

CITY OF ROSEVILLE

NOTICE TO BIDDERS

RFQ 2033

NOTICE IS HEREBY GIVEN that sealed bids for 60kV Network Panel Upgrade will be received by the City of Roseville. Bids will be accepted ONLY at the office of the City Clerk, Roseville Civic Center, **311 Vernon Street, Roseville, California**, until 3:00 p.m., September 18, 2012. Said bids will be publicly opened and read aloud at the City Clerk Research Room, 311 Vernon Street, Roseville, CA, at 3:05 p.m., September 18, 2012. Specifications and bid forms for the submitting of a proposal shall be obtained at the office of the Central Services Director or online at www.roseville.ca.us, and each bid shall be submitted only upon that form. Right is reserved to reject any or all bids and to waive any informalities or irregularities in any bid or in the bidding.

August 28, 2012

Date



Samuel D. Elmer
Administrative Analyst II

IMPORTANT!!!

The City is not responsible for misdelivered bids, and the Bidder is strictly liable for its chosen method of delivery. It is the Bidder's sole responsibility to make sure that bids arrive at the proper location. Any bid which does not actually arrive in the City Clerk's Office by the date and time of the bid opening will be rejected as non-responsive, even if properly addressed or delivered to another City Department.

Your bid **MUST** be addressed and delivered as follows:

**City of Roseville
Attn: Sonia Orozco, City Clerk
311 Vernon Street
Roseville, CA 95678**

The Bidder is also directed to place the enclosed bid label, without alteration, on the outside of the package or envelope so that it is visible when delivered to the City.

SEALED BID



**IMPORTANT
NOTICE TO
BIDDER**

*The envelope containing your bid **MUST** have:*

1. Your name and address in the **UPPER** left corner.
2. This label on the **LOWER** left corner.

INVITATION NO.

RFQ 2033

DATE OF OPENING

September 18, 2012

TIME OF OPENING

3:05 A.M. **X** P.M.

BID FOR

60kV Network Panel Upgrade

SEALED BID

CITY OF ROSEVILLE
RFQ 2033
60kV NETWORK PANEL UPGRADE

GENERAL INFORMATION

The purpose of this Request for Quotation (RFQ) is to solicit bids to provide all equipment, labor and materials for a 60kV Network Panel Upgrade, The successful bidder will be awarded a service agreement (see sample) and must comply with all terms and conditions located on page 2 of the document. Alterations to the terms and conditions will not be allowed. The successful bidder must provide the City of Roseville, and keep in full force and effect during the term of this contract, insurance certificates issued by and insurance company authorized to do business in California.

Please submit an original bid response with two (2) copies – a total of three (3) bid packages. Do not submit any information that is not absolutely necessary in the evaluation of your bid.

Bonds

The successful bidder will be required to provide 0% performance and payment (labor and materials) bond for purchases of \$25,000 or more, prior to award by City Council.

Licenses

The successful bidder must have all necessary licenses and permits required by Federal, State, County and municipal laws, ordinances, rules and regulations. The bidder shall maintain these licenses and permits. Failure to maintain a required license or permit may result in immediate termination of the agreement.

Award

Any resulting service agreement will be done in accordance with all specifications, terms and conditions of this RFQ. The City reserves the right to cancel this contract upon thirty (30) days written notice if the City determines that service, product quality, or response times are not in accordance with the specification of this RFQ. The award will be made to the lowest responsive bidder based on the evaluation criteria. Failure to provide information/answers and/or incomplete information/answers may result in a “non-responsive bidder.”

Required Documents

The following documents included in this RFQ must be returned in your bid response along with any other requested information to be used in the evaluation of your bid:

- a. Invitation for Bid and Award (Formal) (contains name, address, and signature of bidder)
- b. Section 00300 Schedule/Bid Forms – Relay Panels

**CITY OF ROSEVILLE
INVITATION FOR BID AND AWARD [FORMAL]**

RFQ NO. 2033

Issued Central Services Director
By: Purchasing Dept
City of Roseville, CA

Telephone: (916) 774-5720
Fax: (916) 774-5736

Date Issued:
August 28, 2012

Page
No.

No of
Pages

Sealed bids, subject to the Terms and Conditions of this Invitation for Bids and the accompanying Schedule, such other contract provisions, specifications, drawings, or other data as are attached or incorporated by reference in the Schedule, will be received at the office of the **City Clerk, 311 Vernon Street, Roseville, CA 95678**, until **3:00 p.m.**, Pacific Time on **September 18, 2012** and at that time publicly opened, for furnishing the equipment, supplies, or services described in the accompanying Schedule. Bid bond in the amount of 0% is required. Performance bond in the amount of 0% of the total amount of the bid shall be furnished by the successful bidder in accordance with Paragraph 11 of Terms and Conditions.

General information and instructions to bidders are contained in the terms and conditions on the attached page.

SCHEDULE

Please quote your best price, delivered FOB to the City of Roseville, in accordance with all specifications, terms, conditions, and attachments of RFQ 2033, for the following:

Total Lump Sum Bid Price \$_____
(Transferred from Section 00300: A-4)

DO NOT INCLUDE SALES TAX IN YOUR BID

Notes:

- Direct all questions regarding this RFQ to Peter Brevik in writing ONLY, via EMAIL at pBrevik@roseville.ca.us or by fax at 916-774-5736. **Questions *MUST* be submitted no later than Wednesday, September 12, 2012 at 1:00 p.m.**
- Submit (1) **ONE** original and (2) **TWO** copies of your bid package. Please mark packages, "original" and "copy".
- Bidder agrees to offer the City of Roseville and other public entities, public utilities, or non-profit public benefit corporations the item(s) and price(s) quoted herein, under the same terms and conditions of this RFQ, for a period of up to ____year(s). Price(s) may be adjusted in an amount not to exceed increases reflected in the U.S. Dept. OF Labor/Consumer Price Index_____. (Bidder to specify which index applies).

IMPORTANT: THE ATTACHED STICKER MUST APPEAR ON THE OUTSIDE OF THE SEALED BID ENVELOPE WHEN SUBMITTING A SEALED BID.

In compliance with the above, the undersigned offers and agrees to furnish any or all of the items or services enumerated on which prices are quoted at the unit price set opposite each item and deliver them at the designated point(s) within the time specified.

BIDDERS MUST COMPLETE THE FOLLOWING:

Discount terms: ____% ____ days.

Bidder agrees to accept payment by City Visa Credit Card. Yes No **Bidding and award on "all or none" basis.**

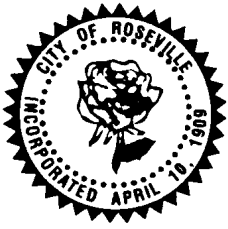
Name and Address of Bidder:

Signature of Person Authorized to Sign Bid:

Date of Bid:

BIDDER TO INDICATE STATUS, AS TO:
"PARTNERSHIP", "CORPORATION", "SOLE
PROPRIETORSHIP", ETC.

