipment, Page 16, Section 9, part 9.1.3. Following the sentence ending with the words "take all actions necessary to cure such failure," insert a new sentence as follows: "The choice of the method and extent of repairs to be made is within the reasonable discretion of the Seller." Add a new section at the end of the existing paragraph as follows:

- 1) During the warranty period, prior to the expiration, the warranty is conditional upon the customer notifying Seller of any claim related within sixty (60) days of when the customer knew or should have known of such a claim.
- 2) During the first twelve (12) months following shipment, this warranty covers removal and re-installation charges for the transformer to a maximum amount of five percent (5%) of the transformer's price. Purchaser shall provide clear access to the transformer for truck and cranes, and costs resulting from the moving of structures and/or associated equipment, and those in excess of five percent (5%) of the transformer's price, are the responsibility of the purchaser.

**Answer:** Denied – it is the sellers full responsibility to pay all cost associated with the warranty repair and not to be limited to 5% of the transformer purchase price.

- H. Reference Agreement for the Purchase and Sale of Equipment, Pages 16-17, Section 9, part 9.1.3. Add to the end of the paragraph the following sentence: "Seller's obligations under this Section 9.1.3 are not to exceed a cumulative maximum of ten percent (10%) of the price of the Transformer. Purchaser shall be responsible to provide clear access to the Transformer requiring warranty correction work under this Section 9, at its own expense."

**Answer:** Denied – it is the sellers responsibility to cover all cost associated with the transformer warranty and not limited to 10% of the transformer purchase price  
City will provide clear access to the transformer for warranty repairs.

- I. Reference Agreement for the Purchase and Sale of Equipment, Page 17, Section 9, part 9.1.5. Add to the list of warranty exclusions the following item as follows: "vandalism,".

**Answer:** Approved

- J. Reference Agreement for the Purchase and Sale of Equipment, Page 18, Section 11, part 11.1. Insert the following phrases into the list of items constituting a Force Majeure event in the sentence beginning "For Purposes of Section 11.1(a)":

- 1) shortage of, or inability to obtain, raw materials, supplies, equipment, fuel, power, labor or other operational necessities; interruption or curtailment of power or other energy or fuel supply.
- 2) In the sentence beginning "In no instance will the following be considered events beyond the Seller's control" add the words "reasonably foreseeable" between the "(1)" and the word "strikes."

**Answer:** Denied – the very reasonable lead time on the transformer should allow any seller to recover delays in materials or labor issues.

- K. Reference Agreement for the Purchase and Sale of Equipment, Page 21, Section 14, part 14.2.1. Strike subpart (a) in full.

**~~(a) if either (1) the delivery of the Transformer is delayed by more than sixty (60) days beyond its Guaranteed Delivery Date;~~**

**Answer:** Denied – the very reasonable lead time on the transformer should not be an issue. This transformer has a very limited time interval for replacement and delays would have a significant impact to the electric system.

- L. Reference Agreement for the Purchase and Sale of Equipment, Page 23, Section 14, part 14.3. Add a new part 14.3.3, Purchaser's Termination for Convenience, as follows.

**REQUESTED CHANGE**

Purchaser's Termination for Convenience.

(A) By giving Seller at least ten (10) days prior notice designating the early termination date, Purchaser shall have the right to terminate the Agreement for convenience and without cause at any time, subject to the following schedule of cancellation fees:

NUMBER OF DAYS NOTICE IS RECEIVED PRIOR TO SCHEDULED SHIP DATE IDENTIFIED IN PURCHASE ORDER..... CANCELLATION CHARGE

<u>30 - 59 DAYS.....</u>	<u>100% (PURCHASE ORDER)</u>
<u>60 - 89 DAYS.....</u>	<u>50%</u>
<u>90 - 119 DAYS.....</u>	<u>35%</u>
<u>120 - 149 DAYS.....</u>	<u>25%</u>
<u>150 - 179 DAYS.....</u>	<u>15%</u>
<u>After Seller's Acknowledgment of Purchase Order.....</u>	<u>10%</u>

The ship date is that date set forth in a Purchase Order issued by Purchaser and acknowledged by Seller. In event of disagreement over Ship Date, Seller's acknowledgement date will be the Ship Date.

(B) Upon receipt of Purchaser's termination notice for termination for convenience, Seller shall promptly stop performing the work and bring the work to an orderly conclusion. Purchaser shall complete the payments for the time and material costs incurred prior to Seller's receipt of notice of termination. Purchaser, at its option, may take possession of any portion of the work paid for in full by Purchaser.

**Answer:** The Termination for Convenience were deleted in their entirety per addendum #1.

- M. Reference Agreement for the Purchase and Sale of Equipment, Page 28, Section 20, part 20.2. Delete "twenty-five percent (25%)" and replace with "five percent (5%)".

**Answer:** Denied -- this is a very critical transformer for the COA with a very reasonable lead time. Reducing the cap on liquidated damages would not compensate the COA for the cost it would incur to correct the issues identified in the liquidated damage section.

- N. Reference Agreement for the Purchase and Sale of Equipment, Page 32, Appendix A.

ORIGINAL	REQUESTED CHANGE
<b>PAYMENT SCHEDULE</b>	<b>PAYMENT SCHEDULE</b>
Released upon delivery to site 60%	Released upon delivery to site <del>90</del> 60%
Released after completion of field testing 30%	<del>Released after completion of field testing 30%</del>
Released after completion of punch list and final drawing approval 10%	Released after completion of punch list and final drawing approval 10%
All payments are due net 30 days from date of invoice	All payments are due net 30 days from date of invoice

**Answer:** Denied -- field testing is extremely important and would reveal any damages associated with shipping, manufacturing, etc. Field testing can be coordinated to occur within 30 calendar days after delivery to the site and dressing of the transformer. This would not have a significant financial impact on the seller of the transformer.

5. **Question:**  
Section 3.04.13A – We are taking exception to GE CR151B terminal board; We are proposing a Marathon Board provided by Reinhausen.

**Answer:** Approved

6. **Question:** Section 3.04.15L – We are taking exception to a 3 stage N2 System. We cannot find an OEM to provide the number of contacts requested. HI is proposing a 2 Stage N2 System.

**Answer:** Approved

7. **Question:**  
Section 3.13.07 – We are taking exception as all equipment is not available to meet the 60 degree C requirements.

**ANSWER:** Approved with highest thermal rated equipment

8. **Question:** Please confirm the RISE Temperature required (55°C) and the maximum temperature on site condition, 50°C. These values are high and will affect the final price of the transformer. According to ANSI, for RISE 65°C, the maximum design temperature is 40°C.

**ANSWER:** Temperature Rise

- (a) The average winding temperature rise at any tap position and at maximum rated MVA shall not exceed 65°C when measured by the resistance method.

- (b) The hot spot temperature rise shall not exceed 70°C at the maximum rated MVA and an ambient temperature of 40°C.
- (c) The hot spot temperature at any tap position and at maximum rated MVA shall not exceed 120°C at a maximum ambient temperature of 40°C specified.

9. Question: Please clarify if each kW of NLL will be evaluated at \$352 or \$10,565. Also, please clarify if the LL will be evaluated at \$187 or \$5,586.

ANSWER: No load losses will be evaluated at \$10,565 per kW. Load losses will be evaluated at \$5,586 per kW.

10. Question: Are the LL going to be evaluated on ONAN (30MVA) base or ONAF II (50MVA or 56MVA) base?

ANSWER: 30MVA base

11. I have a spec dated 3-29-13 received with Addendum 1. If there are newer documents for Addendum 2, please update.

ANSWER: There are no newer documents at this time. Addendum 1 issued on 03-29-13 had revisions to documents that were preceded by Rev-1. If City issues any subsequent document revisions, then the prefix will be changed accordingly.

12. Question: Request for Exception to Accessory, Spec. E-20, 3.04.16 (b) (1)

Specified- ABB relay model No. 4432A95G02

Proposed- Sudden Pressure Relay ABB model 8524A42G01 Contacted ABB directly, and were not familiar with model No. 4432A95G02. ABB recommended Sudden Pressure Relay ABB model 8524A42G01 as an alternative.

ANSWER: Approved

13. Question: Request for Exception to Spec. E-20, 3.16.02 (a)

Specified- Reinhausen type RMV-II-2500 LTC.

Proposed- Reinhausen type RMV-II-1500 LTC combined with Series Transformer.

The Reinhausen type RMV-II-2500 LTC is insufficient to accomplish all requirements of load and emergency overload of this transformer. We propose the use of a series transformer, which is necessary in order to reduce the current to the LTC. In addition, it allows the use of an LTC RMV-II of smaller capacity, such as the Reinhausen type RMV-II-1500.

ANSWER: No – The RMV-II-2500 LTC is capable of handling 2500 amps with a 20% continuous overload capability and a 50% 4 hour overload capability which meets our requirement. We are sticking with the RMV-II-2500.

14. Question: Request for Exception to Accessory, Spec. E-20, 3.14.02 (b)

Specified- Dossert type SCB300-3/4F-4NF-T12-AG-F stud connectors.

Proposed- DELTA PM59C12 & PM60C12 stud connectors.

Dossert type stud connectors are aluminum alloy. We do not use these with our transformers. We propose the use of DELTA type stud connectors, which are copper alloy, our preferred alternative.

ANSWER: Approved

There are no other changes, additions, or deletions by issuance of this addendum.

**IMPORTANT:** If you have submitted a bid before this addendum was issued, your bid will be invalidated. After you have reviewed the addendum, your pricing, you must resubmit your bid acknowledging receipt of this addendum.

## **APPENDIX D**

### **INDEMNIFICATION**

(for Hannum Substation transformer purchase Agreement)

#### **12. INDEMNIFICATION**

12.1 To the fullest extent permitted by law, Seller agrees to indemnify, defend (at Purchaser's option), and hold harmless Purchaser, its officials, officers, employees, agents, and representatives from and against any and all claims, losses, damages, defense costs, or liability from damage to property or from injury to, or death of, any person (including but not limited to Personnel of Purchaser), of any kind or nature (collectively referred to hereinafter as "Claims"), arising out of or in connection with Seller's (or Seller's contractors' or subcontractors', if any) (i) acts, errors, or omissions, (ii) performance or failure to perform, (iii) goods or services provided, or (iv) work performed by, or on behalf of, Seller, relative to this Agreement; except to the extent that such Claims arise out of the active negligence or wilful misconduct of Purchaser.

12.2 Further, to the fullest extent permitted by law, Seller agrees to indemnify, defend (at Purchaser's option), and hold harmless Purchaser, its officials, officers, employees, agents, and representatives from and against any and all claims, losses, damages, defense costs, or liability from (i) Seller's breach of contract with any of its Suppliers, (ii) the release of any hazardous materials or substances that results from the fault, negligent act or omission, or willful misconduct of Seller, its Suppliers, and their Personnel, (iii) any liens or claims of lien against Purchaser, officials, officers, employees, agents, and representatives by any Supplier, (iv) any demand, claim or legal action based on a claim that the Equipment or any portion thereof infringes any patent, copyright or trademark or constitutes an unauthorized disclosure of any trade secret or other violation of proprietary intellectual property rights, (v) the violation of any Applicable Laws or Applicable Permits by Seller or its Personnel, and (g) any taxes, duties or other governmental charges for which Seller is responsible under Section 2.3.

12.3 The obligations set forth in this indemnification provision (i) shall be in effect without regard to whether or not Purchaser, Seller, or any other person maintains, or fails to maintain, insurance coverage, or a self-insurance program, for any such Claims (as set forth in Section 12.1) or any such claims, demands or losses (as set forth in Section 12.2); and (ii) shall survive the termination of this Agreement.



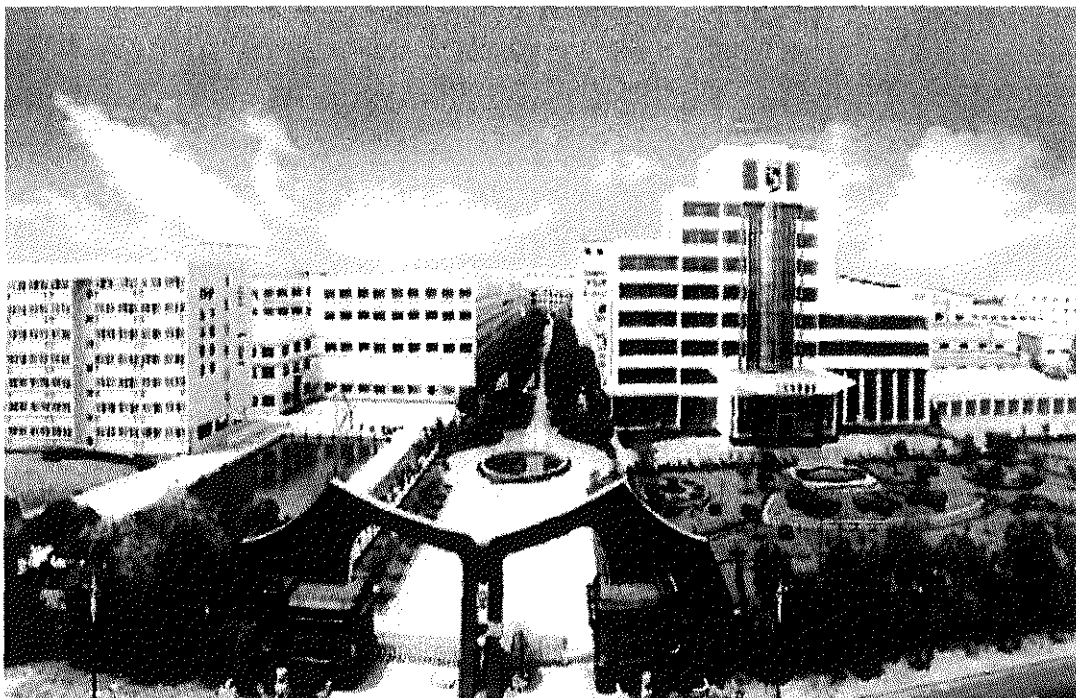
**APPENDIX E**

**BIDDER'S RESPONSE**

**[ATTACHED BEHIND THIS PAGE]**

**Proposal**  
for  
**CITY OF ANAHEIM**

RFB NO.: 7894



**POWER TRANSFORMER: THREE-PHASE: with LOAD-TAP-CHANGER:**  
**69KV-12.47KV, 30/40/50 MVA (33.6/44.8/56 MVA @65° rise)**  
**per SPEC E-20**

May 6th, 2013

# Doubletree Systems Inc.

Date: May 07, 2013

To: Mr. Neil Groom  
City of Anaheim  
Tel: 714-765-5207

Subject: Subject: Proposal per RFP No.: RFB # 7894 SPEC E-20

Dear Mr. Neil Groom,

In accordance with your Solicitation referenced above, Doubletree Systems, Inc. appreciates the opportunity to provide this quotation as per technical specification. We confirm that our proposal is based on the requirements specified by the above mentioned Solicitation without any exception.

JSHP Transformer is Top1 transformer manufacturers in China. JSHP has more than a hundred of units in USA & Canada.

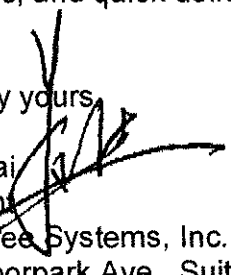
Doubletree Systems, Inc. is JSHP's distributor for USA & Canada.

Included in this proposal:

- Part 1 Bushing and outline drawings
- Part 2 Product performance requirement and Technical Data sheet
- Part 3 Spare parts list
- Part 4 Production schedule
- Part 5 Non-collusion affidavit
- Part 6 Client reference list
- Part 7 JSHP Reference in North America
- Part 8 5 years warranty
- Part 9 Certificates
- Part 10 JSHP Introduction

Again, thank you for this opportunity. I look forward to proving our high quality, economic, and quick delivery solution for these quoted conductors.

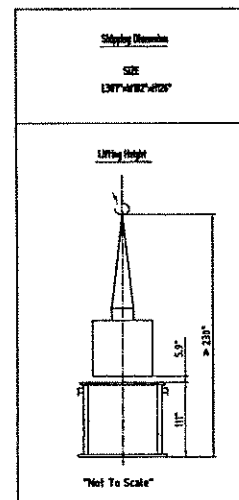
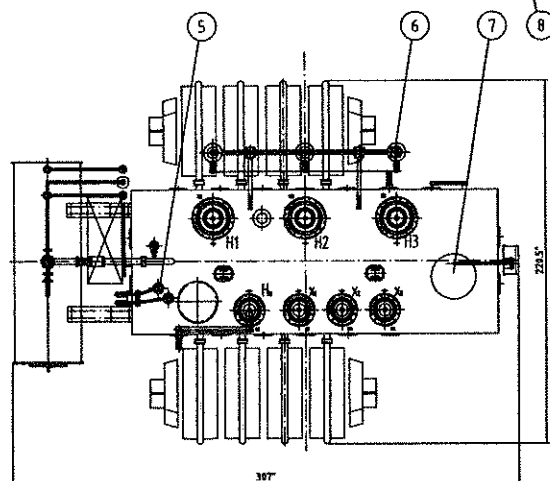
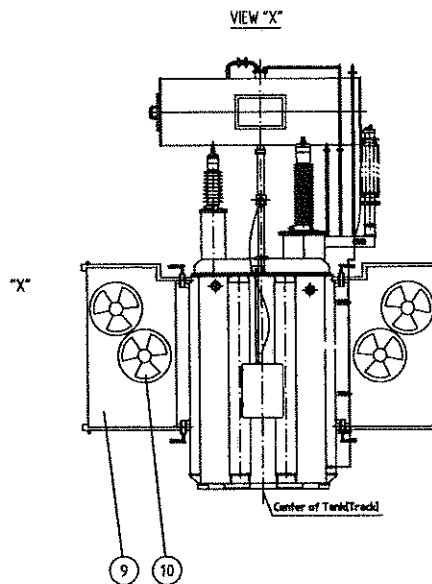
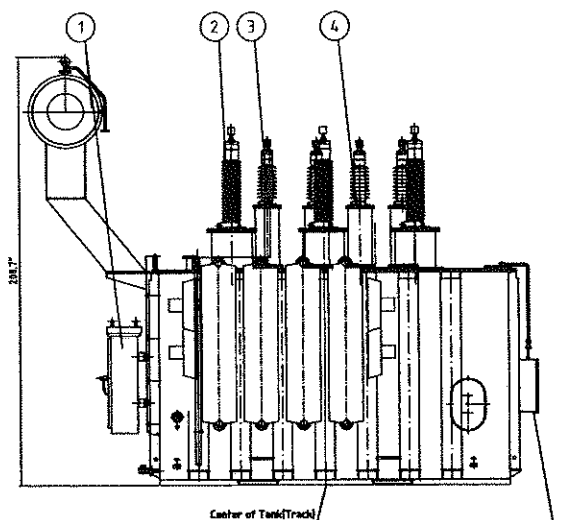
Sincerely yours,

  
Jim Y Cai  
President  
Doubletree Systems, Inc.  
4030 Moorpark Ave., Suite 222  
San Jose, CA 95117

Tel: 408-850-5159 Fax: 408-519-7091 Email: jimcai@jshp-usa.com

No portion of this drawing is to be duplicated or reproduced in any form without the written permission of JSH Engineering Co., Inc.

This drawing is based on a copy of a computerized drawing. The original drawing is not to be reproduced. A master drawing is not required.



Ratings		
Phase	3	PH
Frequency	60	Hz
Capacity(65°C)	56	MVA
Rated Voltage	69/12.47	kV

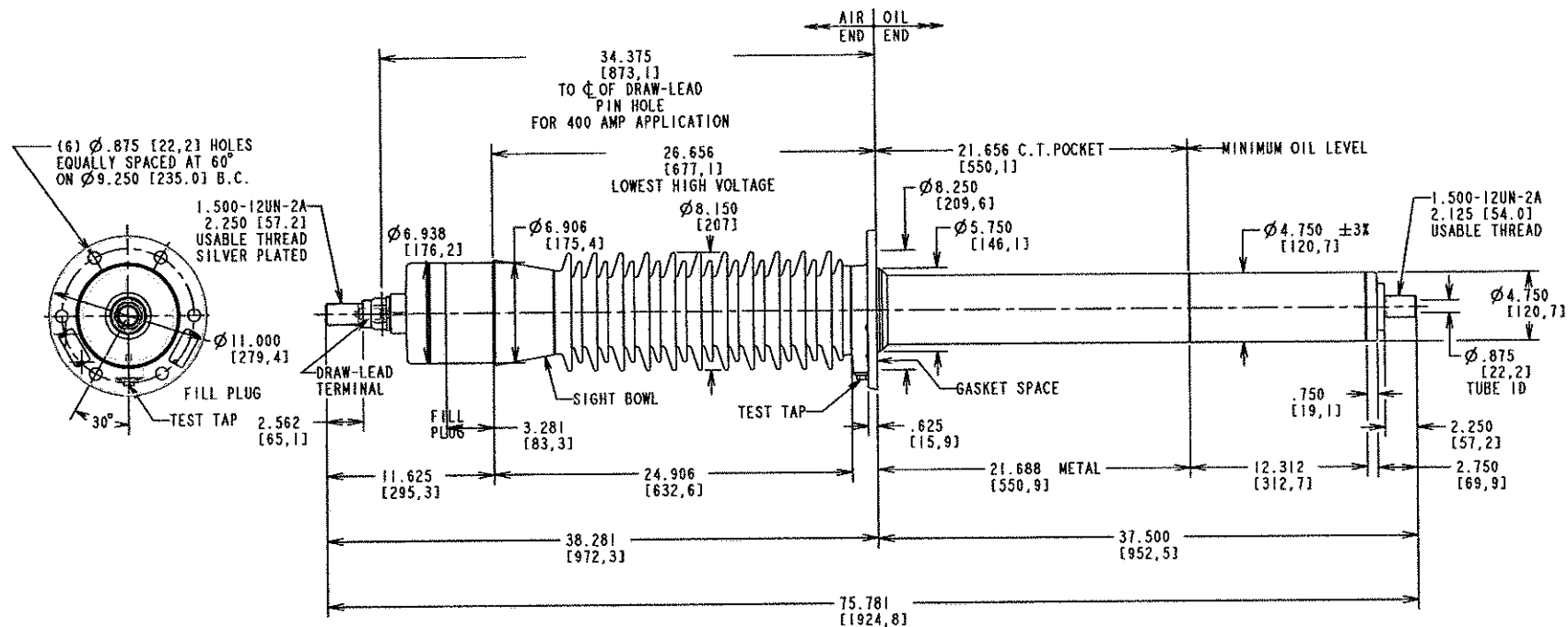
Data Sheet of Weight	
Item	Weight (lbs.)
Core & Coil	98104
Tank, Fittings & Radiator	59586
Total Mass	210691
Transportation (Air-filled)	135362
Oil(7062Gallons)	52469

No.	DESCRIPTION
10	Cooling Fan
9	Radiator
8	On load Tap Changer Drive Unit
7	Load Tap Changer
6	HV Surge Arrester
5	Core & Case Ground Enclosure
4	LV Bushing
3	LV Neutral Bushing
2	HV Bushing
1	Control Cabinet

Designed	Revised	Approved	<b>JSH Engineering Co., Inc.</b>	<b>JSHP TRANSFORMER</b>
by				
Date				Sheet / of

Project name	City of Anaheim	Title	33.6/44.8/56MVA 69/12.47KV Outline Drawing	Formal A3	Language En	Revision 0
Der. from	Repl.					

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STYLE NUMBER	OUTER INSULATING ENVELOPE COLOR	INSULATION CLASS kV	BASIC IMPULSE LEVEL kV	MAX. LINE TO GROUND VOLTAGE kV	CONNECTION METHOD AND CONTINUOUS CURRENT A @ 60Hz			CREEP DISTANCE in. / [mm]		MINIMUM ARCING DISTANCE in. / [mm]	MAXIMUM ALTITUDE ft / [m]	MOUNTING ANGLE FROM VERTICAL deg	APPROX. WEIGHT lb / [kg]
					DRAW- LEAD	INBOARD END							
						TRANS.	O.C.B.						
069Z0412AN	GRAY	69	350	44	400	1200	1200	75.670 [1922]	72.280 [1836]	24.906 [633]	10000 [3048]	0 TO 60	140 [63.5]
069Y0412AN	BROWN												

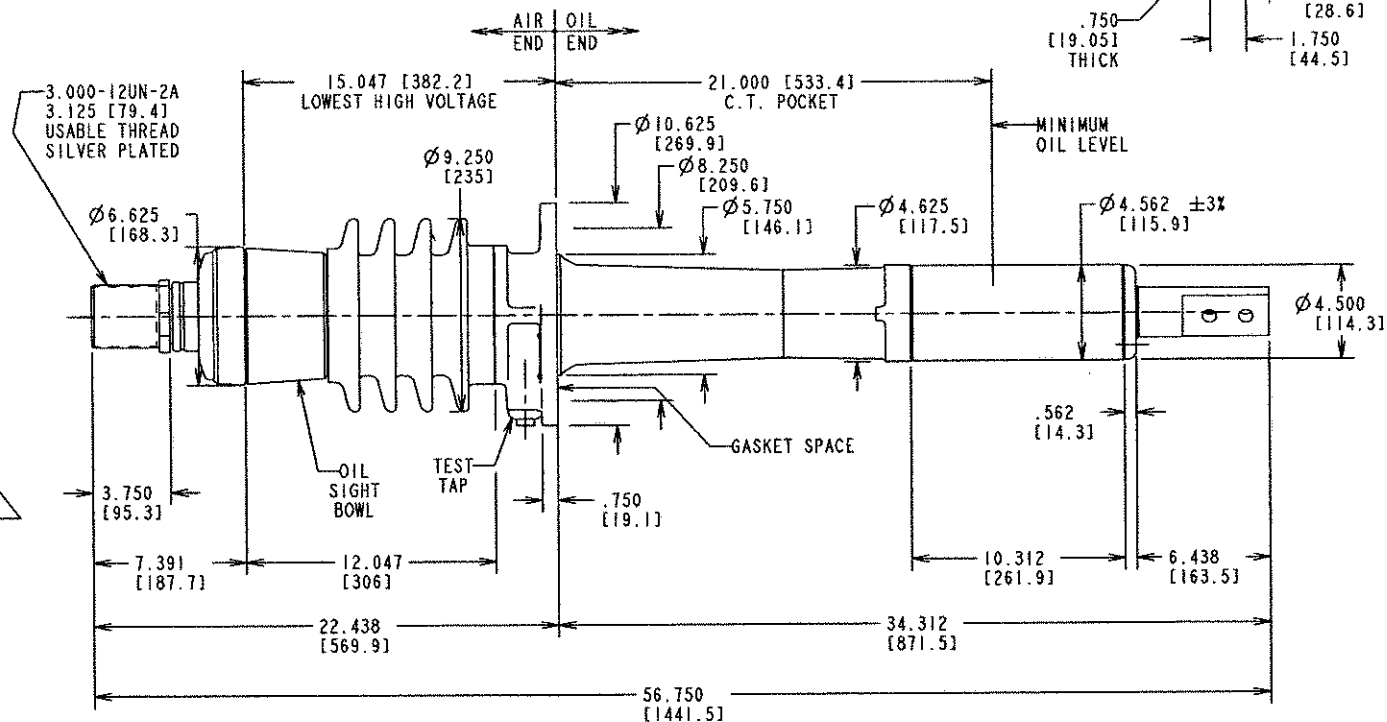
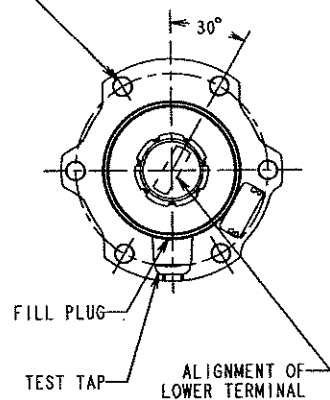
REVISIONS		
NO.	LOC.	DESCRIPTION
1		NEW ISSUE PERKINS 05/06/08
2		ADDED ADDITIONAL NAMEPLATE IN PLAN VIEW PERKINS 07/24/08 WILLIAMS 07/24/08
3		Ø6.906 WAS Ø5.906 PERKINS 01/12/09 POLLARO 01/12/09

PRINTS TO:			TITLE:		
1	7	13	TYPE O Plus C II, IEEE, CONDENSER BUSHING		
2	8	14			
3	9	15	RESP. DEPT.: BUSHINGS		
4	10	16	OFTR: PERKINS 06-Mar-08		
5	11	17	CHKD: 06-Mar-08		
6	12	18	APPD: POLLARO 06-May-08		
REF:			LANG. = ENGLISH		
			DRAWING NO: T069Z0412AN		
			REV.: 3		
			SHEET 1 OF 1		


**ABB**

P/E FILE KEY:  
LINE 1/6EN. ASMS.

(6)  $\phi .875$  [22.2] HOLES  
EQUALLY SPACED AT  $60^\circ$   
ON  $\phi 9.250$  [235.0] B.C.



STYLE NO.	CATALOG NO.	OUTER INSULATING ENVELOPE COLOR	INSULATING CLASS kV	BASIC IMPULSE LEVEL kV	MAX. LINE TO GROUND VOLTAGE kV	CONNECTION METHOD AND CONTINUOUS CURRENT A @ 60Hz			MINIMUM CREEP DISTANCE in. / [mm]	MINIMUM ARCING DISTANCE in. / [mm]	MAXIMUM ALTITUDE ft / [m]	MOUNTING ANGLE FROM VERTICAL deg	APPROX. WEIGHT lb / [kg]
						DRAW-LEAD	INBOARD END						
			25	150	16		N/A	3000	N/A	21.875 [556]	12.047 [306]	10000 [3048]	0 TO 60
025W3000BF	W17B252BB	GRAY				025X3000BF							

REVISIONS 0.4 0.3 0.2 0.1	1	D-4A0543 REDRAWN ON CADD WITH DIMENSIONAL CORRECTIONS; REPLACES PART OF P39485593. W.A. SHINER 10-23-98 L. ELDER 11/10/98	2	-ACTIVE- CHANGED FLANGE MTG FROM SLOTS TO HOLES T. KUHLMAN 24 NOV 03	3	D-4A0506 V03, CHG GLASS TO EPOXY SIGHT BOWL J. ARMBR 12/09/03 D. GEISEL 12/09/03	4	ADDED 1.75 DIM. TO BOTTOM TERMINAL. PERKINS 10/28/04 SAP 10/28/04	5	ADDED L.H.V. 15.047 DIM. PERKINS 03/21/07 WILLIAMS 03/21/07	PRINTS TO: 1 7 13 2 8 14 3 9 15 4 10 16 5 11 17 6 12 18		ABB Inc. ALAMO, TN U.S.A.		P/E FILE KEY: Line 1/608 Azon 	SHEET 1 OF 1
											TITLE: TYPE O Plus C™, IEEE, CONDENSER BUSHING					
											RESP. DEPT.: BUSHINGS		DRAWING NO: T025W3000BF			
											DFTR: W.A. SHINER 23-Oct-98		UNITS = in. / [mm] SCALE = 0.250			
											CHKD:					
											APPD: L. ELDER 11/10/98		LANG. = ENGLISH		REV.: 5	
											REF:					

#### TABLE OF CONSTANTS

1.	CC=CAPITAL RECOVERY (FACTOR) – (5.00% FOR 30 YEARS)	0.065
2.	DC=DEMAND CHARGE (\$/kW)	55.0
3.	EC=ENERGY CHARGE (\$/kWH)	0.04020
4.	LF= LOAD FACTOR	0.5288

#### TABLE OF COMPUTED CONSTANTS

1.	CRC [ <i>CAPITAL RECOVERY CHARGE</i> ] = (\$BID/UNIT)(0.065)
2.	LDC [ <i>LOAD DEMAND CHARGE</i> ] = (TOTAL LOSSES)(55 \$/kW)
3.	NLC [ <i>NO LOAD LOSS COST</i> ] = (NO LOAD LOSSES)(ENERGY CHARGE .0402)(8760HR/YR)
4.	LLC [ <i>LOAD LOSS COST</i> ] = (LOAD LOSSES)(8760HR/YR)(LOADFACTOR)(ENERGYCHARGE)
5.	TAC [ <i>TOTAL ANNUAL COST</i> ] = CRC + LDC + NLC + LLC

1.04.03 ANAHEIM reserves the right to witness the factory transformer testing and loss tests (all travel costs borne by the Contractor for two COA employees to attend the factory test) and conduct independent tests after delivery to the jobsite. In the event any loss (es) exceed(s) the guaranteed value(s), ANAHEIM will deduct an amount equal to ANAHEIM's calculated present worth of the cumulative difference between the guaranteed loss(es) and the actual measured loss(es) over the projected 30-year service life of the transformer from the purchase price and pay only the remainder, or ANAHEIM will seek reimbursement from Manufacturer for the same amount plus all costs incurred.

1.04.04 Bidders shall submit its Bid on the form "Manufacturer Quoted Items" on page 7 of this specification in accordance with these specifications and the terms and conditions of the Request for Bids.

1.04.05 The Contractor/Manufacturer is responsible for providing transformers that meet the specified load rating, after any de-rating due to firewalls, location, cooling, etc. This requirement is to ensure the overall rating of each transformer (after de-rating) is not less than 56.0 MVA at a 65°C temperature rise.

#### **1.05 DRAWINGS AND INFORMATION FURNISHED WITH BID**

1.05.01 The following drawings and information shall be included in each Bidder's response to the RFB. Any missing information or drawings will cause the bid to be deemed non-responsive. The IEEE standard sheet may be used for submittal.

1.05.02 **Bushing Drawings:** Each Bidder shall attach a full set of detailed drawings of the bushings to the eBid. The drawings shall include the current rating and the creepage distance.