Type or Print Signer's Name, Title, Phone No. and Email



PURCHASING
CITY OF ROSEVILLE

2005 HILLTOP CIRCLE, ROSEVILLE, CA 95747
(916) 774-5720 • TDD (916) 774-5220 • FAX (916) 774-5736

SERVICE AGREEMENT

SERVICE AGREEMENT

No:

SERVICE LOCATION:

REQ. NO.: _____ DATE: _____

SUBMIT ALL INVOICES TO:

CITY OF ROSEVILLE
Finance Department
311 Vernon Street
Roseville, CA 95678

Contractor No.:

Telephone No.:

Fax:

Department:

Contractor:

Acct. Code:

Buyer:

Phone:

Start Date	Terms	Completion Date	Insurance Limits	Contact
			Approved by Risk Mgt.	

The contractor shall furnish all labor, equipment and materials necessary to accomplish the following:

SAMPLE

NOTE: Prevailing wage laws and fair employment practices apply to this agreement. Certified payroll documents must be submitted with your invoice(s) to the City's Accounts Payable office (see item 8 of the attached provisions).

Contractor License No.: _____

Total Cost of Service:

Business License No.: _____

\$ _____

ATTENTION: Total cost of service not to exceed the above amount without prior approval of the Purchasing Office.

The Contractor named hereon by the acceptance of this order agrees to the provisions on page 2 of this document titled "Service Agreement".

CITY OF ROSEVILLE,
A MUNICIPAL CORPORATION:

CONTRACTOR:

By: _____

By: _____

Title: _____

Ray Kerridge
City Manager

By: _____

Distribution: 1- Purchasing, 1 - Contractor, 1 - Originating Dept

Title: _____

1. Contractor shall hold harmless, defend and indemnify the City of Roseville and its officers, officials, employees and volunteers from and against all claims, damages, losses and expenses including attorney fees arising out of the work described herein, caused in whole or in part by any negligent act or omission of the contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts of any of them may be liable, except where caused by the active negligence, sole negligence, or willful misconduct of the City of Roseville.
2. Contractor is an independent contractor, and shall not be considered an officer, agent, or employee of City.
3. Without the written consent of the City, this Agreement is not assignable by Contractor either in whole or in part.
4. Time is of the essence of this Agreement.
5. At any time during the term of this Agreement, the City has the right to terminate this Agreement provided vendor is given a 30 day notice.
6. This Agreement may only be amended or modified in writing. It is integrated and contains the complete understanding of the parties.
7. All equipment, supplies and services sold to the City of Roseville shall conform to the general safety orders of the State of California.
8. Unless notified to the contrary, in writing, the City assumes that the Contractor has accepted the work in accordance with the plans and specifications (if any) and agrees to do the work in compliance with this Agreement.
9. All prevailing wages and fair employment practices will be adhered to. For prevailing wage contracts over \$25,000, copies of certified payroll must be submitted with invoices. Prevailing wage rates may be obtained from the State Department of Industrial Relations and/or the following website address: <http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm>.
- 10a. Unless otherwise specified, the Contractor shall maintain the following policies of insurance in full force and effect during the term of this Agreement in the amount shown below. The City of Roseville retains sole discretion in determining the types and proper levels of insurance coverage.

Commercial General Liability Insurance (policy to be as broad as the standard ISO form)	\$1,000,000 per occur/ \$2,000,000 aggregate
Automobile Liability Insurance including owned, hired, and non-owned vehicles.	\$500,000 per person/ \$1,000,000 per accident
Workers' Compensation	Statutory

- 10b. All insurance coverages of Contractor are primary insurance as to City. City shall not be required to contribute to any loss through its insurance policies and/or self-insured programs.
- 10c. The limits of insurance coverages specified above in no way limit the liability of Contractor for full payment and resolution of any claim resulting from Contractor's performance of services under this Agreement.
- 10d. A certificate of insurance, in a form approved by the Risk Management Division, shall be provided by Contractor prior to the execution of this agreement. The City requires at least 30 days prior written notice to the City of any material change or cancellation (10 day for non-payment). The certificate shall include an endorsement naming the City of Roseville, its officers, agents, employees and volunteers as an Additional Insured for on-going and completed operations. In addition, the insurance policy may not contain language which prohibits additional insureds or other insurers from satisfying the self-insured retention or deductible. Any deductibles or self-insured retentions must be declared on the certificate of insurance and approved by the City in writing.
- 10e. The Workers' Compensation policy shall contain the insurer's waiver of subrogation in favor of the City, its officers, agents and employees.
11. Contractor shall comply with all federal, state and local laws and ordinances, including but not limited to the City's storm water regulations, as may be applicable to the performance of services under this agreement. Failure to comply with local ordinances may result in monetary fines and cancellation of this agreement. Refer to www.roseville.ca.us/stormwater for links to more information on the City's storm water regulations.
12. In the event that the terms of any attachment or exhibit conflict with any terms of this Service Agreement, the terms of this Service Agreement shall control.

City reserves the right to withhold any payments to Contractor in the event of noncompliance with insurance requirements.

TERMS AND CONDITIONS OF INVITATION FOR BID

Read carefully

1. GENERAL CONDITIONS

Bidders are required to submit their proposals upon the following conditions:

- (a) Bidders shall thoroughly examine the drawings, specifications, schedule, instructions, and all other documents.
- (b) Bidders shall make all investigations necessary to thoroughly inform themselves regarding plant and facilities for delivery of material and equipment as required by the bid conditions. No plea of ignorance by the bidder of conditions that exist or that may hereafter exist as a result of failure or omission on the part of the bidder to make the necessary examinations and investigations, or failure to fulfill in every detail the requirements of the contract documents, will be accepted as a basis for varying the requirements of the City or the compensation to the vendor.
- (c) Bidders are advised that all City contracts are subject to all legal requirements provided for in the City Charter and/or applicable City ordinances, Uniform Commercial Code of California, and other applicable state and federal statutes.
- (d) No officer or employee of the City shall have a financial interest, direct or indirect, in any contract with the City, or shall be financially interested, directly or indirectly, in the sale to the City of any materials, supplies, or service, except on behalf of the City as an officer or employee. This prohibition extends to the City boards and commissions other than those which are purely advisory.

2. PREPARATION OF BIDS

Bids will be prepared in accordance with the following:

- (a) All information required by the bid form shall be furnished. The bidder shall print or type his name and manually sign the schedule and each continuation sheet on which an entry is made.
- (b) Unit prices shall be shown; and where there is an error in extension of price, the unit price shall govern.
- (c) Alternate bids will not be considered unless authorized by the Invitation For Bids.
- (d) Proposed delivery time must be shown and shall include Sundays and holidays.
- (e) Bidders will not include federal taxes in bid prices since the City of Roseville is exempt from payment of such taxes. An exemption certificate will be signed where applicable upon request.

3. DESCRIPTION OF SUPPLIES

Any catalog or manufacturer's reference used in describing an item is merely descriptive and not restrictive unless otherwise noted and is used only to indicate type and quality of material. Bidders are required to state exactly what they intend to furnish, otherwise they shall be required to furnish the items as specified.

4. SUBMISSION OF BIDS

- (a) Bids and changes thereto shall be enclosed in sealed envelopes addressed to the City Clerk, City of Roseville. The name and address of bidder, the date and hour of the bid opening, and the material or services bid on shall be placed on the outside of the envelope.
- (b) Bids must be submitted on the forms furnished. Telegraphic bids, including bids transmitted by facsimile means, will not be considered. Bids, however, may be withdrawn by telegraphic or facsimile notice provided such notice is received prior to the time and date set for the bid opening.
- (c) Samples, when required, must be submitted within the time specified at no expense to the City of Roseville. If not destroyed or used up during testing, samples will be returned upon request at the bidder's expense.