1.05.03 **Outline Drawings:** Each Bidder shall attach a full set of outline drawings of the transformers to the eBid. The outline drawings shall include the following:

- (a) Projected plan view of the transformer, including radiators, expansion tank and bushing overhang.
- (b) Height of transformer from base to top of highest appurtenance.
- (c) Height of transformer from base to the top of low voltage and high voltage bushings.
- (d) Height of transformer from base to top of tank.
- (e) Height above floor necessary to untank.
- (f) Weight of core and windings.
- (g) Weight of tank and radiators.
- (h) Number of gallons of oil and total weight of the oil.
- (i) Total weight of the assembled transformer including oil.
- (j) Power requirements for all control and auxiliary equipment.

- (k) Shipping weight of tank, core, windings, and oil.
- (l) Proposed base dimensions of the transformer.
- (m) Approximate center of gravity with oil, and without oil.
- (n) Dimensions of transformer base projected beyond and around its tank wall.
- (o) Thickness of transformer base and dimensions of the supporting skid.

#### 1.06 PRODUCT PERFORMANCE REQUIREMENTS

1.06.01 Each Bidder shall furnish the information requested below to the eBid. The Bidder guarantees that the performance of transformer furnished shall be equal to or better than that shown herein.

- (a) Class of transformer, catalog number and/or type: Oil type, Three-phase, Step down transformer
- (b) High voltage rating and taps: 69kV, 5 tap positions
- (c) Low voltage rating: 12.47kV
- (d) Base MVA rating: 30MVA
- (e) All guaranteed values shall be corrected to 75°C (based on a 55oC rise) and 85°C (based on a 65oC rise) respectively. All load losses should be corrected to the 75°C and 85°C respectively. No load losses should be measured at 20°C ambient and reported at an uncorrected reference temperature of 20°C.
  - (1) Guaranteed efficiency at 56,000 kVA and 1.0 power factor, including all fan loads. 99.45%
  - (2) Guaranteed efficiency at 50.0MVA and 1.0 power factor, including all fan loads. 99.50%
  - (3) Guaranteed efficiency at 44.8MVA and 1.0 power factor including all fan loads. 99.54%
  - (4) Guaranteed efficiency at 40.0MVA and 1.0 power factor, including all fan loads. 99.57%
  - (5) Guaranteed efficiency at 33.6 MVA and 1.0 power factor, without fans. 99.61%
  - (6) Guaranteed efficiency at 30 MVA, and at the following values:
    - i 1.0 Power Factor, without Fans
    - ii 25% ONAN Rating 99.54%
    - iii 50% ONAN Rating 99.67%
    - iv 75% ONAN Rating 99.67%
    - v 100% ONAN Rating 99.63%
  - (7) kW load of all cooling equipment at the highest ONAF rating. 4.4kW
  - (8) Guaranteed percent regulation at 30 MVA and 1.0 power factor. 0.27%
  - (9) Guaranteed percent regulation at 30 MVA and 0.80 power factor. 6.21%
  - (10) Guaranteed percent regulation at 56 MVA and 1.0 power factor. 0.5%
  - (11) Guaranteed percent regulation at 56 MVA and 0.80 power factor. 6.4%
  - (12) Guaranteed primary exciting current at 100% voltage. 0.2%
  - (13) Guaranteed primary exciting current at 110% voltage. 0.26%
  - (14) Guaranteed percent impedance at following values:
    - i Center-tap- high side. 10% @ 30MVA
    - ii Highest tap- high side. 10.5% @ 30MVA
    - iii Lowest tap- high side. 9.5% @ 30MVA



- iv Resistance Drop 100% base rating. 0.4%
  - v Reactance Drop 100% base rating. 9.99%
  - vi Impedance Drop 100% base rating. 10%
- (15) Guaranteed Losses
- i No load (core) loss 100% voltage Tap Changer on neutral. 30kW
  - ii No load (core) loss 105% voltage Tap Changer on neutral. 39kW
  - iii No load (core) loss 110% voltage Tap Changer on neutral. 48kW
  - iv Load (copper or I2R) loss 100% rating, 30 MVA, Tap Changer on neutral. 80kW@30MVA
  - v Load (copper or I2R) loss 110% rating, Tap Changer on neutral 97kW@33kW
  - vi Load (copper or I2R) loss 100% rating, 56 MVA, Tap Changer on neutral. 280kW@56MVA
  - vii Total no load (core) and load (copper or I2R) loss 100% rating, 56 MVA, Tap Changer on neutral. 310kW@56MVA
  - viii Total no load (core) and load (copper or I2R) loss 100% rating, 30 MVA, Tap Changer on neutral. 110kW@30MVA
  - ix Highest no load (core) and load (copper or I2R) loss 100% rating 30 MVA at worst-case Tap Changer position or positions.  
Specify tap: N/A
  - x Highest no load (core) and load (copper or I2R) loss 100% rating 56 MVA at worst-case Tap Changer position or positions.  
Specify tap: N/A
  - xi Total cooling fan loss at rated fan motor volts, at both 55°C and 65°C rise. 4.4kW
  - xii Total auxiliary losses, including cooling, for all stages of cooling fans, space heaters and other ancillary equipment at both 55°C and 65°C rise. 7.2kW
- (16) Guaranteed maximum audio sound levels of transformer in decibels at HVC tap and the LTC on the tap settings producing the highest sound level, bidder shall state the LTC tap position(s) producing the highest sound level:
- i At the ONAN rating at both 55°C and 65°C rise. 65dB
  - ii At the ONAF rating with all fans running at both 55°C and 65°C rise. 74dB
- (17) Weights
- i Core and Windings (main): 98104LBS.
  - ii Series / booster transformer / preventative autotransformer (if applicable):  
N/A
  - iii Tank and fittings: 59586LBS.
  - iv Fan equipment: 15408LBS.
  - v Oil (including LTC, and radiator oil): 7062Gallons
  - vi Total gross weight of transformer: 210097LBS.
  - vii Total shipping weight: 135323LBS.
- (18) Type of oil preservation system: Conservator
- (19) Method of mounting radiators; removable or integral with the tank: Removable
- (20) BIL - High voltage and low voltage windings, including the neutral.

- (21) State types of transformer gasket materials to be used.  
Reusable, weatherproof and watertight gaskets shall be used.
- (22) Detailed description of Tap Changers.  
DETC on high side and LTC on low side shall be manufactured by Reinhausen.
- (23) State required minimum distance in linear feet to the any fire and sound walls.  
33'
- (24) State X/R ratio @ 30 MVA, 55°C rise.  
69/12.47
- (25) State X/R ratio @ 44.8 MVA, 65°C rise.  
69/12.47

#### **1.07 MANUFACTURER PRODUCT INFORMATION**

1.07.01 All Manufacturer's shall (i) own/operate a high voltage transformer repair facility which is capable of diagnosis, repair, and restoration of the transformer to its full capability as delineated in the specification, or (ii) have an established current agreement with a facility owner/operator of a high voltage transformer repair facility which will permit manufacturer to diagnosis, repair, and restore the transformer to its full capability as delineated in the specification during the 5 year warranty period. The shipping time to this repair facility cannot exceed 10 working days.

1.07.02 State the company name; contact person's name, phone, email; address of assembly plant where transformer is to be constructed, and location and address of high voltage test facility to perform dielectric tests if different from assembly plant. Also, state the location of the transformer repair facility.

- (a) Assembly Plant: Liyang city, China
- (b) Test Facility: Liyang city, China
- (c) Repair Facility: California, USA

1.07.03 Users of similar product

- (a) Each Bidder shall furnish as part of the Proposal, a list of users of similar product, including the unit capacity, voltage, rating, year of manufacturing, and client's name and phone number.

1.07.04 Each Bidder shall furnish as part of the Proposal a brochure that shows the plant, its location, capacity, years of manufacturing the similar products and any other information to make ANAHEIM familiar with the Bidder's capabilities.

#### **1.08 DELIVERY TIME**

- (a) Delivery is required by the date specified in the eBid documents including time for drawing approval and tests/measurements.

**CITY OF ANAHEIM  
NON-COLLUSION AFFIDAVIT**

(TO BE EXECUTED BY BIDDER, NOTARIZED & SUBMITTED WITH BID)

Re: Bid / RFP # 7894 for: POWER TRANSFORMER: THREE-PHASE: with LOAD-TAP-CHANGER:  
69KV-12.47KV, 30/40/50 MVA (33.6/44.8/56 MVA @65C rise) per SPEC E-20  
(Insert #) (title of bid)

STATE OF California  
(The State of the place of business)

SS.

COUNTY OF \_\_\_\_\_  
(The County of the place of business)

I, Jim Y Cai, being first duly sworn, deposes and  
(Name of the person signing this form)

says that s/he is President of Doubletree Systems, Inc., the party making  
(Title of the person signing this form) (Name of bidding company)

the foregoing bid that such bid is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization or corporation; that such bid is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that said bidder has not in any manner directly or indirectly sought by agreement, communication, or conference with anyone to fix the bid price of said bidder or of any other bidder, or to fix any overhead, profit, or cost element of such bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in such bid are true, and further, that said bidder has not directly or indirectly submitted his bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid and will not pay any fee in connection therewith, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any other individual except to any person or persons as have a partnership or other financial interest with said bidder in this general business.

Jim Y Cai

(Printed name of the person authorized to sign)

By \_\_\_\_\_

(Signature)

Subscribed and sworn to before me this

7 day of May, 2013

Notary Public in and for said County and State

See attached  
for Notary

NON-COLLUSION AFFIDAVIT-Notary Required

# CALIFORNIA JURAT WITH AFFIANT STATEMENT

- ☒ See Attached Document (Notary to cross out lines 1-6 below)  
☐ See Statement Below (Lines 1-5 to be completed only by document signer[s], *not* Notary)

1  
2  
3  
4  
5  
6

Signature of Document Signer No. 1 \_\_\_\_\_ Signature of Document Signer No. 2 (if any) \_\_\_\_\_

State of California

County of Santa Clara } ss.

Subscribed and sworn to (or affirmed) before me on this

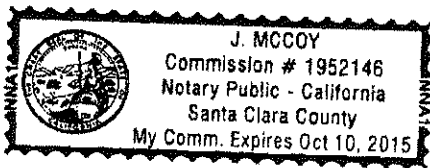
7 day of May, 2013 by  
Date Month Year  
(1) Yunging Cai  
Name of Signer

- ☐ Personally known to me  
☒ Proved to me on the basis of satisfactory evidence to be the person who appeared before me (.) (.)  
(and

(2) \_\_\_\_\_  
Name of Signer

- ☐ Personally known to me  
☐ Proved to me on the basis of satisfactory evidence to be the person who appeared before me.)

J. McCoy  
Signature of Notary Public



Place Notary Seal Above

## OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

### Further Description of Any Attached Document

Title or Type of Document: City of Anaheim Non-Collision Affidavit

Document Date: 5-7-13 Number of Pages: 1

Signer(s) Other Than Named Above: NONE

RIGHT THUMBPRINT OF SIGNER #1  
Top of thumb here

RIGHT THUMBPRINT OF SIGNER #2  
Top of thumb here

### CLIENT REFERENCE LIST for

**BID # 7894** **Bid Title:** POWER TRANSFORMER: THREE-PHASE: with LTC: 69KV-12.47KV, 30/40/50 MVA (Spec. E-20) 7894

**Proposer's Company Name:** Jiangsu Huapeng Transformer Co., Ltd. DBA JSHP Transformer

List client references for which your company has performed similar work as described and required in the bid specifications.

1.	Company	SMUD
	Address	6201 S Street
	City, ST, zip	Sacramento, California
	Contact Name	James Hayes
	Phone Number	916-732-6450
	Fax Number	
	Email	Jim.hayes@smud.com
	Years and nature of relationship	Supplied one unit of 116/21.9 kV, 24/32/40 MVA in 2009 and delivering one unit of 230KV 240MVA autotransformer in 2013.
2.	Company	BC Hydro
	Address	
	City, ST, zip	Vancouver, BC, Canada
	Contact Name	Bob Middleton
	Phone Number	604 528 2198
	Fax Number	
	Email	Bob.Middleton@bchydro.com
	Years and nature of relationship	Delivered 8 units from 115Kv to 230KV 400MVA autotransformers And has 5 year alliance agreement
3.	Company	City of Lakeland
	Address	501 E. Lemon Street, A-71
	City, ST, zip	Lakeland, FL
	Contact Name	Randy Dotsan
	Phone Number	863-698-0330
	Fax Number	
	Email	randall.dotson@lakelandelectric.com
	Years and nature of relationship	Supplied one unit 230/69-21 kV, 90/120/150 MVA autotransformer in 2009
4.	Company	Iberdrola Renewable
	Address	1125 NW Couch St., Suite 700
	City, ST, zip	Portland, Oregon
	Contact Name	MR. Osvaldo Villanueva
	Phone Number	503-478-6318
	Fax Number	
	Email	Osvaldo.Villanueva@iberdrolausa.com
	Years and nature of relationship	Supplied more than 10 units of 110KV, 230kV transformers in past 5 year, including two units of 220kV 150MVA auto to Rosamond,CA in 2010

Use additional pages if necessary to include additional client references you would like the City to take into consideration.

## Recommended Spare Parts List

Recommended spare parts for start-up and 5 years operation are as follows:

IT	DESCRIPTION	UNIT	QTY	UNIT PRICE US\$ FOB destination	TOTAL PRICE US\$ FOB destination
1	HV Bushing gaskets	SET	1	-	-
2	LV Bushing gaskets	SET	1	-	-
3	Neutral Bushing gaskets	SET	1	-	-
4	Complete Set of Gaskets	SET	1	-	-
5	Fan with Motor	SET	1	1,300	1,300
6	Complete set of contacts and coils	SET	2	700	700
7	Finish Paint	kg	3	-	-

Note: Price for spare parts is not included in the quotation price of transformer.

## Manufacturing/Delivery Schedule

1. Number of weeks to submit drawings/documents after receipt of order.

Approval Dwgs: 8 weeks

Final Prints Dwgs: 14 weeks

Instruction Manuals: 28 weeks

Certified Test Reports: 28 weeks

2. Number of weeks allocated for customer to review drawings: 2 weeks

3. Number of weeks to fabricate and ready for shipment after drawing comment or release to proceed. 14 weeks

4. Number of work days included in this event for shop testing: 7 days

5. Number of work days included for preparation for shipment: 14 days

6. Quoted shipping duration to Site from Point of Shipment: 7 weeks

7. Total quoted delivery period (*after receipt of award*) 36 weeks

## Summary of JSHP Transformer Service in North America

August 18, 2007

JSHP Transformer Co., Ltd. has setup a marketing and support office under contract with Doubletree Systems in Oct., 2006 and the office is located in Sunnyvale, California.

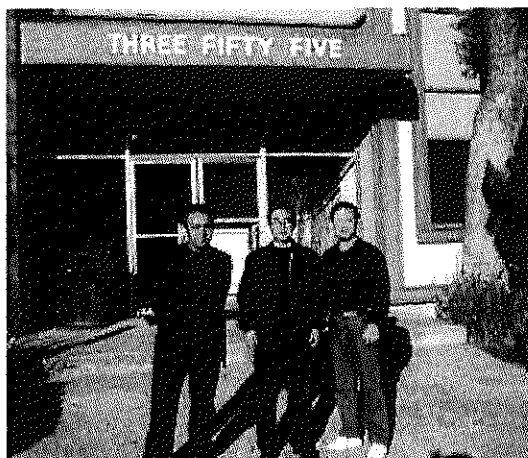
JSHP has signed a strategic agreement with North American Substation Service ( NASS ) led by former Waukesha transformer service manager Mark Roberts to provide prompt transformer service for JSHP in US. NASS sent a couple of engineers to JSHP China to have training on JSHP transformers. NASS provides assembly, oil filling, testing, and warranty service on demand basis. And NASS also provides necessary insurance for the service.

NASS headquartered in Florida has about 50 field engineers around US to provide transformer services. NASS has two engineers to cover Virginia area.

At the same time, JSHP has its own people ready to go US anytime when necessary since they already have multiple entry visa to US.

One of JSHP team is Mr. Eric Yin, Manger of JSHP international sales since 2006. He has 10 years with JSHP, 4 years as director of design engineering before he was promoted to the manager of JSHP international sales. He speaks English and has multiple entry US visa. He will spend half of his time in US to support US office.

Jim Y Cai, manager of North America Marketing & Support of JSHP Transformer Co.,Ltd has 20 years in power systems control & protection, with 14 years in US. Jim Cai will run day-to-day operation of the office and coordinates between US and China and provides support to local sales representatives. Right now, JSHP has about 35 states covered by sales representatives.



JSHP set up US office

Early 2007, JSHP has received orders to provide one unit of 230KV/115KV/34.5KV 84/112/140 MVA and one unit of 115KV/34.5KV 75/100/125MVA to Cohocton, NY of UPC Wind and one unit of 115KV/22MVA to Stage Coach Substation owned by NY Oil & Gas. All the three units will be delivered on site by August, 2007.

So far, the production schedule is on time and JSHP will use the Sunnyvale office to handle the orders. Professional logistic company familiar with power transformers will be



# JSHP TRANSFORMER



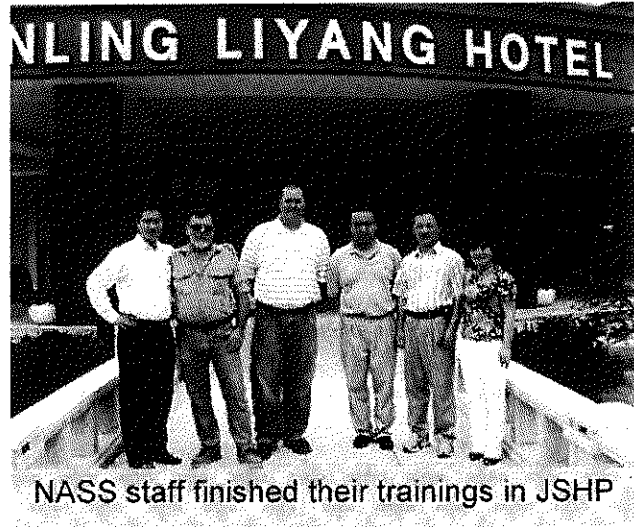
used and NASS will have their engineers trained in JSHP and get ready for the commissioning.

JSHP's north America office will demonstrate its ability of providing necessary US marketing and service support for US customers through those new orders in US.

NASS Contact:



Pierre Feghali, P.E.  
Vice President of  
Business Development  
North American Substation Services, Inc  
Email:  
pfeghali@northamericansubstationservices.com  
Cell: 408-533-3327  
Office: 407-788-3717  
Efax: 408-490-2756



NASS staff finished their trainings in JSHP

# JSHP TRANSFORMER



## JSHP References in North America

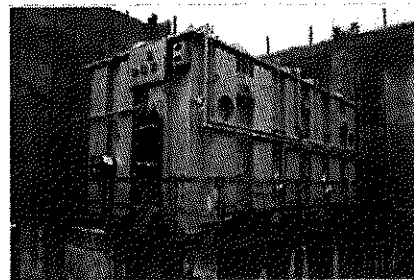
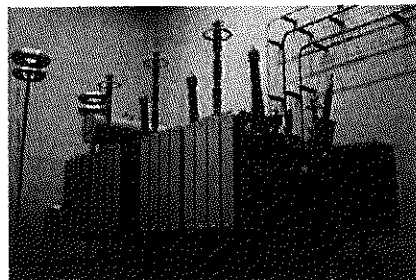
May 11, 2012

- Received PO from CH2M to supply of 2 units of 230kV 2976MVA and one 230kV 351MVA GSUs for WEST DEPTFORD ENERGY STATION, NJ, USA
- Received order from PacifiCorp for one unit of 230KV 125MVA autotransformer & one 161kV 180 MVA for MidAmerican
- Received order from NYSEG for 9 units , up to 230kV, 300MVA
- Received order from New York Power Authority for 5 units of 230kV 140 MVA GSUs
- Received repeated PO from Iberdrola Renewables
- Received order from AES for one 345kV GSU ,
- Received an award from Bayonne Energy Center for supply one 345kV 610 MVA Step up and Four of 138kV 160MVA GSU and two Aux transformers to be delivered to Bayonne, NJ around end of 2010.

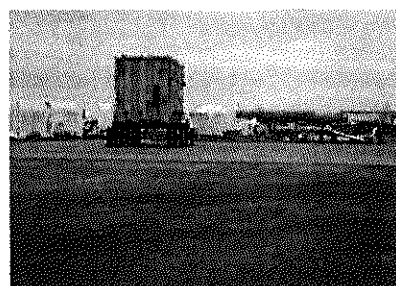
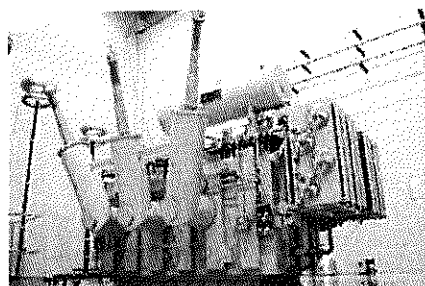


CH2MHILL

LS Power



- Received award notice from BC Transmission Corp. with a 5 year alliance contract to supply 230kV autotransformers from 2010 to 2014
- Received order from the Grand River Dam Authority for a 345kV, 280 MVA autotransformer



- Received order from FortisBC for 4 GSUs including 230kV, 200 MVA



North America Marketing & Service  
4030 Moorpark Avenue, Suite 222, San Jose, CA94086, USA  
Tel: +1-408-850-1416 Email: services@jsHP.com Web: www.jsHP.com

# JSHP TRANSFORMER



- Received order from New York Power Authority for one 138kV, 120MVA GSU transformer



- Two Units of 230kV, 400 MVA autotransformers to be delivered in 2009 to Vancouver, BC

## Mr. Bob Middleton

BC Hydro, Stations Maintenance & Transmission Engineering  
Vancouver, BC, Canada  
Email: [Bob.Middleton@bchydro.com](mailto:Bob.Middleton@bchydro.com)  
Tel: (604) 528-2198



- Received orders from Iberdrola Renewable ( former PPM Energy ) of Portland, Oregon for  
One unit 115/34.5kV 30/40/50 MVA &  
One unit 39/52/65 MVA 69Y/39.8-34.5Y/19.9KV  
One unit 60/80/100 MVA 161/34.5kV

## Mr. Villanueva, Osvaldo

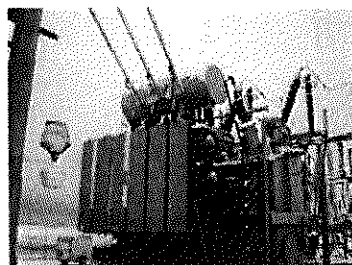
1125 NW Couch St., Suite 700  
Portland, Oregon 97209  
Tel: 503-478-6318  
Email: [Osvaldo.Villanueva@iberdrolausa.com](mailto:Osvaldo.Villanueva@iberdrolausa.com)  
Mr. Ken Long/Stantec  
Portland, OR  
Tel: (503) 297-1631 Email: [KLong@stantec.com](mailto:KLong@stantec.com)



- Bechtel Canada Order  
8 units 69kV 40MVA autotransformers  
2 units 18/24MVA 46/4.16KV autotransformers  
to be delivered in Sept., 2009  
Patrick Lemée / Phone: +1 (514) 394-3878  
Email: [pleme@bechtel.com](mailto:pleme@bechtel.com)

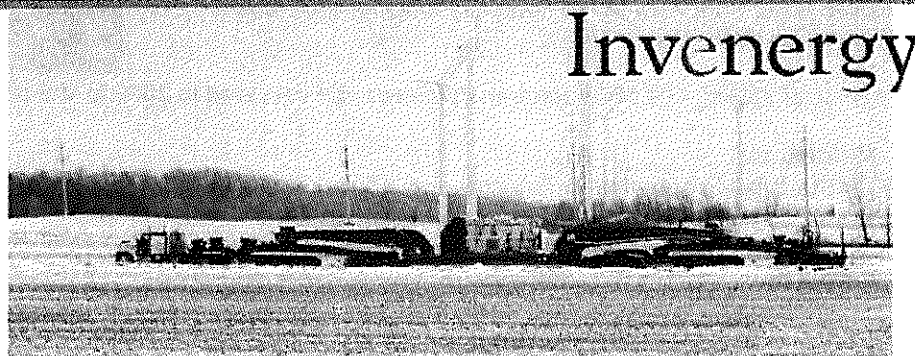



- Received order on May 15, 2008 from MSE Power Systems for Windy Point Partners for one 230kV 48/64/80 MVA unit to be delivered by Nov 17, 2008.  
403 New Karner Road Albany, NY 12205



## MSE Power Systems

- Received order from Invenergy LLC for 2008 delivery of 230kV 133 MVA autotransformer.  
Mr. Mike Bessell, One South Wacker Dr, Ste 2020, Chicago, IL 60606  
[mbessell@invenergyllc.com](mailto:mbessell@invenergyllc.com) office 312-506-1470



- Received letter of intent from SMUD ( Sacramento Municipal Utility Department ) of California for one 138kV autotransformer for delivery by .  **SMUD**
- Received an order from FPL for 3 universal spare GSU transformers on March 3, 2008 and will deliver to site at Maine March, 2009

**Joe Watson**

Manager, Thermal/Hydro Power Delivery  
FPL Energy  
700 Universe Blvd.GPA/JB  
Juno Beach, FL 33408  
Office Phone (561)691-2206  
Email: Joe\_Watson@fpl.com



- Received order on Jan 18, 2008 from Everpower Renewables of Krayn Wind LLC for 115KV/66KV/19.92KV 42/56/70 MVA with 28 weeks lead time ARO.
- Received an order on June 3, 2008 from city of Lakeland, Florida for one unit 230/69-21 kV, 90/120/150 MVA with 30 weeks lead time ARO

**Randall "Randy" L. Dotson, P.E.**

LAKELAND ELECTRIC  
Mgr. of Substation Operations, Energy Delivery  
501 E. Lemon Street, A-71  
Lakeland, FL 33801



Phone 863-834-6494  
Cell 863-698-0330  
email randall.dotson@lakelandelectric.com

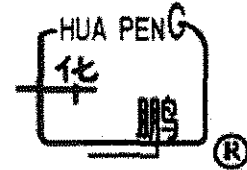
- JSHP has passed vendor pre-qualification at AEP and **Black & Veatch**.

AEP Contact:  
Black & Veatch:

**Mr. Ted Everman @ 614-552-1458**  
**Mr. Joe Eschbacher**  
Procurement Specialist  
Central Procurement - Black & Veatch  
Ph. 913.458.2185



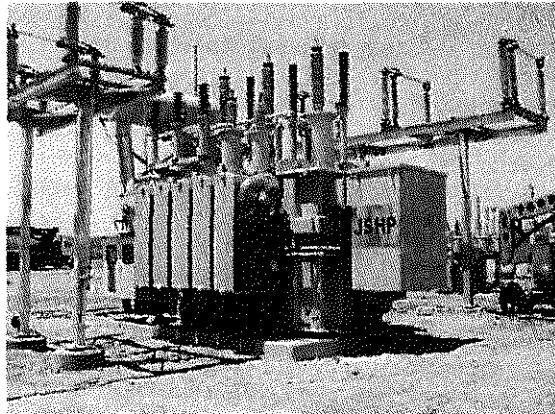
# JSHP TRANSFORMER



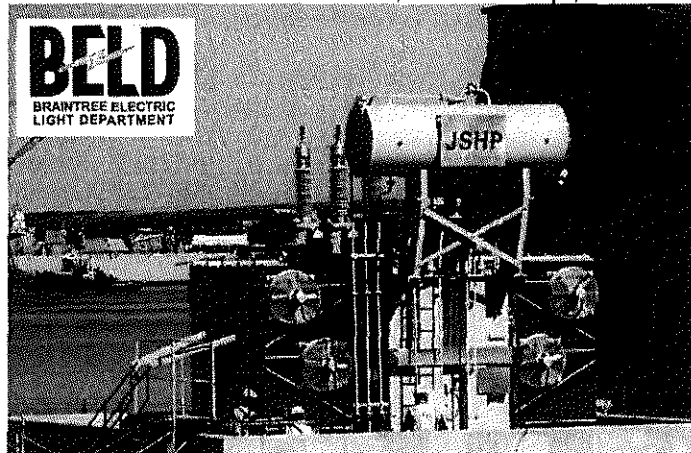
- An order by Public Service Company of New Mexico (PNM) : 138kV/69kV 42/56/70 MVA Auto Transformer , RMV-II and was delivered June, 2008

**Mr. Robert Perlcek**

Public Service Company of New Mexico (PNM)  
Alvarado Square  
414 Silver SW  
Albuquerque, NM 87102 Tel: (505) 241-4807



- An order by Braintree Electric Light Department (BELD) on July, 2007: Two units 115kV/13.8kV 42/56/70 MVA GSU Transformer, delivered Sept, 2008



**Weijun Li, P.E.** Principal Engineer Braintree Electric Light Department  
150 Potter Road, Braintree, MA 02184

Phone: 781.348.1076 Email: [wli@beld.com](mailto:wli@beld.com)

"On a Mission from BELD " An article on trip to JSHP & Korea by BELD published in Braintree Forum. ( Please click on the link, or copy the link <http://www.townonline.com/braintree/news/x1640529270> to your Web Browser )

**Arnold Carlos, P.Eng.**

A.G. Carlos Inc.

Phone: (519) 341-4781

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North America Marketing & Service  
4030 Moorpark Avenue, Suite 222, San Jose, CA94086, USA  
Tel: +1-408-850-1416 Email: [services@jshp.com](mailto:services@jshp.com) Web: [www.jshp.com](http://www.jshp.com)

# JSHP TRANSFORMER



Email: [arnold@agcarlos.com](mailto:arnold@agcarlos.com)

- The engineers who went to the JSHP factory and witnessed the test

**Mr. Tim Ellison, P.E.**

Senior Consultant  
MSE Power Systems, Inc.  
403 New Karner Road  
Albany, NY 12205  
Phone (518) 452-7718 x155      Email: [tellison@msepower.com](mailto:tellison@msepower.com)

**Michael L. Lamb & Jim Campbell**

Consulting Engineer-Transformers  
Dominion Technical Solutions, Inc.  
2400 Grayland Avenue, Richmond, VA 23220 Office -- (804) 257-4006  
Email: [Mike\\_Lamb@Dom.com](mailto:Mike_Lamb@Dom.com)

**Mr. Jin Sim**

VP of Technology  
Waukesha Electric Systems  
Email: [Jin.Sim@Waukesha.spx.com](mailto:Jin.Sim@Waukesha.spx.com)  
Tel: (919) 580-3234



- OEM to GE Prolec with GE brand to the North America market .

JSHP transformers have been used in North America through GE Prolec. The transformers branded as GE-Prolec product were sold to and supported in North America by GE-Prolec.

In 2008, JSHP Transformer delivered 823 units of 110kV-345kV voltage level transformers and has thousands oil immersed units installed world wide.

In 2009, JSHP Transformer delivered about 766 units of 110kV-500kV voltage level transformers and 100+ units of them are 220kV up.

In 2010, JSHP Transformer delivered about 653 units of 110kV-500kV voltage level transformers and 100+ units of them are 220kV up.



## Five Years Limited Warranty

JSHP Transformer Co., Ltd. warrants to the purchaser that the transformer, together with all parts and components in the original purchase, and according with customer's requirement, is free of defects in workmanship and materials.

This warranty extends to all parts manufactured by the seller, JSHP, for 66 months after delivery from the factory or 60 months from commissioning date, whichever period expires first. All other components parts are warranted for the same periods, or for the periods covered by the original equipment manufacturer's warranty, whichever is longer. This warranty covers any defects and malfunction of transformer except that which may happen because of vandalism, improper installation if not provided by JSHP, handling, operation, or for any cause other than defects in workmanship and materials. The method and extent of repairs to be made rests solely with JSHP.

During the warranty period guidance of erection costs are included. This warranty does cover the cost of removal from the site and reinstallation after repair, and costs resulting from the moving of structures or associated equipment are excluded.

The seller, JSHP, shall not be liable for special, indirect, or consequential damages, and this warranty is in lieu of all warranties of merchantability, fitness for a particular purpose or other warranties expressed or implied, and the remedies of the customer herein provided fulfill all liabilities of JSHP, whether in warranty, negligence or otherwise.

Unless otherwise agreed, the transformer will be shipped Shanghai port in China. Shipments will be mutually agreed upon means (e.g. truck) to site specify by customer, provide no unusual circumstances unknown to JSHP (no roads, impassable conditions or extreme grades). Customer agrees to inspect transformer within 48 hours of arrival at destination and notify both JSHP and the carrier of any observable damage or irregularity. **NOTIFICATION SHALL BE ACCOMPLISHED BY COMPLETING AND RETURN JSHP TRANSFORMER CO., LTD. FORM INSPECTION RECEIPT SUMMARY.**

**THE SELLER SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. THE SELLER MAKES NO WARRANTY OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER WARRANTY EITHER EXPRESSED OR IMPLIED, EXCEPT AS EXPRESSLY SET FOR THE HEREIN.**

Revised January, 2008



**JSHP Transformer Co., Ltd.**

## **Copy of Quality Control Certificates**

- **ISO9001:2008**
- **ISO14001:2004**
- **OHSAS18001-1999**
- **CE Certificate**





华信技术检验有限公司  
VOUCHING TECHNICAL INSPECTION LTD

## 管理体系认证证书

CERTIFICATE OF REGISTRATION

我公司认定下列组织的质量管理体系  
VTI Certifies herewith that

江苏华鹏变压器有限公司  
Jiangsu Huapeng Transformer Co., Ltd.

江苏省溧阳市昆仑开发区 68 号  
No. 68 Kunlun Developed Zone, Liyang City, Jiangsu, P.R. China  
邮政编码 (ZIP): 213300

符合以下标准的要求, 特发此证  
demonstrated a Quality Management Systems  
that complies with the requirements of

**GB/T19001-2008 idt ISO9001:2008**

管理体系认证范围 (详见证书附件):

Scope:

油浸式变压器、干式变压器、组合式变压器、预装式变电站、单相变压器以及  
各种特种变压器、散热器、电磁线的设计、制造、销售和服务

Design, manufacture, sale and service of oil-immersed type transformer, dry-type  
transformer, pad-mounted transformer, prefabricated substation, single-phase  
transformer, all kinds of special transformer, radiator and wire

注册号:  
Registration No.