5. REJECTION OF BIDS

- (a) The City may reject a bid if:
 - 1. The bidder misstates or conceals any material fact in the bid or if,
 - 2. The bid does not strictly conform to law or the requirements of the bid or if,
 - 3. The bid is conditional, except that the bidder may qualify his bid for acceptance by the City on an "All or None" basis or a "Low Item" basis. An "All or None" basis bid must include all items upon which bids are invited.
- (b) In the event that a bidder is or subsequently becomes delinquent in the payment of his or its City taxes, including state and local sales tax, such fact shall constitute grounds for rejection of the bid, or if awarded the bid, for cancellation of the contract. However, the City reserves the right to deduct any delinquent taxes from payments that the City may owe to the delinquent bidder as a result of such contract.
- (c) The City may reject all bids whenever it is deemed in the best interest of the City to do so and may reject any part of a bid unless the bid has been qualified as provided in 5 (a) 3 above. The City may waive any minor informalities or irregularities in any bid.

6. WITHDRAWAL OF BIDS

Bids may not be withdrawn after the time set for the bid opening, unless approved by the City Council.

7. LATE BIDS OR MODIFICATIONS

Bids and modifications received after the time set for the bid opening will not be considered.

8. CLARIFICATION OR OBJECTION TO BID SPECIFICATIONS

If any person contemplating submitting a bid for this contract is in doubt as to the true meaning of the specifications, other bid documents, or any part thereof, he may submit to the Central Services Manager on or before five days prior to scheduled opening a request for clarification. All such requests for information shall be made in writing, and the person submitting the request will be responsible for its prompt delivery. Any interpretation of the bid, if made, will be made only by Addendum duly issued. A copy of such Addendum will be mailed or delivered to each person receiving a set of bids. The City will not be responsible for any other explanation or interpretation of the proposed bid made or given prior to the award of the contract. Any objections to the specifications and requirements as set forth in this bid must be filed in writing with the Central Services Manager on or before five days prior to scheduled opening.

9. DISCOUNTS

- (a) Prompt payment discounts will be considered in making the award provided the discount offered is sufficient to permit payment within such period in the regular course of business.
- (b) In connection with any discount offered, time will be computed from the date of receipt of supplies or serves, or from the date a correct invoice is received, whichever is the later date. Payment is deemed to have been made on the date of mailing of the check.

10. AWARD OF CONTRACT

- (a) The contract will be awarded to the lowest responsible bidder whose bid, conforming to the Invitation For Bids, is most advantageous to the City, price and other factors considered. The City may determine price based upon the cost to the City over the expected useful life of the materials or supplies.
- (b) The City reserves the right to accept any item or group of items of this bid, unless the bidder qualifies his bid by specific limitations. Re Par. 5 (a) 3 above.
- (c) A written award of acceptance mailed or otherwise furnished to the successful bidder results in binding contract without further action by either party.
- (d) Prices must be quoted f.o.b. Roseville with all transportation charges prepaid, unless otherwise specified in the Invitation For Bids.
- (e) Delivery time and prompt payment discounts, including time allowed for payment, will be considered in breaking of tie bids.

11. PERFORMANCE BOND

- (a) The successful bidder(s) shall furnish the City of Roseville with a performance bond in the amount set forth in the Invitation For bids. This bond is not to be submitted with bid but must be presented to the Purchasing Department upon notification.
- (b) The City of Roseville will not enter into a contract or issue a purchase order until the successful bidder has complied with the performance bond provisions.
- (c) The performance bond shall be in a form acceptable to the City Attorney of City.
- (d) The performance bond of the successful bidder(s) shall be returned by the City upon completion of the contract and final acceptance of all items in accordance with conditions thereof.
- (e) Failure of vendor to perform any of the service required by this contract within ten days of receipt of written demand for performance from City, or failure of vendor to correct or replace defective goods or products within ten days from receipt of written demand therefor, shall constitute a total breach of this contract and shall cause this contract to terminate. In the event of such termination, the performance deposit shall be retained by the City of Roseville as liquidated damages, based upon mutual agreement and understanding between vendor and City at the times this bid is solicited, submitted, and accepted, that the City of Roseville is a government agency engaged in public projects and that the measurement of damages might result from a breach of the terms and specifications herein is difficult or impossible to determine. Provided, however, that if in the opinion of the Central Services Manager and the City Manager the failure to perform the conditions of this contract is occasioned by or is the result of acts or events over which the vendor has no control, said performance bond may in whole or in part, as may be determined by the Central Services Manager and the City Manager, be returned to the vendor without action by the City Council of the City of Roseville. It is understood that such determination shall be entirely at the discretion of the Central Services Manager and the City Manager.

12. ASSURANCE OF COMPLIANCE – EQUAL EMPLOYMENT OPPORTUNITY AND SMALL AND/OR MINORITY BUSINESS ENTERPRISE REQUIREMENTS

Bidder agrees that if this bid is accepted, he/she will not engage in employment practices which have the effect of discriminating against employees or prospective employees because of race, religion, national origin, sex, age, handicap, or political belief or affiliation. In addition, bidder agrees that he/she will abide by all applicable terms and provisions of the City of Roseville's Affirmative Action Plan, including without limitation the Nondiscrimination Clause and the Small and/or Minority Business Enterprise Clause as contained in the City of Roseville's current Affirmative Action Plan, on file in the City's Personnel Department.

SECTION 00300

SCHEDULE/BID FORMS
RELAY PANELS

BID SCHEDULE A – Bidder shall submit this schedule with the Proposal. Bid items A-1 through A-3 be quoted individually, with Item A-4 being the sum of all three bid items.

Item	DESCRIPTION	QUANTITY	UNIT PRICE	EXTENDED PRICE
A-1	<u>Berry 606 Panel 10R</u> : Prewired relay and control panel on front sheet. Including relays, test switches, control handle, inter-panel wiring and loose parts as listed in Bill of Materials. F.O.B. included.	1 Ea		
A-2	<u>Hardrock Panel</u> : Prewired relay and control cabinet. Including relays, test switches, inter-panel wiring, loose parts and all necessary anchoring appurtenances. F.O.B. included.	1 Ea		
A-3	<u>Bus CT Junction Boxes</u> : Prewired CT junction box, in outdoor rated enclosure. Including test switches, terminal blocks and associated wiring. F.O.B. included.	2 Ea		
A-4	<u>Total</u>: Bid Schedule A:			

Delivery Schedule:

Bidder shall identify their proposed delivery dates in the following table:

Item	DESCRIPTION	PROPOSED DELIVERY DATE
B-1	All shop drawings for the panels shall be complete and submitted for approval within <u>28</u> days after award of contract.	
B-2	The control panels with all protection and metering equipment shall be completely fabricated, assembled, wired and delivered F.O.B. to City of Roseville, CA within <u>75</u> days after Award of contract.	