0411Q10022R5M

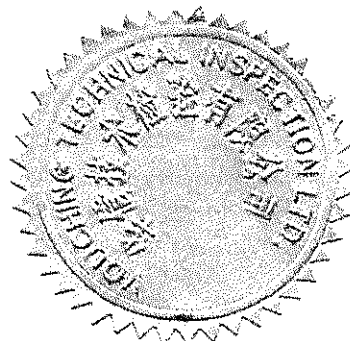
颁发日期:  
Issue Date

2011-1-14

有效终止日期:  
Expiration Date

2014-1-14

总经理 (President):



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中国·北京海淀区北三环西路48号2号楼2层  
Building2, Floor2, No.48 Beisanhuan Xilu, Beijing, China

邮编: 100086  
www.vti-china.org



华信技术检验有限公司

VOUCHING TECHNICAL INSPECTION LTD

## 管理体系认证证书

CERTIFICATE OF REGISTRATION

我公司认定下列组织的职业健康安全管理体系  
VTI Certifies herewith that

江苏华鹏变压器有限公司

Jiangsu Huapeng Transformer Co., Ltd.

江苏省溧阳市昆仑开发区 68 号

No. 68 Kunlun Developed Zone, Liyang City, Jiangsu, P.R. China

邮政编码 (ZIP): 213300

符合以下标准的要求, 特发此证

has demonstrated an Occupational Health and Safety Management System  
that complies with the requirements of

**GB/T28001-2001 (covers OHSAS18001:1999)**

职业健康安全管理体系覆盖范围:

Scope:

油浸式变压器、干式变压器、组合式变压器、预装式变电站、单相变压器  
以及各种特种变压器、散热器、电磁线的设计、制造、销售和服务

Design, manufacture, sale and service of oil-immersed type transformer, dry-type  
transformer, pad-mounted transformer, prefabricated substation, single-phase  
transformer, all kinds of special transformer, radiator and wire

注册号:  
Registration No.

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颁发日期:  
Issue Date

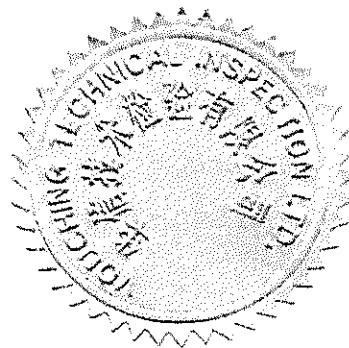
2011-1-10

有效终止日期:  
Expiration Date

2014-1-10



总经理 President



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Building2, Floor2, No.48 Beisanhuan Xilu, Beijing, China

邮编: 100086

www.vti-china.org



华信技术检验有限公司  
VOUCHING TECHNICAL INSPECTION LTD

## 管理体系认证证书

CERTIFICATE OF REGISTRATION

我公司认定下列组织的环境管理体系

VTI Certifies herewith that

江苏华鹏变压器有限公司

Jiangsu Huapeng Transformer Co., Ltd.

江苏省溧阳市昆仑开发区 68 号

No. 68 Kunlun Developed Zone, Liyang City, Jiangsu, P.R. China

邮政编码 (ZIP): 213300

符合以下标准的要求, 转发此证

has demonstrated an Environmental Management System  
that complies with the requirements of

**GB/T24001-2004 idt ISO14001:2004**

环境管理体系覆盖范围:

Scope:

油浸式变压器、干式变压器、组合式变压器、预装式变电站、单相变压器  
以及各种特种变压器、散热器、电磁线的设计、制造、销售和服务

Design, manufacture, sale and service of oil-immersed type transformer, dry-type  
transformer, pad-mounted transformer, prefabricated substation, single-phase  
transformer, all kinds of special transformer, radiator and wire

注册号:  
Registration No.

0411E10025R2M

颁发日期:  
Issue Date

2011-1-14

有效终止日期:  
Expiration Date

2014-1-14

总经理 (President):



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中国·北京海淀区北三环西路 48 号 2 号楼 2 层  
Building 2, Floor 2, No. 48 Beisanhuan Xilu, Beijing, China

邮编: 100086  
www.vti-china.org

## CE Certificate

**DECLARATION**

Number: 236905

*of*

**OFFICIAL LEGAL**

**EUROPEAN AUTHORIZED REPRESENTATIVE**

*for the company*

**Jiangsu Huapeng Transformer Co Ltd**  
Zhengchang Road,  
Kunlun Development  
Liyang City, Jiangsu Province  
P.R. China 213300

**Appointed Authorized Representative**

*In compliance with the TUV-ISO 9001-2000 Quality Assurance System*

**CONSULTANTS EUROPE BV, WEESP, THE NETHERLANDS**

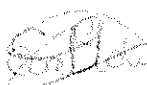
*the following CE-certified products will be included*


Transformer MBS9 - 1600/11  
Transformer MBS9 - 2000/11  
Transformer MBS9 - 2500/11

**ORIGINEEL**

**Date: September 26, 2005**

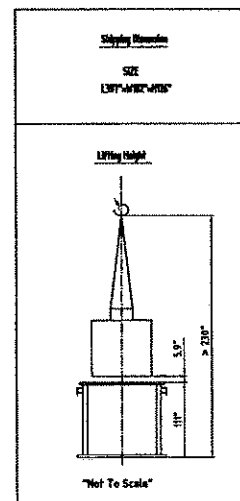
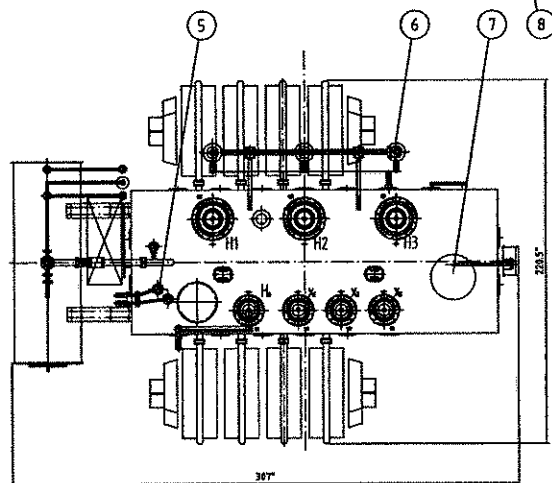
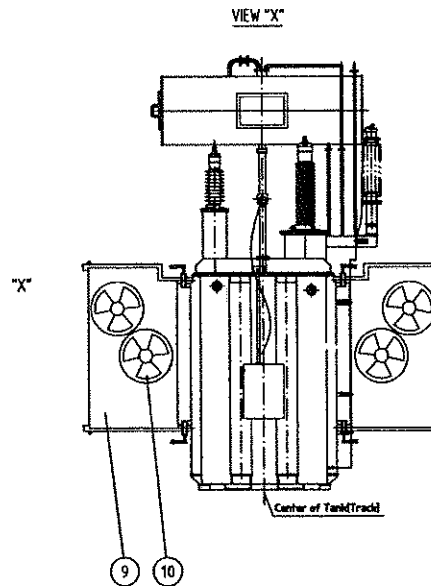
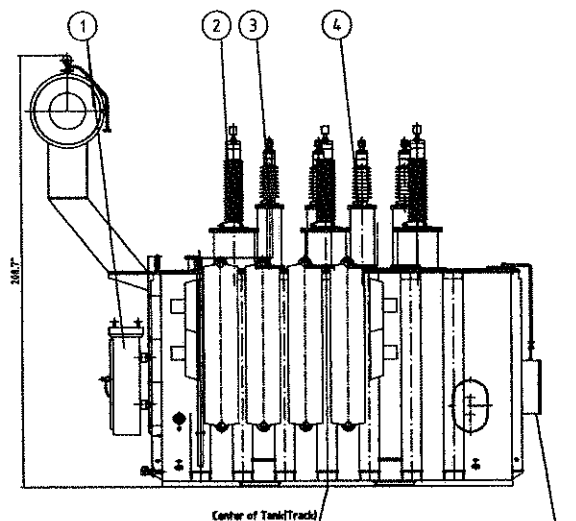
**Place: Weesp, the Netherlands**





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This document is based on the basis of a computerized system. The drawing should be used as a reference only. A printed copy is not required.



Ratings		
Phase	3	PH
Frequency	60	Hz
Capacity(65°C)	56	MVA
Rated Voltage	69/12.47	kV

Data Sheet of Weight	
Item	Weight (Lbs.)
Core & Coil	98104
Tank, Fittings & Radiator	59586
Total Mass	210097
Transportation (Air-filled)	135362
Oil(7062Gallons)	52469

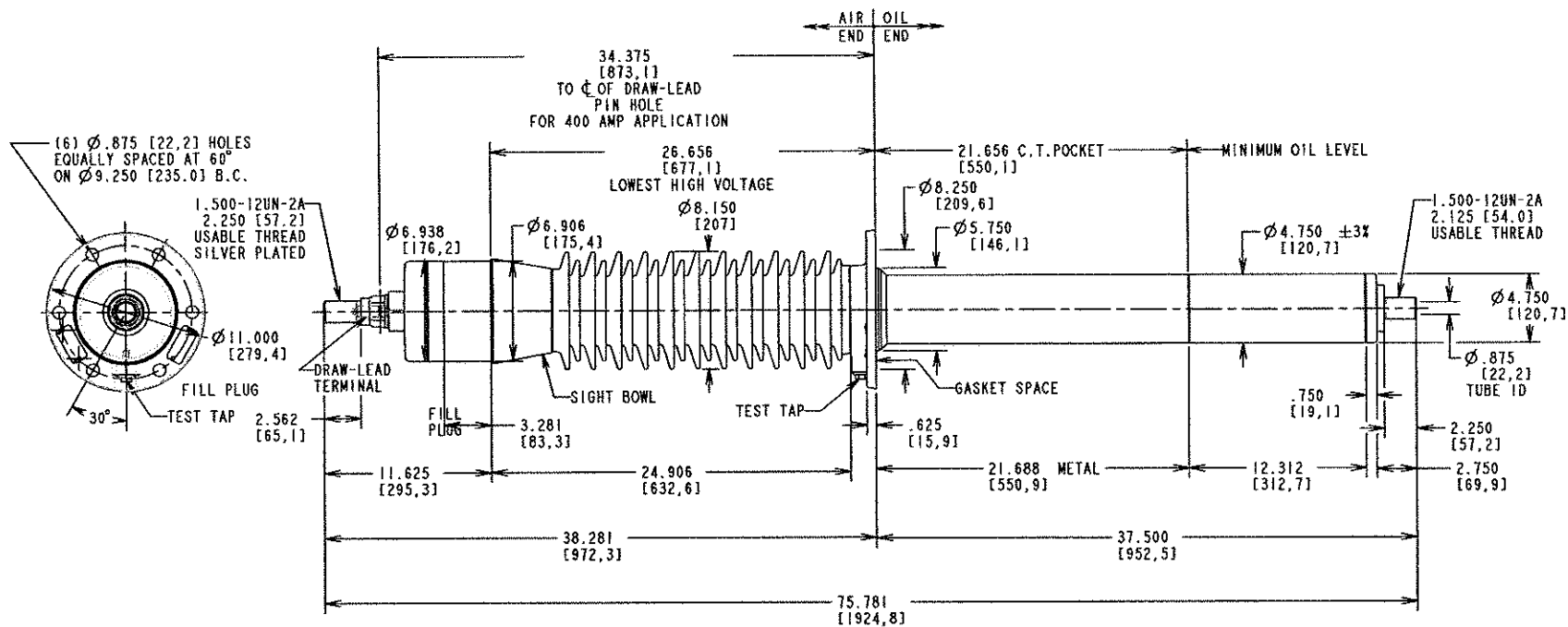
10	Cooling Fan
9	Radiator
8	On Load Tap Changer Drive Unit
7	Load Tap Changer
6	HV Surge Arrester
5	Core & Clamp Ground Enclosure
4	LV Bushing
3	LV Neutral Bushing
2	NV Bushing
1	Control Cabinet
No.	DESCRIPTION

<b>JSHP</b> TRANSFORMER		<b>JSHP TRANSFORMER</b>	
Designed	Revised	Approved	
by			
Date			

Project name: City of Anaheim				Title: 33.6/44.8/56MVA 69/12.47KV Outline Drawing			
Revision	Appd	Date	Des. from	Repla.	Format: A3	Language: En	Revision: 0

Sheet / of

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STYLE NUMBER	OUTER INSULATING ENVELOPE COLOR	INSULATION CLASS kV	BASIC IMPULSE LEVEL kV	MAX. LINE TO GROUND VOLTAGE kV	CONNECTION METHOD AND CONTINUOUS CURRENT A @ 60Hz		CREEP DISTANCE in. / [mm]		MINIMUM ARCING DISTANCE in. / [mm]	MAXIMUM ALTITUDE ft / [m]	MOUNTING ANGLE FROM VERTICAL deg	APPROX. WEIGHT lb / [kg]
					DRAW-LEAD	INBOARD END	NOMINAL	MINIMUM				
069Z0412AN	GRAY	69	350	44	400	1200	75.670 [1922]	72.280 [1836]	24.906 [633]	10000 [3048]	0 TO 60	140 [63.5]
069Y0412AN	BROWN						1200	1200				

REV. NO.	REVISIONS			PRINTS TO:	TITLE:	RESP. DEPT.:	BUSHINGS	UNITS = in. / [mm]	DRAWING NO:	REV.:	SHEET 1 OF 1
	1	2	3								
1	NEW ISSUE PERKINS 05/06/08			1	7	13					
2	ADDED ADDITIONAL NAMEPLATE IN PLAN VIEW PERKINS 07/24/08			2	8	14					
3	WILLIAMS 07/24/08			3	9	15					
	Ø6.906 WAS Ø5.906. PERKINS 01/12/09 POLLARO 01/12/09			4	10	16					
				5	11	17					
				6	12	18					
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**ABB**

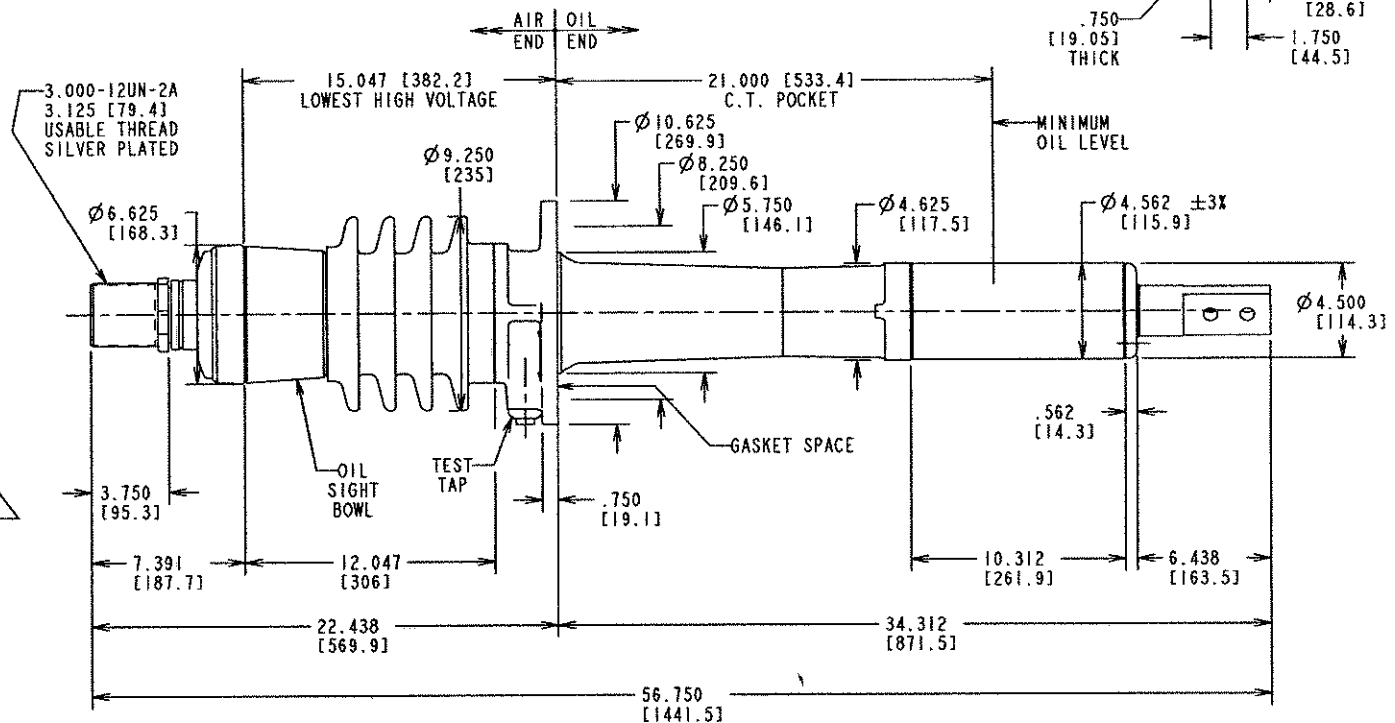
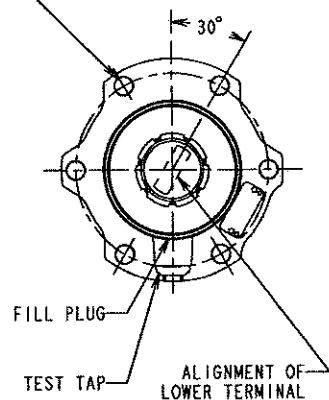
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SPECIAL FEATURES: NONE

(6)  $\varnothing$ .875 [22.2] HOLES  
EQUALLY SPACED AT 60°  
ON  $\varnothing$ 9.250 [235.0] B.C.



STYLE NO.	CATALOG NO.	OUTER INSULATING ENVELOPE COLOR	INSULATION CLASS kV	BASIC IMPULSE LEVEL kV	MAX. LINE TO GROUND VOLTAGE kV	CONNECTION METHOD AND CONTINUOUS CURRENT A @ 60Hz	MINIMUM CREEP DISTANCE in. / [mm]	MINIMUM ARCING DISTANCE in. / [mm]	MAXIMUM ALTITUDE ft / [m]	MOUNTING ANGLE FROM VERTICAL deg	APPROX. WEIGHT lb / [kg]
025W3000BF	W17B252BB	GRAY	25	150	16	N/A	21.875 [556]	12.047 [306]	10000 [3048]	0 TO 60	147 [66.7]
025X3000BF	W17B252	BROWN									


REV. & LOC.	REVISIONS				PRINTS TO:				ABB Inc. ALAMO, TN U.S.A.				  P/E FILE KEY: Line 1/Gen Assm	
	D-440543 REDRAWN ON CADD WITH DIMENSIONAL CORRECTIONS; REPLACES PART OF 03948553 W.A. SHINER 10-23-98 L. ELDER 11/10/98  -ACTIVE- CHANGED FLANGE MTG FROM SLOTS TO HOLES T. KUHLMAN 24 NOV 03  D-440506 V03, CRG GLASS TO EPOXY SIGHT BOWL J. ARMIGER 12/09/03 D. GEIBEL 12/09/03  ADDED 1.75 DIM. TO BOTTOM TERMINAL. PERKINS 10/28/04 SAP 10/28/04  ADDED L.H.V. 15.047 DIM PERKINS 03/21/07 WILLIAMS 03/21/07				1	7	13	TITLE: TYPE O Plus C™, IEEE, CONDENSER BUSHING						
					2	8	14	RESP. DEPT.: BUSHINGS						
					3	9	15	DFTR: W.A. SHINER 23-Oct-98 UNITS = in./[mm]						
					4	10	16	CHKD:						
					5	11	17	SCALE = 0.250						
					6	12	18	DRAWING NO: T025W3000BF						
					REF:				APPD: L. ELDER 11/10/98 LANG. = ENGLISH				REV.: 5	
													SHEET 1 OF 1	

TABLE OF CONSTANTS

1.	CC=CAPITAL RECOVERY (FACTOR) – (5.00% FOR 30 YEARS)	0.065
2.	DC=DEMAND CHARGE (\$/kW)	55.0
3.	EC=ENERGY CHARGE (\$/kWH)	0.04020
4.	LF= LOAD FACTOR	0.5288

TABLE OF COMPUTED CONSTANTS

1.	CRC [ <i>CAPITAL RECOVERY CHARGE</i> ] = (\$BID/UNIT)(0.065)
2.	LDC [ <i>LOAD DEMAND CHARGE</i> ] = (TOTAL LOSSES)(55 \$/kW)
3.	NLC [ <i>NO LOAD LOSS COST</i> ] = (NO LOAD LOSSES)(ENERGY CHARGE .0402)(8760HR/YR)
4.	LLC [ <i>LOAD LOSS COST</i> ] = (LOAD LOSSES)(8760HR/YR)(LOADFACTOR)(ENERGYCHARGE)
5.	TAC [ <i>TOTAL ANNUAL COST</i> ] = CRC + LDC + NLC + LLC

1.04.03 ANAHEIM reserves the right to witness the factory transformer testing and loss tests (all travel costs borne by the Contractor for two COA employees to attend the factory test) and conduct independent tests after delivery to the jobsite. In the event any loss (es) exceed(s) the guaranteed value(s), ANAHEIM will deduct an amount equal to ANAHEIM's calculated present worth of the cumulative difference between the guaranteed loss(es) and the actual measured loss(es) over the projected 30-year service life of the transformer from the purchase price and pay only the remainder, or ANAHEIM will seek reimbursement from Manufacturer for the same amount plus all costs incurred.

1.04.04 Bidders shall submit its Bid on the form "Manufacturer Quoted Items" on page 7 of this specification in accordance with these specifications and the terms and conditions of the Request for Bids.

1.04.05 The Contractor/Manufacturer is responsible for providing transformers that meet the specified load rating, after any de-rating due to firewalls, location, cooling, etc. This requirement is to ensure the overall rating of each transformer (after de-rating) is not less than 56.0 MVA at a 65°C temperature rise.

**1.05 DRAWINGS AND INFORMATION FURNISHED WITH BID**

1.05.01 The following drawings and information shall be included in each Bidder's response to the RFB. Any missing information or drawings will cause the bid to be deemed non-responsive. The IEEE standard sheet may be used for submittal.

1.05.02 **Bushing Drawings:** Each Bidder shall attach a full set of detailed drawings of the bushings to the eBid. The drawings shall include the current rating and the creepage distance.

1.05.03 **Outline Drawings:** Each Bidder shall attach a full set of outline drawings of the transformers to the eBid. The outline drawings shall include the following:

- (a) Projected plan view of the transformer, including radiators, expansion tank and bushing overhang.
- (b) Height of transformer from base to top of highest appurtenance.
- (c) Height of transformer from base to the top of low voltage and high voltage bushings.
- (d) Height of transformer from base to top of tank.
- (e) Height above floor necessary to untank.
- (f) Weight of core and windings.
- (g) Weight of tank and radiators.
- (h) Number of gallons of oil and total weight of the oil.
- (i) Total weight of the assembled transformer including oil.
- (j) Power requirements for all control and auxiliary equipment.



- (k) Shipping weight of tank, core, windings, and oil.
- (l) Proposed base dimensions of the transformer.
- (m) Approximate center of gravity with oil, and without oil.
- (n) Dimensions of transformer base projected beyond and around its tank wall.
- (o) Thickness of transformer base and dimensions of the supporting skid.

#### 1.06 PRODUCT PERFORMANCE REQUIREMENTS

1.06.01 Each Bidder shall furnish the information requested below to the eBid. The Bidder guarantees that the performance of transformer furnished shall be equal to or better than that shown herein.

- (a) Class of transformer, catalog number and/or type: Oil type, Three-phase, Step down transformer
- (b) High voltage rating and taps: 69kV, 5 tap positions
- (c) Low voltage rating: 12.47kV
- (d) Base MVA rating: 30MVA
- (e) All guaranteed values shall be corrected to 75°C (based on a 55oC rise) and 85°C (based on a 65oC rise) respectively. All load losses should be corrected to the 75°C and 85°C respectively. No load losses should be measured at 20°C ambient and reported at an uncorrected reference temperature of 20°C.
  - (1) Guaranteed efficiency at 56,000 kVA and 1.0 power factor, including all fan loads. 99.45%
  - (2) Guaranteed efficiency at 50.0MVA and 1.0 power factor, including all fan loads. 99.50%
  - (3) Guaranteed efficiency at 44.8MVA and 1.0 power factor including all fan loads. 99.54%
  - (4) Guaranteed efficiency at 40.0MVA and 1.0 power factor, including all fan loads. 99.57%
  - (5) Guaranteed efficiency at 33.6 MVA and 1.0 power factor, without fans. 99.61%
  - (6) Guaranteed efficiency at 30 MVA, and at the following values:
    - i 1.0 Power Factor, without Fans
    - ii 25% ONAN Rating 99.54%
    - iii 50% ONAN Rating 99.67%
    - iv 75% ONAN Rating 99.67%
    - v 100% ONAN Rating 99.63%
  - (7) kW load of all cooling equipment at the highest ONAF rating. 4.4kW
  - (8) Guaranteed percent regulation at 30 MVA and 1.0 power factor. 0.27%
  - (9) Guaranteed percent regulation at 30 MVA and 0.80 power factor. 6.21%
  - (10) Guaranteed percent regulation at 56 MVA and 1.0 power factor. 0.5%
  - (11) Guaranteed percent regulation at 56 MVA and 0.80 power factor. 6.4%
  - (12) Guaranteed primary exciting current at 100% voltage. 0.2%
  - (13) Guaranteed primary exciting current at 110% voltage. 0.26%
  - (14) Guaranteed percent impedance at following values:
    - i Center-tap- high side. 10% @ 30MVA
    - ii Highest tap- high side. 10.5% @ 30MVA
    - iii Lowest tap- high side. 9.5% @ 30MVA

- iv Resistance Drop 100% base rating. 0.4%
  - v Reactance Drop 100% base rating. 9.99%
  - vi Impedance Drop 100% base rating. 10%
- (15) Guaranteed Losses
- i No load (core) loss 100% voltage Tap Changer on neutral. 30kW
  - ii No load (core) loss 105% voltage Tap Changer on neutral. 39kW
  - iii No load (core) loss 110% voltage Tap Changer on neutral. 48kW
  - iv Load (copper or I2R) loss 100% rating, 30 MVA, Tap Changer on neutral. 80kW@30MVA
  - v Load (copper or I2R) loss 110% rating, Tap Changer on neutral 97kW@33kW
  - vi Load (copper or I2R) loss 100% rating, 56 MVA, Tap Changer on neutral. 280kW@56MVA
  - vii Total no load (core) and load (copper or I2R) loss 100% rating, 56 MVA, Tap Changer on neutral. 310kW@56MVA
  - viii Total no load (core) and load (copper or I2R) loss 100% rating, 30 MVA, Tap Changer on neutral. 110kW@30MVA
  - ix Highest no load (core) and load (copper or I2R) loss 100% rating 30 MVA at worst-case Tap Changer position or positions.  
Specify tap: N/A
  - x Highest no load (core) and load (copper or I2R) loss 100% rating 56 MVA at worst-case Tap Changer position or positions.  
Specify tap: N/A
  - xi Total cooling fan loss at rated fan motor volts, at both 55°C and 65°C rise. 4.4kW
  - xii Total auxiliary losses, including cooling, for all stages of cooling fans, space heaters and other ancillary equipment at both 55°C and 65°C rise. 7.2kW
- (16) Guaranteed maximum audio sound levels of transformer in decibels at HVC tap and the LTC on the tap settings producing the highest sound level, bidder shall state the LTC tap position(s) producing the highest sound level:
- i At the ONAN rating at both 55°C and 65°C rise. 65dB
  - ii At the ONAF rating with all fans running at both 55°C and 65°C rise. 74dB
- (17) Weights
- i Core and Windings (main): 98104LBS.
  - ii Series / booster transformer / preventative autotransformer (if applicable): N/A
  - iii Tank and fittings: 59586LBS.
  - iv Fan equipment: 15408LBS.
  - v Oil (including LTC, and radiator oil): 7062Gallons
  - vi Total gross weight of transformer: 210097LBS.
  - vii Total shipping weight: 135323LBS.
- (18) Type of oil preservation system: Conservator
- (19) Method of mounting radiators; removable or integral with the tank: Removable
- (20) BIL - High voltage and low voltage windings, including the neutral.

- (21) State types of transformer gasket materials to be used.  
Reusable, weatherproof and watertight gaskets shall be used.
- (22) Detailed description of Tap Changers.  
DETC on high side and LTC on low side shall be manufactured by Reinhausen.
- (23) State required minimum distance in linear feet to the any fire and sound walls.  
33'
- (24) State X/R ratio @ 30 MVA, 55°C rise.  
69/12.47
- (25) State X/R ratio @ 44.8 MVA, 65°C rise.  
69/12.47

#### **1.07 MANUFACTURER PRODUCT INFORMATION**

1.07.01 All Manufacturer's shall (i) own/operate a high voltage transformer repair facility which is capable of diagnosis, repair, and restoration of the transformer to its full capability as delineated in the specification, or (ii) have an established current agreement with a facility owner/operator of a high voltage transformer repair facility which will permit manufacturer to diagnosis, repair, and restore the transformer to its full capability as delineated in the specification during the 5 year warranty period. The shipping time to this repair facility cannot exceed 10 working days.

1.07.02 State the company name; contact person's name, phone, email; address of assembly plant where transformer is to be constructed, and location and address of high voltage test facility to perform dielectric tests if different from assembly plant. Also, state the location of the transformer repair facility.

- (a) Assembly Plant: Liyang city, China
- (b) Test Facility: Liyang city, China
- (c) Repair Facility: California, USA

1.07.03 Users of similar product

- (a) Each Bidder shall furnish as part of the Proposal, a list of users of similar product, including the unit capacity, voltage, rating, year of manufacturing, and client's name and phone number.

1.07.04 Each Bidder shall furnish as part of the Proposal a brochure that shows the plant, its location, capacity, years of manufacturing the similar products and any other information to make ANAHEIM familiar with the Bidder's capabilities.

#### **1.08 DELIVERY TIME**

- (a) Delivery is required by the date specified in the eBid documents including time for drawing approval and tests/measurements.

### CLIENT REFERENCE LIST for

**BID # 7894**      **Bid Title:** POWER TRANSFORMER: THREE-PHASE: with LTC: 69KV-12.47KV, 30/40/50 MVA (Spec. E-20) 7894

**Proposer's Company Name:** Jiangsu Huapeng Transformer Co., Ltd. DBA JSHP Transformer

List client references for which your company has performed similar work as described and required in the bid specifications.

1.	Company	SMUD
	Address	6201 S Street
	City, ST, zip	Sacramento, California
	Contact Name	James Hayes
	Phone Number	916-732-6450
	Fax Number	
	Email	Jim.hayes@smud.com
	Years and nature of relationship	Supplied one unit of 116/21.9 kV, 24/32/40 MVA in 2009 and delivering one unit of 230KV 240MVA autotransformer in 2013.
2.	Company	BC Hydro
	Address	
	City, ST, zip	Vancouver, BC, Canada
	Contact Name	Bob Middleton
	Phone Number	604 528 2198
	Fax Number	
	Email	Bob.Middleton@bchydro.com
	Years and nature of relationship	Delivered 8 units from 115Kv to 230KV 400MVA autotransformers And has 5 year alliance agreement
3.	Company	City of Lakeland
	Address	501 E. Lemon Street, A-71
	City, ST, zip	Lakeland, FL
	Contact Name	Randy Dotsan
	Phone Number	863-698-0330
	Fax Number	
	Email	randall.dotson@lakelandelectric.com
	Years and nature of relationship	Supplied one unit 230/69-21 kV, 90/120/150 MVA autotransformer in 2009
4.	Company	Iberdrola Renewable
	Address	1125 NW Couch St., Suite 700
	City, ST, zip	Portland, Oregon
	Contact Name	MR. Osvaldo Villanueva
	Phone Number	503-478-6318
	Fax Number	
	Email	Osvaldo.Villanueva@iberdrolausa.com
	Years and nature of relationship	Supplied more than 10 units of 110KV, 230kV transformers in past 5 year, including two units of 220kV 150MVA auto to Rosamond,CA in 2010

Use additional pages if necessary to include additional client references you would like the City to take into consideration.

**CITY OF ANAHEIM  
NON-COLLUSION AFFIDAVIT**

(TO BE EXECUTED BY BIDDER, NOTARIZED & SUBMITTED WITH BID)

Re: Bid / RFP # 7894 for: POWER TRANSFORMER: THREE-PHASE: with LOAD-TAP-CHANGER:  
69KV-12.47KV, 30/40/50 MVA (33.6/44.8/56 MVA @65C rise) per SPEC E-20  
(Insert #) (title of bid)

STATE OF California  
(The State of the place of business)

SS.

COUNTY OF \_\_\_\_\_  
(The County of the place of business)

I, Jim Y Cai, being first duly sworn, deposes and  
(Name of the person signing this form)

says that s/he is President of Doubletree Systems, Inc., the party making  
(Title of the person signing this form) (Name of bidding company)

the foregoing bid that such bid is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization or corporation; that such bid is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that said bidder has not in any manner directly or indirectly sought by agreement, communication, or conference with anyone to fix the bid price of said bidder or of any other bidder, or to fix any overhead, profit, or cost element of such bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in such bid are true, and further, that said bidder has not directly or indirectly submitted his bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid and will not pay any fee in connection therewith, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, or to any other individual except to any person or persons as have a partnership or other financial interest with said bidder in this general business.