SECTION 00300

BIDDER'S QUALIFICATION STATEMENT:

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED BY: _____

NAME: _____

ADDRESS: _____

PRINCIPAL OFFICE: _____

____ Corporation _____ Partnership _____ Individual _____ Other

1. FIRM

1.1. How many years has your firm been in business?

1.2. How many years has your firm been in business under its present business name? _____

1.2.1. Under what other or former names has your firm operated?

2. EXPERIENCE

2.1. List the last three relay panels you furnished:

<u>YEAR</u>	<u>CUSTOMER</u>	<u>CONTACT PERSON</u>	<u>PURCHASE ORDER AMOUNT</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2.2. List the location of the plant or plants at which the equipment will be manufactured. If more than one plant is involved, describe the portion of the equipment manufactured in each plant and percentage of total cost represented by that portion.

2.3. On a separate sheet, list major contracts your firm has in progress with similar goods and services, giving the name of project, owner, type and amount of Goods being furnished, contract amount, percent complete and scheduled completion date.

SECTION 00300

4.REFERENCES

4.1. Trade references: _____

4.2. Surety:

4.2.1. Name of bonding company: _____

4.2.2. Name and address of agent: _____

5.SIGNATURE

5.1.Dated at _____ this _____ day of _____ 20____.

Name of Organization: _____

By: _____

Title: _____

END OF SECTION

SECTION 00750

TERMS AND CONDITIONS

ARTICLE I SHIPMENT AND DELIVERY OF THE GOODS.

Shipment and delivery of the Goods shall be in accordance with this Article except as otherwise provided or specified.

- A. All Goods shall be delivered within the time period in the Schedule. Point of Delivery is the City of Roseville Central Stores at 2075 Hilltop Circle, Roseville, CA 95747. CONTRACTOR shall select the means and methods of transportation. Call (916) 774-5721 (24)hrs prior to delivery. Delivery can only be accepted Monday through Friday, 7:00A.M. to 3:00P.M..
- B. Comply with the following shipping, delivery, handling and storage requirements, which apply to all technical sections of these Specifications.
 - 1. Provide schedule to CITY two weeks prior to delivery.
 - 2. When practical, Goods shall be factory assembled.
 - a. Cover machined and unpainted parts that may be damaged by the elements with a strippable protection coating.
 - b. Secure and protect equipment and material.
 - 3. Package or crate Goods to provide protection from damage during shipping, handling, and storage.
 - a. Mark or tag outside of each package or crate to indicate its Contract number, bill of lading number, contents by name, name of project, equipment number, and approximate weight.
 - 4. Mark spare parts and special tools to identify the associated Goods by name, equipment, and part number. Package parts for protection against damage from the elements during shipping, handling, and storage. Ship in boxes or containers marked to indicate the contents and as stated above.
 - 5. Where specified for specific Goods, factory test results shall be reviewed and accepted before such Goods are shipped.
- C. CITY may inspect the Goods upon delivery for the sole purpose of identifying the Goods and general verification of quantities in order to provide a basis for a progress payment. Such inspection will not be construed as final or as acceptance of any Goods not in conformance with the Contract Documents.

ARTICLE II SHOP DRAWINGS.

A. General

CONTRACTOR shall submit to the CITY the Shop Drawings within 28 days of the Award of Contract. The submissions shall have been checked by and bear a specific notation or indication of approval of CONTRACTOR. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and like information to enable CITY to review the information as required.

SECTION 00750

1. Shop Drawings and Data to be Submitted

Shop Drawings and data shall be complete and legible. Shop Drawings shall include as applicable, nameplate data; equipment and enclosure outlines, weights, and dimensions; installation and anchoring requirements; wiring diagrams; panel layout and arrangement; and shall provide complete information for installation and erection. Wire schedules and lists are not acceptable as replacements for wiring diagrams. Operation and Maintenance Data shall be provided in detail including diagnostic analysis steps for normal maintenance; maintenance and repair; and for identification of parts for ordering replacements.

2. Final Approved Shop Drawings

CONTRACTOR shall submit two sets (one electronic and one hard copy) of Shop Drawings in Architectural Size "D". The final set of approved drawings shall be submitted with electronic copy of the all equipment outline and installation drawings, panel arrangement drawings, connection wiring diagrams and other drawings required to provide a complete package of shop drawings in **AutoCAD 2004** format on CD-ROM or via email to the CITY. Final "Approved" and "as built" Shop Drawings shall be submitted with the electronic copy of drawings.

- B. At the time of each submission, CONTRACTOR shall in writing call CITY's attention to any deviations that the Shop Drawings may have from the requirements of the *Contract*. CONTRACTOR shall determine whether a difference from *Contract* is a deviation or a change. Any deviation shall be clearly documented in the Shop Drawing Submittal. Any change shall be submitted as a substitution.
- C. CITY may review the Shop Drawings and samples, but CITY'S review and approval will be only for conformance with the design concept of the Goods and for compliance with the information given in the *Contract*. Such review and approval will not extend to design data reflected in Shop Drawings, which is peculiarly within the special expertise of CONTRACTOR or any party dealing directly with CONTRACTOR. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by CITY and shall return the required number of corrected copies of Shop Drawings and, if necessary, shall submit new samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by CITY on previous submittals. CONTRACTOR's submission of any Shop Drawings or sample bearing CONTRACTOR's approval shall constitute a representation to CITY that CONTRACTOR assumes full responsibility for having determined and verified the design criteria, quantities, dimensions, installation requirements, materials, catalog numbers and similar data and that CONTRACTOR has reviewed or coordinated each Shop Drawing or sample with the requirements of the *Contract* and are in accordance with the requirements of applicable laws, ordinances, rules or regulations, or industry codes.
- D. When a Shop Drawing or sample is required by the Specifications, CONTRACTOR shall not commence production of any part of the Goods affected thereby until such Shop Drawing or sample has been reviewed and approved by CITY.
- E. CITY 's review and approval of Shop Drawings or samples will not relieve CONTRACTOR from responsibility for any deviations from the *Contract* unless CONTRACTOR has in writing called CITY's attention to such deviation at the time of submission and CITY has given written concurrence and approval to the specific deviation, nor will any concurrence or approval by CITY relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings.

END OF SECTION

SECTION 16910

CONTROL AND RELAY PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Furnishing design, fabrication, assembly, mounting, inter-panel wiring and testing of control and relay panels.
2. CITY-furnished design to be assembled, mounted and wired as shown on the Drawings.
3. Provide wire bundle for all external wires with markers for City to terminate to existing terminals on the back portion.

B. Bid Documents

<u>File Name</u>	<u>Description</u>
Section 00300	Schedule/Bid Forms
Section 00750	Terms and Conditions
Section 16910	Control and Relay Panels Technical Specification
Hardrock_bom	Bill of Materials - Hardrock Panel
Nameplate Schedule - Hardrock	Nameplate Schedule details - Hardrock Panel
Berry606_bom	Bill of Materials - Berry 606 Panel
Nameplate Schedule - Berry606	Nameplate Schedule details - Berry 606 Panel
305E4-149	606 Cabinet 10R - Wiring Diagram
305E6-193	Panel 10R - Device Layout Details
365E4-116	Bus1 & Bus 2 Differential CT JB - Wiring Diagram
365E4-125	Relay Panel 4 (Upper) - Wiring Diagram
365E4-126	Relay Panel 4 (Lower) - Wiring Diagram
365E4-127	Relay Panel 4 (Side Wall) - Wiring Diagram
365E6-171	Front Panel Arrangement/Details - Layout
365S3-03	Control Building Base Details

1.2 QUALIFICATIONS

- A. Contractor shall have a minimum of five (5) years experience designing, fabricating and supplying relay control panels for utility applications at 60kV or above. References to be detailed in Section 0300: Bid Schedule.