Jim Y Cai

(Printed name of the person authorized to sign)

By \_\_\_\_\_

(Signature)

Subscribed and sworn to before me this

7 day of May, 2013

Notary Public in and for said County and State

*see attached  
for Notary*

NON-COLLUSION AFFIDAVIT-Notary Required

# CALIFORNIA JURAT WITH AFFIANT STATEMENT

- ☒ See Attached Document (Notary to cross out lines 1-6 below)  
☐ See Statement Below (Lines 1-5 to be completed only by document signer[s], *not* Notary)

1  
2  
3  
4  
5  
6

Signature of Document Signer No. 1

Signature of Document Signer No. 2 (if any)

State of California }  
County of Santa Clara } ss.

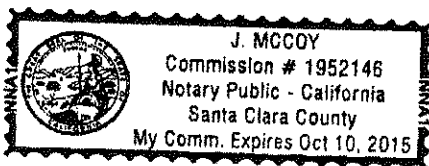
Subscribed and sworn to (or affirmed) before me on this

7 day of May, 2013, by  
Date Month Year  
(1) Yunging Cai  
Name of Signer

- ☐ Personally known to me  
☒ Proved to me on the basis of satisfactory evidence to be the person who appeared before me (.) (.)  
(and

(2) \_\_\_\_\_  
Name of Signer

- ☐ Personally known to me  
☒ Proved to me on the basis of satisfactory evidence to be the person who appeared before me.)



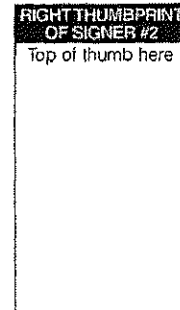
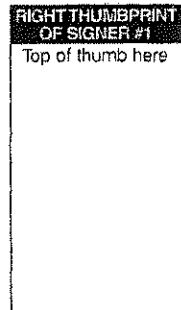
Place Notary Seal Above

## OPTIONAL

Though the information below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent removal and reattachment of this form to another document.

### Further Description of Any Attached Document

Title or Type of Document: City of Anaheim Non-Collision Affidavit  
Document Date: 5-7-13 Number of Pages: 1  
Signer(s) Other Than Named Above: NONE



## Recommended Spare Parts List

Recommended spare parts for start-up and 5 years operation are as follows:

IT	DESCRIPTION	UNIT	QTY	UNIT PRICE US\$ FOB destination	TOTAL PRICE US\$ FOB destination
1	HV Bushing gaskets	SET	1	-	-
2	LV Bushing gaskets	SET	1	-	-
3	Neutral Bushing gaskets	SET	1	-	-
4	Complete Set of Gaskets	SET	1	-	-
5	Fan with Motor	SET	1	1,300	1,300
6	Complete set of contacts and coils	SET	2	700	700
7	Finish Paint	kg	3	-	-

Note: Price for spare parts is not included in the quotation price of transformer.

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## Manufacturing/Delivery Schedule

1. Number of weeks to submit drawings/documents after receipt of order.

Approval Dwgs: 8 weeks

Final Prints Dwgs: 14 weeks

Instruction Manuals: 28 weeks

Certified Test Reports: 28 weeks

2. Number of weeks allocated for customer to review drawings: 2 weeks

3. Number of weeks to fabricate and ready for shipment after drawing comment or release to proceed. 14 weeks

4. Number of work days included in this event for shop testing: 7 days

5. Number of work days included for preparation for shipment: 14 days

6. Quoted shipping duration to Site from Point of Shipment: 7 weeks

7. Total quoted delivery period (*after receipt of award*) 36 weeks



**CLIENT REFERENCE LIST**  
for

**BID #** 7894 **Bid Title:** POWER TRANSFORMER: THREE-PHASE: with LOAD-TAP-CHANGER: per SPEC E-20

**Proposer's Company Name:** Jiangsu Huapeng Transformer Co., Ltd. DBA JSHP Transformer

List client references for which your company has performed similar work as described and required in the bid specifications.

1.	Company	<u>FortisBC</u>	
	Address	<u>FortisBC</u>	
	City, ST, zip	<u>BC, Canada</u>	
	Contact Name	<u>Keith Ankerman</u>	
	Phone Number	<u>250-717-0851</u>	Fax Number
	Email	<u>keith.ankerman@fortisbc.com</u>	
	Years and nature of relationship		
<hr/>			
2.	Company	<u>BC Hydro</u>	
	Address		
	City, ST, zip	<u>Vancouver, BC, Canada</u>	
	Contact Name	<u>Bob Middleton</u>	
	Phone Number	<u>604 528 2198</u>	Fax Number
	Email	<u>Bob.Middleton@bchydro.com</u>	
	Years and nature of relationship	<u>5 years</u>	
<hr/>			
3.	Company	<u>Grand River Dam Authority</u>	
	Address	<u>222 west dwain willis avenue</u>	
	City, ST, zip	<u>Vinita OK 74301</u>	
	Contact Name	<u>Jeff Tullis</u>	
	Phone Number	<u>918 824 7837</u>	Fax Number
	Email		
	Years and nature of relationship		
<hr/>			
4.	Company	<u>Bechtel Canada</u>	
	Address		
	City, ST, zip		
	Contact Name	<u>Patrick Lemee</u>	
	Phone Number	<u>514 394 3878</u>	Fax Number
	Email	<u>pleme@bechtel.com</u>	
	Years and nature of relationship		

Use additional pages if necessary to include additional client references you would like the City to take into consideration.

## Summary of JSHP Transformer Service in North America

August 18, 2007

JSHP Transformer Co., Ltd. has setup a marketing and support office under contract with Doubletree Systems in Oct., 2006 and the office is located in Sunnyvale, California.

JSHP has signed a strategic agreement with North American Substation Service ( NASS ) led by former Waukesha transformer service manager Mark Roberts to provide prompt transformer service for JSHP in US. NASS sent a couple of engineers to JSHP China to have training on JSHP transformers. NASS provides assembly, oil filling, testing, and warranty service on demand basis. And NASS also provides necessary insurance for the service.

NASS headquartered in Florida has about 50 field engineers around US to provide transformer services. NASS has two engineers to cover Virginia area.

At the same time, JSHP has its own people ready to go US anytime when necessary since they already have multiple entry visa to US.

One of JSHP team is Mr. Eric Yin, Manger of JSHP international sales since 2006. He has 10 years with JSHP, 4 years as director of design engineering before he was promoted to the manager of JSHP international sales. He speaks English and has multiple entry US visa. He will spend half of his time in US to support US office.

Jim Y Cai, manager of North America Marketing & Support of JSHP Transformer Co.,Ltd has 20 years in power systems control & protection, with 14 years in US. Jim Cai will run day-to-day operation of the office and coordinates between US and China and provides support to local sales representatives. Right now, JSHP has about 35 states covered by sales representatives.



JSHP set up US office

Early 2007, JSHP has received orders to provide one unit of 230KV/115KV/34.5KV 84/112/140 MVA and one unit of 115KV/34.5KV 75/100/125MVA to Cohocton, NY of UPC Wind and one unit of 115KV/22MVA to Stage Coach Substation owned by NY Oil & Gas. All the three units will be delivered on site by August, 2007.

So far, the production schedule is on time and JSHP will use the Sunnyvale office to handle the orders. Professional logistic company familiar with power transformers will be

# JSHP

## TRANSFORMER

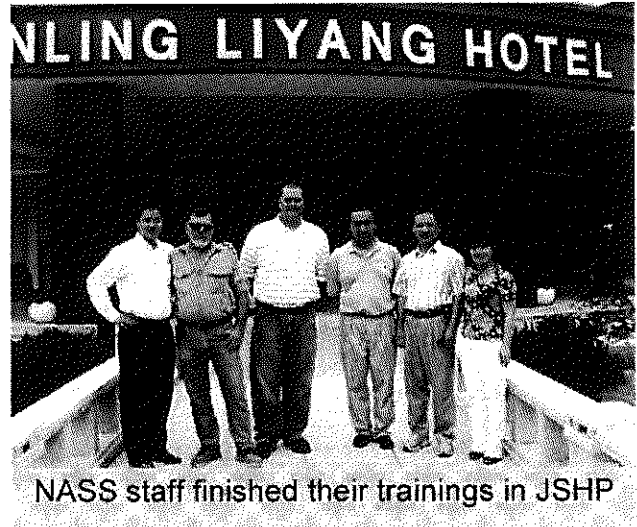
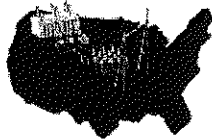


used and NASS will have their engineers trained in JSHP and get ready for the commissioning.

JSHP's north America office will demonstrate its ability of providing necessary US marketing and service support for US customers through those new orders in US.

NASS Contact:

Pierre Feghali, P.E.  
Vice President of  
Business Development  
North American Substation Services, Inc  
Email:  
pfeghali@northamericansubstationservices.com  
Cell: 408-533-3327  
Office: 407-788-3717  
Efax: 408-490-2756



NASS staff finished their trainings in JSHP

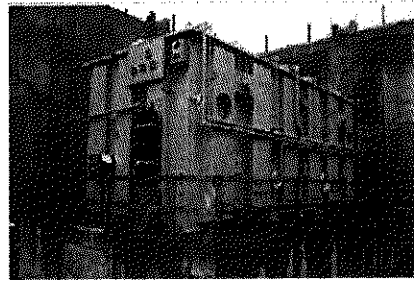
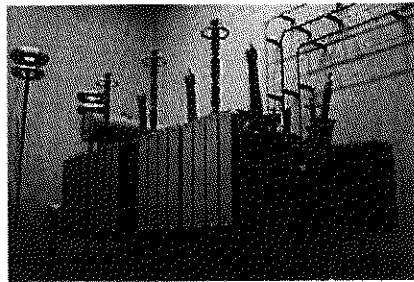
# JSHP TRANSFORMER



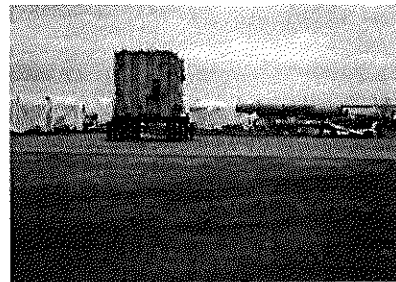
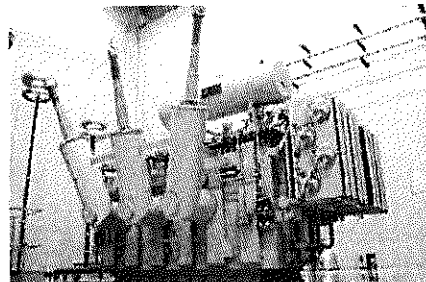
## JSHP References in North America

May 11, 2012

- Received PO from CH2M to supply of 2 units of 230kV 2976MVA and one 230kV 351MVA GSUs for WEST DEPTFORD ENERGY STATION, NJ, USA
- Received order from Pacificorp for one unit of 230KV 125MVA autotransformer & one 161kV 180 MVA for MidAmerican
- Received order from NYSEG for 9 units , up to 230kV, 300MVA
- Received order from New York Power Authority for 5 units of 230kV 140 MVA GSUs
- Received repeated PO from Iberdrola Renewables
- Received order from AES for one 345kV GSU .
- Received an award from Bayonne Energy Center for supply one 345kV 610 MVA Step up and Four of 138kV 160MVA GSU and two Aux transformers to be delivered to Bayonne, NJ around end of 2010.



- Received award notice from BC Transmission Corp. with a 5 year alliance contract to supply 230kV autotransformers from 2010 to 2014
- Received order from the Grand River Dam Authority for a 345kV, 280 MVA autotransformer



- Received order from FortisBC for 4 GSUs including 230kV, 200 MVA



# JSHP TRANSFORMER



- Received order from New York Power Authority for one 138kV, 120MVA GSU transformer



- Two Units of 230kV, 400 MVA autotransformers to be delivered in 2009 to Vancouver, BC

## Mr. Bob Middleton

BC Hydro, Stations Maintenance & Transmission Engineering  
Vancouver, BC, Canada  
Email: [Bob.Middleton@bchydro.com](mailto:Bob.Middleton@bchydro.com)  
Tel: (604) 528-2198



- Received orders from Iberdrola Renewable ( former PPM Energy ) of Portland, Oregon for  
One unit 115/34.5kV 30/40/50 MVA &  
One unit 39/52/65 MVA 69Y/39.8-34.5Y/19.9KV  
One unit 60/80/100 MVA 161/34.5kV

## Mr. Villanueva, Osvaldo

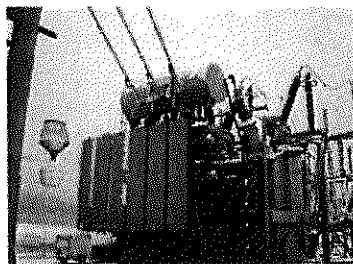
1125 NW Couch St., Suite 700  
Portland, Oregon 97209  
Tel: 503-478-6318  
Email: [Osvaldo.Villanueva@iberdrolausa.com](mailto:Osvaldo.Villanueva@iberdrolausa.com)  
Mr. Ken Long/Stantec  
Portland, OR  
Tel: (503) 297-1631 Email: [KLong@stantec.com](mailto:KLong@stantec.com)



- Bechtel Canada Order  
8 units 69kV 40MVA autotransformers  
2 units 18/24MVA 46/4.16KV autotransformers  
to be delivered in Sept., 2009  
Patrick Lemée / Phone: +1 (514) 394-3878  
Email: [pleme@bechtel.com](mailto:pleme@bechtel.com)

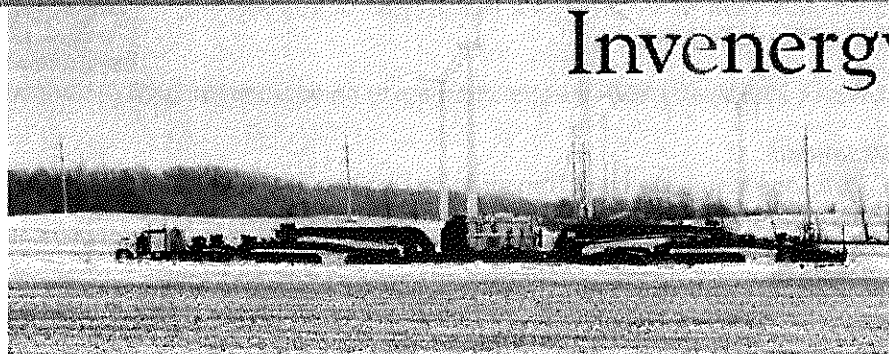


- Received order on May 15, 2008 from MSE Power Systems for Windy Point Partners for one 230kV 48/64/80 MVA unit to be delivered by Nov 17, 2008.  
403 New Karner Road Albany, NY 12205




## MSE Power Systems

- Received order from Invenergy LLC for 2008 delivery of 230kV 133 MVA autotransformer.  
Mr. Mike Bessell, One South Wacker Dr, Ste 2020, Chicago, IL 60606  
[mbessell@invenergyllc.com](mailto:mbessell@invenergyllc.com) office 312-506-1470



## Invenergy

- Received letter of intent from SMUD ( Sacramento Municipal Utility Department ) of California for one 138kV autotransformer for delivery by  **SMUD**
- Received an order from FPL for 3 universal spare GSU transformers on March 3, 2008 and will deliver to site at Maine March, 2009

**Joe Watson**

Manager,Thermal/Hydro Power Delivery  
FPL Energy  
700 Universe Blvd.GPA/JB  
Juno Beach,FL 33408  
Office Phone (561)691-2206  
Email: Joe\_Watson@fpl.com



- Received order on Jan 18, 2008 from Everpower Renewables of Krayn Wind LLC for 115KV66KV/19.92KV 42/56/70 MVA with 28 weeks lead time ARO.
- Received an order on June 3, 2008 from city of Lakeland, Florida for one unit 230/69-21 kV, 90/120/150 MVA with 30 weeks lead time ARO

**Randall "Randy" L. Dotson, P.E.**

LAKELAND ELECTRIC  
Mgr. of Substation Operations, Energy Delivery  
501 E. Lemon Street, A-71  
Lakeland, FL 33801



Phone 863-834-6494  
Cell 863-698-0330  
email randall.dotson@lakelandelectric.com

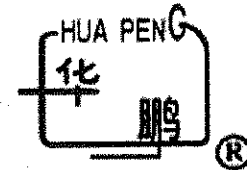
- JSHP has passed vendor pre-qualification at AEP and **Black & Veatch**.