1.3 REFERENCE - STANDARDS AND CODES

- A. Unless otherwise specified or defined, equipment, materials, details of installation, labor and tests furnished under this Contract shall conform with the standard rules, regulations and specifications of one or more of the following codes or standards:

Local, State and Federal Laws.
AEIC American Electric Insulated Cable.

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ANSI	American National Standards Institute.
ASCE 7	American Society of Civil Engineers
ASTM	American Society for Testing and Materials.
AWG	American Wire Gauge.
AWS	American Welding Society
EEI	Edison Electric Institute
ICEA	Insulated Cable Engineers' Association.
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers.
Fed. Spec.	Federal Specification.
NEC	National Electrical Code.
NEMA	National Electrical Manufacturer's Association.
NFPA	National Fire Protection Association
NESC	National Electrical Safety Code.
NETA	National Electrical Testing association.
OSHA	Occupational Safety and Health Act.
TITLE 24	California Building Standards Code
UL	Underwriters' Laboratories.

- B. Panels shall be fabricated by a UL approved shop.
- C. Conflicts, if any, that may exist between the above items will be resolved at the discretion of the CITY.
- D. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern.

1.4 SUBMITTALS

- A. Make submittals in accordance with *Section 00750 - Terms and Conditions*.
- B. Shop Drawings
 - 1. Submit shop drawings in accordance with *Section 00750 - Terms and Conditions*.
 - 2. Anchoring details of control and relay panel assembly to ensure they are properly braced to comply with seismic requirements (drawings that show anchoring details shall be submitted for review).
 - 3. Shop drawings shall be submitted to the CITY for review and approval before the panels are manufactured.
 - 4. All design drawings, calculations and material lists as required per Section 2.1 below shall be included in the Shop Drawing submittal.
- C. Certified Test Reports: Submit copies of certified test reports for all other tests required in this Section. Test reports shall be dated and signed by a responsible person at the test location. Factory Test Reports of important equipment/devices, such as RTU equipment, protective relays, etc. shall be provided.
- D. Operations and Maintenance Manuals:
 - 1. Customize to describe the specific equipment actually furnished. Do not include extraneous data for models, options, or sizes not furnished.
 - a. Where more than one model, option, or size of an equipment type is furnished, clearly indicate the information pertaining to each model, option, or size furnished.

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- b. Manufacturer's preprinted literature may be accepted provided it has been customized to clearly indicate the models, options, and sizes actually furnished, and that equipment models not furnished have been clearly crossed out or deleted.
 - c. Include approved shop drawing catalog cuts and data sheets.
2. Bind all material in heavy duty three ring binder(s) identified for the project and contract. Organize material by equipment and system with all necessary information for the system included in the section. Arrange printing so that punched holes do not obliterate data.
3. Material in manuals shall be suitable for photographic reproduction. Where copies of identical material are included, clarity and quality of copies shall equal the original.
4. O&M Manual shall be complete in all respects for equipment, controls, accessories, and associated appurtenances, and shall include the following:
 - a. Title page, typed table of contents with page numbers, and heavy section dividers with numbered plastic index tabs.
 - b. Sections on each piece of equipment including product data sheets where applicable.
 - c. Diagrams and illustrations.
 - d. Performance and nameplate data.
 - e. Proper adjustment.
 - f. Test procedures and results of factory tests where required.
 - g. Maintenance and overhaul instructions, illustrated with detailed assembly drawings showing each part with part numbers and sequentially numbered parts list. Include instructions for ordering spare parts, and complete preventive maintenance and overhaul instructions required to ensure satisfactory performance and longevity of the equipment.
 - h. Lists of Materials.
 - i. Instruction Books for Control, Relay, and Meter Devices.
5. Two copies each (1 set specific to the Berry 606 panel and 1 set specific to the Hardrock panel) of Operations and Maintenance Manuals shall be provided. All spare/loose parts provided shall be included in the Hardrock panel O&M Manual.

1.5 DELIVERY AND HANDLING

- A. Delivery and handling in accordance with *Section 00750 – Terms and Conditions*.

PART 2 PRODUCTS

2.1 GENERAL

- A. Furnish Goods suitable for installation and operation under rated conditions up to 3,000 feet above sea level.
- B. Furnish Goods to be installed indoors and capable of continuous operation within an ambient temperature range of -10 degrees F to 122 degrees F.
- C. The Relay and Control panel for Hardrock Substation shall be designed and constructed in accordance with the latest edition of the California Building Code. The calculations shall be performed, stamped and signed by a Structural Engineer licensed in the State of California. The structural calculations shall include the anchoring of the Relay and Control panel to the control center floor per the latest edition of ASCE 7 site

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specific seismic loading. The anchoring design and supply of anchoring appurtenances shall be the CONTRACTOR'S responsibility. The Relay and Control panel will be installed in an existing CITY control center by CITY personnel. Structural modifications necessary, if any, required for the floor in the existing control center shall be included in the CONTRACTORS design and calculations. Any materials necessary for these modifications shall be provided by the CONTRACTOR as part of this contract. All anchors and materials required for the installation of the control panel shall be itemized and detailed on the Shop Drawings.

- D. The Relay and Control panel for Berry 606 is a direct replacement front sheet for an existing panel lineup. All appropriate Codes and Standards shall be used in the design of the panel to assure the devices will be securely affixed to the panel and that the panel will have appropriate thickness and bracing to support all of the installed devices. However, signed/stamped structural calculations are not required for the Berry 606 panel.
- E. The interior structural framework of the Relay and Control panel shall be constructed to support the relays as shown on the drawings. The CONTRACTOR shall provide detailed drawings of the framework for approval prior to construction of the framework.

2.2 CITY-FURNISHED DRAWING PACKAGE

- A. No substitutions shall be accepted for the relays and relay system manufacturers and types specified, unless specifically noted.
- B. Where discrepancies/differences between these specifications and the drawings exist, the drawings shall supersede.
- B. The City-furnished drawing package is defined as and will consist of the following:
 - 1. Detailed Bill of Materials.
 - 2. Nameplate Schedules.
 - 3. Complete set of panel layout/elevation drawings with specific dimensions.
 - 4. Complete set of panel device wiring diagrams.
 - 5. Complete set of panel terminal block wiring as applicable for reference.

2.4 WORKMANSHIP

- A. The equipment shall be of high commercial quality in material, workmanship and design. The material and design shall be such as has been proved to be satisfactory for the application by past experience of the manufacturer quoted. Each Bidder shall, in his bid proposal, show that he has previously made equipment of the same type and that it is providing satisfactory service under similar conditions.

2.5 CONTROL AND RELAY PANELS

- A. General

All equipment furnished shall be in accordance with the best modern practice and shall conform to the latest applicable standards of the American National Standards Institute, Inc. (ANSI), the Institute of Electrical and

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Electronic Engineers, Inc. (IEEE), and the National Electrical Manufacturers Association (NEMA), as to design, construction, performance, and tests unless otherwise specified herein. In the event of contradictory requirements between the ANSI, NEMA, or IEEE standards and these requirements, the terms of these requirements shall apply.

- B. All outgoing wiring leaving the front panels shall have wire lengths and routing as indicated on the drawings. These wires will be terminated by CITY and will have the appropriate heat shrink wire labels secured but NOT heat-shrunk to the wire length. All other wire labels shall be installed per section 2.5-C-2-g below.
- C. Material
 - 1. Equipment for the switchboard sections shall be in compliance with the following:
 - 2. Relay Panel Wiring
 - a. Relay panel wiring shall be performed with switchboard type stranded No. 10 AWG copper conductor for current transformer circuits and No. 14 AWG copper conductor for all other circuits unless otherwise noted on the drawings. Wires shall have gray SIS insulation rated for 600-volt service and which passes the VW-1 vertical flame test. The stranding for general switchboard wiring shall be Class K stranded.
 - b. All terminations of wire shall be made with pre-insulated pressure-crimp type ring-tongue terminal connectors, applied with a compression tool that requires full compression before relieving.
 - i. To insure positive electrical connections, and to avoid damage to the ferrule, it is mandatory that the proper crimping tool be used in accordance with the instructions for its use. The proper terminal and crimping tool shall be used for each wire size.
 - ii. Ring-tongue terminal connectors shall equal to the pre-insulated PLASTI-GRIP terminal, as manufactured by AMP Incorporated, Harrisburg, PA., 17105, phone 717/564-0100.
 - iii. The crimping tool, used to apply these terminal connectors, shall be equal to the TETRA-CRIMP Tooling as manufactured by AMP Incorporated, and as recommended by the manufacturer of the ring-tongue terminal connectors being furnished and installed by the Contractor.
 - c. Exposed wiring shall be kept to a minimum. Where used, exposed wiring shall be formed into compact groups bound together and firmly supported. Exposed wiring shall be run straight, horizontally, or vertically with short-radius right-angle bends.
 - d. Hinge wiring shall be twisted around the longitudinal axis of the wire, wherever possible, instead of being bent laterally. Location of wire bundle for hinge wiring shall be noted on the drawings.
 - e. Splices will not be permitted in the wiring.
 - f. All connections shall be made at device studs or terminal blocks. A maximum of two connections per terminal stud will be used where possible. All wiring between various devices shall be performed by the most direct method rather than looping back and forth

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across the switchboard section.

- g. Circuit/conductor designations as shown on the wiring diagrams shall be machine lettered, stamped, engraved, or nearly marked with permanent black ink on a white heat shrink marking sleeve at every wire termination.
 - i. The heat shrink sleeves shall be suitable for being slipped onto each conductor, over solderless-type lugs or connectors which have already been applied to the conductor, and heat shrunk to fit the conductor using a heat gun.
 - ii. After shrinking, the marker sleeve shall be tight enough to stay in place regardless of conductor position and loose enough to permit the marker to be slid and twisted so it can be read after the conductor is terminated.
 - iii. The lettering shall be machine printed or neatly hand printed with indelible ink, black on white background, and shall be in accordance with the designations shown on the wiring diagrams.
 - iv. The heat shrink tubing shall be suitable for being "printed" in a typewriter or printer with a multiple strike inked textile ribbon.
 - v. The heat shrink marking sleeves shall be equivalent to:
 - 1. Critchley, E-Z Mark Type I HS, with a minimum nominal shrink ration of 2:1, as manufactured by Critchley Inc., 255 East 400 South, Suite 106, Salt Lake City, UT 84111, telephone (801) 531-8996; or
 - 2. Raychem RNF-100 heat shrink tubing as manufactured by the RAYCHEM Corporation, Electronics Group, Department G, 300 Constitution Dr., Menlo Park, GA 94025.
 - vi. The heat gun shall be equivalent to the Model 46-013A Heat Gun with Nozzle 46922 as manufactured by Ideal Industries Incorporated, Department G., Becker Place, Sycamore, Ill 60178.
- h. Each wire shall be protected from abrasion where it leaves a channel or wire-way. Grommets shall be provided at all holes and all elliptical slots furnished for wires and cables, including holes provided for Roseville-furnished wires and cables.

3. Nameplates

- a. Nameplates shall be furnished and mounted as shown on the arrangement drawings, nameplate schedule, and nameplate details.
- b. Nameplates, stencils, KROY-type labels, or neat lettering giving the device function number and wiring diagram location designation shall also be placed on the back of the panels adjacent to each device.
- d. Nameplates shall meet the following requirements:
 - i. All engraving shall be centered, unless otherwise specified.
 - ii. Nameplate material shall be laminated phenolic resin sheet 1/16 or 3/32 inch thick (as specified) cut to size with square edges.
 - iii. Nameplate material shall have semi-matte, buffed, or satin finish black surfaces, except for nameplates specified to have red surfaces.
 - iv. All nameplate material shall be suitable for exposure to direct sunlight without fading.
 - v. Nameplate material shall have a white center.
 - vi. Nameplate material shall be equal to Lamicaid No. 7025.

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- vii. All lettering shall be flat groove type cut through the black surface to military specification MIL-P-78A and Federal Specification L-P-509A.
- viii. The Contractor shall use gothic lettering.
- ix. All mounting holes shall be 1/8 inch diameter.
- x. All edges shall be beveled.

4. Terminal Blocks

- a. Terminal blocks for control and instrumentation circuits shall be rated 600-volts and 25-amps. The blocks shall be molded-block type to accommodate ring lugs one-half inch (diameter) at the terminal screws and have screws with serrated or grooved contact surfaces. The blocks shall be furnished with molded insulated barriers between terminals and have a removable white marking strip. The blocks shall have 12 termination points each. Terminal blocks shall be GE Type EB25A12W or approved equivalent.
- b. Terminal blocks for current transformer circuits shall be 4-pole, shorting type and shall be GE Type EB-27 or approved equivalent.
- c. Terminal blocks for analog or digital SCADA indication shall be as noted on the drawings.

D. Construction of Relay Panels

- 1. Structural and Mechanical Features - The equipment shall have the following structural and mechanical features:
 - a. Relay panels/doors shall be of the size described on the drawings.
 - b. Panels shall be of especially leveled sheet steel no lighter than No. 11 United States Standard Gage and finished with ANSI No. 70 light gray color unless otherwise specified. The interior side of all panels shall be painted white in color.
 - c. End trim edges formed by breaking sheet steel back at 90 degrees. The outside radius shall not exceed 3/8 inch. Welds, fastenings, and cut edges shall not be visible from the front of the end trim.
 - d. Individual panels shall be fabricated according to the drawings and mounted on the framework as shown on the panel arrangement drawings. The manufacturer shall provide final detailed relay panel shop fabrication detail drawings of each panel for approval prior to fabrication of the panels.

E. Testing and Checkout

- 1. Perform continuity and function checks of all wiring installed by the CONTRACTOR.
- 2. Do not energize or turn on D.C. power to the electronic and digital protective relays. Acceptance testing of all digital protective relays will be performed by CITY personnel upon receipt of the Relay and Control panel.