AEP Contact:  
Black & Veatch:

**Mr. Ted Everman @ 614-552-1458**  
**Mr. Joe Eschbacher**  
Procurement Specialist  
Central Procurement - Black & Veatch  
Ph. 913.458.2185



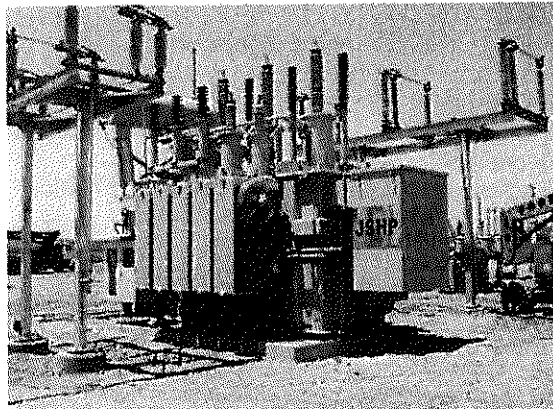
# JSHP TRANSFORMER



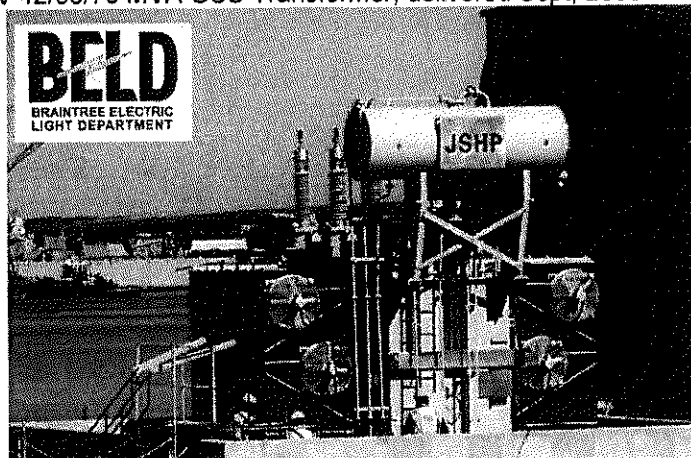
- An order by Public Service Company of New Mexico (PNM) : 138kV/69kV 42/56/70 MVA Auto Transformer , RMV-II and was delivered June, 2008

**Mr. Robert Perlicek**

Public Service Company of New Mexico (PNM)  
Alvarado Square  
414 Silver SW  
Albuquerque, NM 87102 Tel: (505) 241-4807



- An order by Braintree Electric Light Department (BELD) on July, 2007: Two units 115kV/13.8kV 42/56/70 MVA GSU Transformer, delivered Sept, 2008



**Weijun Li, P.E.** Principal Engineer Braintree Electric Light Department  
150 Potter Road, Braintree, MA 02184

Phone: 781.348.1076 Email: [wli@beld.com](mailto:wli@beld.com)

"On a Mission from BELD " An article on trip to JSHP & Korea by BELD published in Braintree Forum. ( Please click on the link, or copy the link <http://www.townonline.com/braintree/news/x1640529270> to your Web Browser )

**Arnold Carlos, P.Eng.**

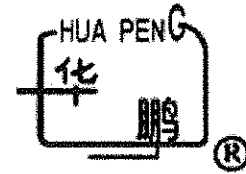
A.G. Carlos Inc.

Phone: (519) 341-4781

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North America Marketing & Service  
4030 Moorpark Avenue, Suite 222, San Jose, CA94086, USA  
Tel: +1-408-850-1416 Email: [services@jshp.com](mailto:services@jshp.com) Web: [www.jshp.com](http://www.jshp.com)

# JSHP TRANSFORMER



Email: [arnold@agcarlos.com](mailto:arnold@agcarlos.com)

- The engineers who went to the JSHP factory and witnessed the test

**Mr. Tim Ellison, P.E.**

Senior Consultant

MSE Power Systems, Inc.

403 New Karner Road

Albany, NY 12205

Phone (518) 452-7718 x155

Email: [tellison@msepowers.com](mailto:tellison@msepowers.com)

**Michael L. Lamb & Jim Campbell**

Consulting Engineer-Transformers

Dominion Technical Solutions, Inc.

2400 Grayland Avenue, Richmond, VA 23220 Office -- (804) 257-4006

Email: [Mike\\_Lamb@Dom.com](mailto:Mike_Lamb@Dom.com)

**Mr. Jin Sim**

VP of Technology

Waukesha Electric Systems

Email: [Jin.Sim@Waukesha.spx.com](mailto:Jin.Sim@Waukesha.spx.com)

Tel: (919) 580-3234



- OEM to GE Prolec with GE brand to the North America market .

JSHP transformers have been used in North America through GE Prolec. The transformers branded as GE-Prolec product were sold to and supported in North America by GE-Prolec.

In 2008, JSHP Transformer delivered 823 units of 110kV-345kV voltage level transformers and has thousands oil immersed units installed world wide.

In 2009, JSHP Transformer delivered about 766 units of 110kV-500kV voltage level transformers and 100+ units of them are 220kV up.

In 2010, JSHP Transformer delivered about 653 units of 110kV-500kV voltage level transformers and 100+ units of them are 220kV up.





## Five Years Limited Warranty

JSHP Transformer Co., Ltd. warrants to the purchaser that the transformer, together with all parts and components in the original purchase, and according with customer's requirement, is free of defects in workmanship and materials.

This warranty extends to all parts manufactured by the seller, JSHP, for 66 months after delivery from the factory or 60 months from commissioning date, whichever period expires first. All other components parts are warranted for the same periods, or for the periods covered by the original equipment manufacturer's warranty, whichever is longer. This warranty covers any defects and malfunction of transformer except that which may happen because of vandalism, improper installation if not provided by JSHP, handling, operation, or for any cause other than defects in workmanship and materials. The method and extent of repairs to be made rests solely with JSHP.

During the warranty period guidance of erection costs are included. This warranty does cover the cost of removal from the site and reinstallation after repair, and costs resulting from the moving of structures or associated equipment are excluded.

The seller, JSHP, shall not be liable for special, indirect, or consequential damages, and this warranty is in lieu of all warranties of merchantability, fitness for a particular purpose or other warranties expressed or implied, and the remedies of the customer herein provided fulfill all liabilities of JSHP, whether in warranty, negligence or otherwise.

Unless otherwise agreed, the transformer will be shipped Shanghai port in China. Shipments will be mutually agreed upon means (e.g. truck) to site specify by customer, provide no unusual circumstances unknown to JSHP (no roads, impassable conditions or extreme grades). Customer agrees to inspect transformer within 48 hours of arrival at destination and notify both JSHP and the carrier of any observable damage or irregularity. **NOTIFICATION SHALL BE ACCOMPLISHED BY COMPLETING AND RETURN JSHP TRANSFORMER CO., LTD. FORM INSPECTION RECEIPT SUMMARY.**

**THE SELLER SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. THE SELLER MAKES NO WARRANTY OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER WARRANTY EITHER EXPRESSED OR IMPLIED, EXCEPT AS EXPRESSLY SET FOR THE HEREIN.**

Revised January, 2008



**JSHP Transformer Co., Ltd.**

## **Copy of Quality Control Certificates**

- **ISO9001:2008**
- **ISO14001:2004**
- **OHSAS18001-1999**
- **CE Certificate**



华信技术检验有限公司  
VOUCHING TECHNICAL INSPECTION LTD

## 管理体系认证证书

CERTIFICATE OF REGISTRATION

我公司认定下列组织的质量管理体系  
VTI Certifies herewith that

江苏华鹏变压器有限公司  
Jiangsu Huapeng Transformer Co., Ltd.

江苏省溧阳市昆仑开发区 68 号  
No. 68 Kunlun Developed Zone, Liyang City, Jiangsu, P.R. China  
邮政编码 (ZIP): 213300

符合以下标准的要求, 特发此证  
demonstrated a Quality Management Systems  
that complies with the requirements of

**GB/T19001-2008 idt ISO9001:2008**

管理体系认证范围 (详见证书附件):

Scope:

油浸式变压器、干式变压器、组合式变压器、预装式变电站、单相变压器以及  
各种特种变压器、散热器、电磁线的设计、制造、销售和服务

**Design, manufacture, sale and service of oil-immersed type transformer, dry-type  
transformer, pad-mounted transformer, prefabricated substation, single-phase  
transformer, all kinds of special transformer, radiator and wire**

注册号:  
Registration No.

0411Q10022R5M

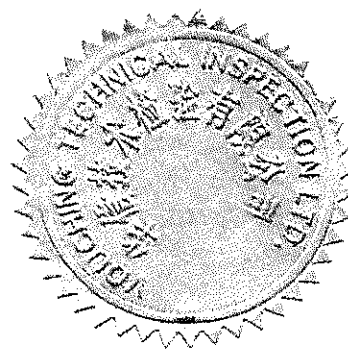
颁发日期:  
Issue Date

2011-1-14

有效终止日期:  
Expiration Date

2014-1-14

总经理 (President):



本证书有效性须由每年例行监督审核维持

中国·北京海淀区北三环西路 48 号 2 号楼 2 层  
Building 2, Floor 2, No. 48 Beisanhuan Xilu, Beijing, China

邮编: 100086  
www.vti-china.org



华信技术检验有限公司  
VOUCHING TECHNICAL INSPECTION LTD

## 管理体系认证证书

CERTIFICATE OF REGISTRATION

我公司认定下列组织的职业健康安全管理体系  
VTI Certifies herewith that

江苏华鹏变压器有限公司  
Jiangsu Huapeng Transformer Co., Ltd.

江苏省溧阳市昆仑开发区 68 号  
No. 68 Kunlun Developed Zone, Liyang City, Jiangsu, P.R. China  
邮政编码 (ZIP): 213300

符合以下标准的要求, 特发此证  
has demonstrated an Occupational Health and Safety Management System  
that complies with the requirements of

**GB/T28001-2001 (covers OHSAS18001:1999)**

职业健康安全管理体系覆盖范围:

Scope:

油浸式变压器、干式变压器、组合式变压器、预装式变电站、单相变压器  
以及各种特种变压器、散热器、电磁线的设计、制造、销售和服务

Design, manufacture, sale and service of oil-immersed type transformer, dry-type  
transformer, pad-mounted transformer, prefabricated substation, single-phase  
transformer, all kinds of special transformer, radiator and wire

注册号:  
Registration No.

0411S10026R2M

颁发日期:  
Issue Date

2011-1-10

有效终止日期:  
Expiration Date

2014-1-10



总经理 President



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中国·北京海淀区北三环西路48号2号楼2层  
Building2, Floor2, No.48 Beisanhuan Xilu, Beijing, China

邮编: 100086  
www.vti-china.org



华信技术检验有限公司  
VOUCHING TECHNICAL INSPECTION LTD

## 管理体系认证证书

### CERTIFICATE OF REGISTRATION

我公司认定下列组织的环境管理体系

VTI Certifies herewith that

江苏华鹏变压器有限公司

Jiangsu Huapeng Transformer Co., Ltd.

江苏省溧阳市昆仑开发区 68 号

No. 68 Kunlun Developed Zone, Liyang City, Jiangsu, P.R. China

邮政编码 (ZIP): 213300

符合以下标准的要求, 特发此证

has demonstrated an Environmental Management System  
that complies with the requirements of

**GB/T24001-2004 idt ISO14001:2004**

环境管理体系覆盖范围:

Scope:

油浸式变压器、干式变压器、组合式变压器、预装式变电站、单相变压器  
以及各种特种变压器、散热器、电磁线的设计、制造、销售和服务

Design, manufacture, sale and service of oil-immersed type transformer, dry-type  
transformer, pad-mounted transformer, prefabricated substation, single-phase  
transformer, all kinds of special transformer, radiator and wire

注册号:  
Registration No.

0411E10025R2M

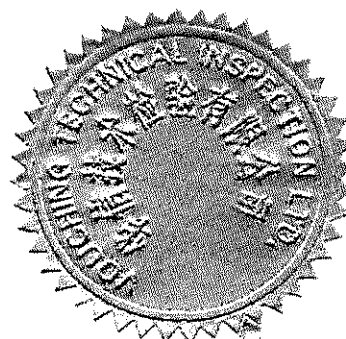
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Building2, Floor2, No.48 Beisanhuan Xilu, Beijing, China

邮编: 100086  
www.vti-china.org

## CE Certificate

**DECLARATION**

Number: 220905

*of*

**OFFICIAL LEGAL**

**EUROPEAN AUTHORIZED REPRESENTATIVE**

*for the company*

Jiangsu Huapeng Transformer Co Ltd  
Zhengchang Road,  
Kunlun Development  
Liyang City, Jiangsu Province  
P.R. China 213300

**Appointed Authorized Representative**

*In compliance with the TUV-ISO 9001-2000 Quality Assurance System*

**CONSULTANTS EUROPE BV, WEESP, THE NETHERLANDS**


*the following CE-certified products will be included*


Transformer MBS9 - 1600/11  
Transformer MBS9 - 2000/11  
Transformer MBS9 - 2500/11

**ORIGINEEL**

Date: September 26, 2005

Place: Weesp, the Netherlands





POWER TRANSFORMER: 3-PHASE: w/LOAD-TAP-CHANGER:69KV-12.47KV, 30/40/50 MVA (Spec E-20) (7894), bidding

Printed 05/14/2013

**Bid Results****Bidder Details**

**Vendor Name** Doubletree Systems inc  
**Address** 4030 moorpark ave., ste. 222  
 san jose, CA 95117  
 United States

**Respondee** Jim Y Cai  
**Respondee Title** President  
**Phone** 408-850-1416 Ext.  
**Email** jimcai@jshp-usa.com

**Vendor Type**

**Bid Detail**

**Bid Format** Electronic  
**Submitted** May 7, 2013 4:17:37 PM (Pacific)  
**Delivery Method** web  
**Bid Responsive** Yes  
**Bid Status** Submitted  
**Confirmation #** 22539  
**Ranking** 0

**Respondee Comment****Buyer Comment**

No exceptions to City's T&amp;Cs stated.

**Attachments**

File Title	File Name	File Type
Non-collusion Affidavit	NON-COLLUSION AFFIDAVIT-Notary Required.pdf	Non-collusion Affidavit
References	E-BID CLIENT REFERENCE LIST_JSHP.pdf	Client References
Whole proposal package	JSHP_7894-Transformer-69KV_Proposal_DSI.pdf	Required Attachments per E20 Specifications

**Line Items**

Type	Item Code	UOM	Qty	Unit Price	Line Total	Discount	Comment
<b>Discount Terms</b> no discount							
<b>REQUIRED ITEMS: costs for everything necessary to provide these items in accordance with the E20 Specifications</b>							
1	TRANSFORMER: a complete and fully functional transformer in full accordance with the E20 Specifications.						
	EA		1	\$715,000.0000	\$715,000.0000	\$715,000.0000	
2	DELIVERY: to deliver the Transformer and all required items to FOB Anaheim CA						
	LOT		1	\$95,000.0000	\$95,000.0000	\$95,000.0000	
3	OFF-LOADING and PLACEMENT: to offload and set the Transformer on the mounting pad; ready for final welding and connections.						
	LOT		1	\$4,500.0000	\$4,500.0000	\$4,500.0000	
4	ASSEMBLY: to assemble the Transformer and all required appurtenances to complete Transformer.						
	LOT		1	\$39,000.0000	\$39,000.0000	\$39,000.0000	

POWER TRANSFORMER: 3-PHASE: w/LOAD-TAP-CHANGER:69KV-12.47KV, 30/40/50 MVA (Spec E-20) (7894), bidding

Printed 05/14/2013

**Bid Results**

Type	Item Code	UOM	Qty	Unit Price	Line Total	Discount	Comment
5	OIL TRANSFER: all labor and materials to complete oil transfer.						
		LOT	1	\$500.0000	\$500.0000	\$500.0000	
6	FIELD-TESTING and ADJUSTMENTS: cost Field-testing of and required Adjustments to the transformer at the jobsite to ensure it is prepared to go online.						
		LOT	1	\$5,000.0000	\$5,000.0000	\$5,000.0000	
				<b>Subtotal</b>	<b>\$859,000.0000</b>	<b>\$859,000.0000</b>	
<b>OPTIONAL ITEMS: costs for everything necessary for these items; City, at its discretion, may choose all, some, or none of them; however, if chosen, they will be considered in the evaluation of all bids:</b>							
7	TECHNICAL SUPPORT: for Morgan Schaffer to provide a technical support specialist to perform a technical assessment of all 12 different Calisto monitors at various substations located in Anaheim.						
		LUMPSUM	1	\$5,800.0000	\$5,800.0000	\$5,800.0000	
8	69 kV bushing complete w/ gaskets.						
		LOT	1	\$2,900.0000	\$2,900.0000	\$2,900.0000	
9	15 kV low-voltage bushing complete w/ gaskets.						
		LOT	1	\$3,800.0000	\$3,800.0000	\$3,800.0000	
10	Extra Gaskets, complete set, as required for all cover and tank openings, manholes and hand-holes.						
		SET	1	\$1,000.0000	\$1,000.0000	\$1,000.0000	
11	Transformer fan w/ motor.						
		SET	1	\$1,300.0000	\$1,300.0000	\$1,300.0000	
12	Contacts and coils, complete set, for each type of contactor/relay furnished on transformer, load tap changer.						
		LOT	1	\$800.0000	\$800.0000	\$800.0000	
13	Tools necessary for erection or maintenance of transformer. (Any items that are regularly furnished w/ this class of equipment, or are necessary for the satisfactory operation thereof, which are not specified herein.)						
		SET	1	0	0	0	
				<b>Subtotal</b>	<b>\$15,600.0000</b>	<b>\$15,600.0000</b>	
				<b>Total</b>	<b>\$874,600.0000</b>	<b>\$874,600.0000</b>	