2.6 PANEL DEVICES

- A. Provide each panel with the devices as shown on the Drawings and described herein. The equipment shall

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be mounted in the positions shown. The panel layout drawings are diagrammatic and are intended to convey the desired device layout. Should physical constraints or device dimensions require a layout that differs from that shown on the Contract Drawings, indicate an alternate arrangement in the shop drawings and state reasons for the alternate arrangement. The Contractor shall obtain mounting details for each piece of equipment detailed in the Bill of Materials from the appropriate manufacturer. Mounting details may be given on the Drawings as a guide. It shall be the Contractor's responsibility to design for the appropriate mounting details based on the manufacturer's details.

- B. Refer to the City-furnished Bill of Materials for name of manufacturer and catalog number of the major metering, control, and relay equipment to be furnished and installed in each control and relay panel. Quote protective relays and meters on a "no substitute" basis. Items noted on the Bill of Material as "Supplied by others" shall be excluded from the price quotation.
- C. All relays and meters mounted on the front of the panels shall be semi-flush mounted, except as noted.

2.7 QUALITY CONTROL AND ASSURANCE (QC/QA) PROGRAM

- A. VENDOR shall have a QC/QA Program to manage the quality of the Goods during manufacture and delivery.
- B. VENDOR shall have a QC/QA Program to include the following activities, as a minimum:
 - 1. Quality control over processes used in the production of the Goods.
 - 2. Quality control over suppliers, and services engaged in the production of the Goods.
 - 3. Shop drawing coordination and checking procedures, including submittals from other manufacturers and subcontractors.
 - 4. Quality control over checkout and testing of the equipment and systems.
 - 5. Methods for protecting finished Goods prior to delivery.
- C. The VENDOR shall provide a proposed plan and schedule for construction, fabrication, and testing of the control panels and all equipment to be furnished on this purchase order to allow the CITY to determine their requirements and schedule for witnessing testing and construction of the panels and equipment.

END OF SECTION

Bill of Material - Hardrock

Device #	Part	Catalog #	Qty.	Comments
D1	SEL 311L	0311L13DD4254X1XX	2	
D2	ABB FT-1 or (MPS UTS1)	C744B430G20 (CT552)	6	Clear Cover, Or City approved equal
D3	ABB FT-1 or (MPS UTS1)	C129A501G01 (CT100)	12	Clear Cover, Or City approved equal
D4	Areva P-543	P543318U4M0448K	2	
D5	SEL 351A	0351A032X4A54X1	2	
D6	GE Miniature CB	EP102UCC04	4	4A, 125VDC, 2-pole
D7	GE Miniature CB	EP102UCC25	3	25A, 125VDC, 2-pole
D8	GE Miniature CB	EP102UCC16	2	16A, 125VDC, 2-pole
		Spare/Loose Parts		
L1	Bitronics M350	M350V3U030	2	
L2	Bitronics M650	M650B3U530	2	
L3	Electroswitch Series 31, LSR	9303DD	2	
L4	eMax RAW	632A304-White	2	125VDC, White LED
L5	Electroswitch Series 24, LOR	7808D	2	
L6	Electroswitch Series 24	24210B	2	
L7	SEL 351-6	035164C4A54XX1	1	
L8	ABB FT-1 or (MPS UTS1)	C744B430G20 (CT552)	2	Clear Cover, Or City approved equal
L9	ABB FT-1 or (MPS UTS1)	C129A501G01 (CT100)	4	Clear Cover, Or City approved equal
L10	ABB FT-1 or (MPS UTS1)	C837A407G01 (CT701)	1	Clear Cover, Or City approved equal
L11	GE Miniature CB	EP102UCC04	1	4A, 125VDC, 2-pole
L12	States MTS 2-Pole TS	C4-202A-B	1	Back Connected
L13	SEL GPS Clock	24010XXX2	1	
L14	SEL GPS Clock	24070001B	5	
L15	SEL RG-6 Cable	C960	4	Each cable to be 130 ft in length
L16A	GE D20S Wesdac Status Module	507-0101	1	24VDC Wetted input, PCOMMON v.3.05
L16B	GE D20S Westerm	517-0165	1	w/ Phoenix terminals
		Bus CT Junction Boxes		
B1	Hoffman Type 4 Enclosure	A30H30BLP	2	Continuous Hinge w/ clamps, Wall-mount
B2	Hoffman Panel for Enclosure	A30P30	2	Painted Steel Backplane
B3	States MTS 8-Pole TS	C3-208U	4	Front Connected
B4	States MTS 8-Pole TS	C3-208P	2	Front Connected

NAMEPLATE SCHEDULE -HARDROCK

NP#	NP Size	1st Row Lettering	Ltr Ht	2nd Row Lettering	Ltr Ht	Notes
N1	1" x 6"	RELAY PANEL #4	1/2"			
N2	1" x 4"	87LA50	3/8"			
N3	1" x 6"	87LA50 TS1	5/16"	SEE LABEL "A"	1/8"	
N4	1" x 6"	87LA50 TS2	5/16"	SEE LABEL "B"	1/8"	
N5	1" x 6"	87LA50 TS3	5/16"	SEE LABEL "C"	1/8"	
N6	1" x 4"	87LB50	3/8"			
N7	1" x 6"	87LB50 TS1	5/16"	SEE LABEL "D"	1/8"	
N8	1" x 6"	87LB50 TS2	5/16"	SEE LABEL "E"	1/8"	
N9	1" x 6"	87LB50 TS3	5/16"	SEE LABEL "F"	1/8"	
N10	1" x 4"	87LA51	3/8"			
N11	1" x 6"	87LA51 TS1	5/16"	SEE LABEL "G"	1/8"	
N12	1" x 6"	87LA51 TS2	5/16"	SEE LABEL "H"	1/8"	
N13	1" x 6"	87LA51 TS3	5/16"	SEE LABEL "I"	1/8"	
N14	1" x 4"	87LB51	3/8"			
N15	1" x 6"	87LB51 TS1	5/16"	SEE LABEL "J"	1/8"	
N16	1" x 6"	87LB51 TS2	5/16"	SEE LABEL "K"	1/8"	
N17	1" x 6"	87LB51 TS3	5/16"	SEE LABEL "L"	1/8"	
N18	1" x 4"	87B1	3/8"			
N19	1" x 6"	87B1 TS1	5/16"	SEE LABEL "M"	1/8"	
N20	1" x 6"	87B1 TS2	5/16"	SEE LABEL "N"	1/8"	
N21	1" x 6"	87B1 TS3	5/16"	SEE LABEL "O"	1/8"	
N22	1" x 4"	87B2	3/8"			
N23	1" x 6"	87B2 TS1	5/16"	SEE LABEL "P"	1/8"	
N24	1" x 6"	87B2 TS2	5/16"	SEE LABEL "Q"	1/8"	
N25	1" x 6"	87B2 TS3	5/16"	SEE LABEL "R"	1/8"	
N26	1" x 3"	60-KV BUS 1	3/16"	KV	3/16"	To be shipped loose
N27	1" x 6"	BUS 1 METER TS	5/16"	SEE LABEL "S"	1/8"	To be shipped loose
N28	1" x 3"	SOUTHEAST 60-KV LINE	3/16"	MW/MVAR	3/16"	To be shipped loose
N29	1" x 3"	BERRY 606 60-KV LINE	3/16"	MW/MVAR	3/16"	To be shipped loose
N30	1" x 3"	79CS50	3/16"	CB 6050 RECLOSER	3/16"	To be shipped loose
N31	1" x 3"	79CS51	3/16"	CB 6051 RECLOSER	3/16"	To be shipped loose
N32	1" x 3"	86B1	3/16"	BUS 1 DIFF RLY LOCKOUT	3/16"	To be shipped loose
N33	1" x 3"	87B1C/O	3/16"	BUS 1 LOCKOUT CUTOUT	3/16"	To be shipped loose
N34	1" x 3"	86B2	3/16"	BUS 2 DIFF RLY LOCKOUT	3/16"	To be shipped loose
N35	1" x 3"	87B2C/O	3/16"	BUS 2 LOCKOUT CUTOUT	3/16"	To be shipped loose
N36	1" x 6"	86B1-TS	5/16"	SEE LABEL "T"	1/8"	To be shipped loose
N37	1" x 6"	86B2-TS	5/16"	SEE LABEL "U"	1/8"	To be shipped loose
N38	1" x 4"	51/25-52	3/8"			To be shipped loose
N39	1" x 6"	51/25-52 TS1	5/16"	SEE LABEL "V"	1/8"	To be shipped loose
N40	1" x 6"	51/25-52 TS2	5/16"	SEE LABEL "W"	1/8"	To be shipped loose
N41	1" x 6"	51/25-52 TS3	5/16"	SEE LABEL "X"	1/8"	To be shipped loose
N42	1" x 3"	60-KV BUS 2	3/16"	KV	3/16"	To be shipped loose
N43	1" x 3"	60-KV BUS	3/16"	AMPS	3/16"	To be shipped loose
N44	1" x 6"	BUS 2 METER TS	5/16"	SEE LABEL "Y"	1/8"	To be shipped loose

87LA50 TS1									
IA IN	IA OUT	IB IN	IB OUT	IC IN	IC OUT	VA	60KV LINE PT'S		
							VB	VC	VN

87LA50 TS2									
CB 6050		CB 6050		CB 6050		CB 6050		OUT 206	
TC1(+)	TRIP	TC2(+)	TRIP	(+)	CLOSE	SYN-CL	(-)		

87LA50 TS3											
ALARM (+)	CB 6050 52A	STUB BUS	RLYS RE	RLYS 3PRI	RECL CANCEL	60KV BUS 1 PT VA VN		P.S. (+) (-)			

Timing diagram for 87LB50 TS1. The diagram shows the relationship between input and output signals over time. The signals are labeled as IA IN, IA OUT, IB IN, IB OUT, IC IN, and IC OUT. The diagram illustrates the timing of these signals, showing that IA IN and IB IN are input signals, while IA OUT, IB OUT, IC IN, and IC OUT are output signals. The timing shows that IA IN and IB IN are active during specific intervals, and the corresponding output signals (IA OUT, IB OUT, IC IN, and IC OUT) are active during those intervals.

87LB50 TS2									
CB 6050		CB 6050		87LA50		87LA50		RLY 7	
TC1(+)	TRIP	TC2(+)	TRIP	(+)	3PRI	(+)	RC		

87LB50 TS3									
ALARM	CB6050	STUB						PS	
(+)	52A	BUS						(+)	(-)

87LA51 TS1										
IA IN	IA OUT	IB IN	IB OUT	IC IN	IC OUT	VA	60KV LINE PT'S			
							VB	VC	VN	

[illegible]

LABEL "H"

[illegible]

LABEL "I"

[illegible]

LABEL "J"

[illegible]

LABEL "K"

[illegible]

LABEL "L"

Top view of the 87LB51 TS3 component. The component is a rectangular package with pins on all four sides. The top edge has pins labeled ALARM (+), CB6051 52A, STUB BUS, and PS (+). The bottom edge has pins labeled PS (-). The dimensions are indicated by arrows and values: .4375" for the width, .5125" for the pin pitch, and .5125" for the pin width.

LABEL "M"

[illegible]

LABEL "N"

87B1 TS2

86B1

(+)

.4375" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .4375"

[illegible][illegible]

87B2 TS2

86B2 (+) 86B2

.4375" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .4375"

[illegible]

BUS 1 METER TS

60KV BUS 1 PT

VA VN

.4375" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .5125" .4375"

[illegible][illegible]

LABEL "V"

[illegible]

ABEL "W"

[illegible]

LABEL "X"

[illegible]

LABEL "Y"

[illegible]

Bill of Material - Berry 606

Device #	Part	Catalog #	Qty.	Comments
D1	G.E. Circuit Breaker	TED124030WL	1	
D2	G.E. Circuit Breaker	TED124020WL	1	
D3	G.E. Circuit Breaker	TED124010WL	4	
D4	SEL 311L	0311L13DD4254X1XX	1	
D5	ABB FT-1 or (MPS UTS1)	744B430G20 (BT552)	2	Black cover/handles
D6	ABB FT-1 or (MPS UTS1)	129A501G01 (BT100)	4	Black cover/handles
D7	Areva P-543	P543318U4M0448K	1	
D8	E-max AVR	7792314	1	
		Loose Parts		
L1	Bitronics Ammeter	ATAIE121000100	1	CTR=160
L2	Bitronics Voltmeter	VTAIE121000300	1	PTR=300
L3	Bitronics Watt/Var Meter	QTWIE121000J00	1	CTR=160, PTR=300
L4	Electroswitch Series 31, LSR	9303DD	1	125VDC
L5	Electroswitch Series 24, CSR	8857DB	1	125VDC

NAMEPLATE SCHEDULE - BERRY ST.

NP#	NP Size	1st Row Lettering	Ltr Ht	2nd Row Lettering	Ltr Ht	Notes
N1	1.5" x 6"	PANEL 10R	1/2"	CIRCUIT BREAKER 606	3/8"	
N2	1" x 3"	CB CONTROLS	3/16"		3/16"	
N3	1" x 3"	CB MOTOR	3/16"	125V DC (20A)	3/16"	
N4	1" x 3"	87LA606	3/16"	125V DC (10A)	3/16"	
N5	1" x 3"	87LB606	3/16"	125V DC (10A)	3/16"	
N6	1" x 3"	METERS	3/16"	125V DC (10A)	3/16"	
N7	1" x 3"	SPARE	3/16"	125V DC (10A)	3/16"	
N8	1" x 5"	87LA606	1/2"			
N9	1" x 6"	87LA606 TS1	5/16"	SEE LABEL "A"	1/8"	
N10	1" x 6"	87LA606 TS2	5/16"	SEE LABEL "B"	1/8"	
N11	1" x 6"	87LA606 TS3	5/16"	SEE LABEL "C"	1/8"	
N12	1" x 5"	87LB606	1/2"			
N13	1" x 6"	87LB606 TS1	5/16"	SEE LABEL "D"	1/8"	
N14	1" x 6"	87LB606 TS2	5/16"	SEE LABEL "E"	1/8"	
N15	1" x 6"	87LB606 TS3	5/16"	SEE LABEL "F"	1/8"	
N16	.5" x 1.5"	1TX606	3/16"			
N17	1" x 3"	BREAKER CONTROL SW.	3/16"	52CS606	3/16"	To be shipped loose
N18	1" x 3"	CB606 SYNC. SWITCH	3/16"	SS606	3/16"	To be shipped loose
N19	1" x 3"	CB606 RECLOSER	3/16"	79CS606	3/16"	To be shipped loose

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