



0000122318

**APPLICATION
W-01445A-10-0517**

**PART 3 OF 8
BAR CODE # 0000122318**

**To review remaining parts please
see the following:**

PART 1 OF 8 BAR CODED #0000122316
PART 2 OF 8 BAR CODED #0000122317
PART 4 OF 8 BAR CODED #0000122319
PART 5 OF 8 BAR CODED #0000122320
PART 6 OF 8 BAR CODED #0000122321
PART 7 OF 8 BAR CODED #0000122322
PART 8 OF 8 BAR CODED #0000112323

WA1-4706

ARIZONA WATER COMPANY
WORK AUTHORIZATION

SCANNED

W.A. NUMBER: 1-4706
 P.E. NUMBER:
 BUDGET ITEM NO.: 1-4706
 SHEET NO.: 1 of 2

SYSTEM: COOLIDGE	WORK TO START BY: UPON AUTHORIZATION
DIVISION: COOLIDGE	WORK TO BE FINISHED BY: WITHIN 60 DAYS
TAX CODE: 2100	

DESCRIPTION OF WORK:

Install a booster station at the Coolidge Airport using the 15,000 gallon tank from Valley Farms.

FACTORS JUSTIFYING WORK:

APPROVED 2010 BUDGET ITEM \$150,000.
 RELEASE TO DESIGN 2010 \$12,400.
 The current distribution system does not have any storage resulting in short cycling of the wells, pressure issues and main breaks.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	6,500	James Wilson <i>JW 6/7/10</i>	6/2/10
LABOR	6,500	REVIEWED BY:	
CONTRACT PORTION	98,469	Charles Briggs <i>CB 6-7-10</i>	6-2-2010
OVERHEAD	26,753	REVIEWED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 138,222	Andrew J. Haas <i>AJH 6-7-10</i>	6-2-10
FUNDS RECEIVED:		APPROVED BY:	
CONTRIBUTIONS RECEIVED	0	Fred Schneider <i>FS 6-8-10</i>	6-3-10
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY:	
TOTAL CONTRIBUTIONS/ADVANCES	0	Joe Harris <i>JH</i>	6/3/10
NET CASH REQUIRED	\$ 138,222	AUTHORIZED BY:	
		William M. Garfield <i>W.M.G.</i>	6-4-2010
		William Garfield	

COMMENTS:

THE TOTAL RELEASE AMT FOR DESIGN & CONSTRUCTION IS \$150,622

FILE COPY

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by **FRED SCHNEIDER**
 Date 6/4/10

AFH



ARIZONA WATER COMPANY

CASA GRANDE DIVISION
220 E. 2ND STREET, CASA GRANDE, AZ 85122
PH 520-836-8785 / FX 520-836-2850

PROPOSAL/CONTRACT

CONTRACTOR: Felix Construction Company	SYSTEM:
ADDRESS: 1326 W. Industrial Dr.	W.A. No(s):
Coolidge, Az. 85228	BID DUE DATE: 05/28/2010

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

- Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
- Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
- Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
- Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
- Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
- Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statutes ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5081 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
- Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
- The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
- Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project Invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
- Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within _____ calendar days after the Commencement Notice is issued.
- Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
- The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR: Felix Construction Company	PROPOSAL/CONTRACT ACCEPTED: ARIZONA WATER COMPANY
By: <i>Dana Watts</i>	By: <i>[Signature]</i>
Print Name: Dana Watts	Print Name: JAMES WILSON
Title: E-I&C Division Manager	Title: SR. ENGINEER
Date: 04/23/2010	Date: 6/2/10



ARIZONA WATER COMPANY

IN PUT DIVISION INFORMATION
DIVISION ADDRESS

PROPOSAL/CONTRACT

CONTRACTOR: <u>FELIX CONSTRUCTION COMPANY</u>	SYSTEM:
AZ CONTRACTOR LICENSE NO: <u>ROC 172036</u> CLASSIFICATION: <u>L-11</u>	W.A. No(s):
ADDRESS: <u>309 E. 10th DR. #</u>	BID DUE DATE:
<u>MESA, AZ. 85210</u>	BID BOND REQUIRED <input type="checkbox"/> Yes <input type="checkbox"/> No

DESCRIPTION OF PROJECT: Provide and install new 400amp SES and well controls at the Coolidge Airport

	QUANTITY	UNIT PRICE		TOTAL COST	
		LABOR	MATERIALS	LABOR	MATERIALS
1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)					
Provide and install new 400 amp SES w/ main disconnect	1			2750	5500
Install 480V feed from SES to skid mount booster pump starter panels	1			2000	5854
Design and install controls for Well #1 & #2 with SPA relay and Endress	1			1500	7000
Hauser tank level transmitter w/ stand and enclosure					
System start up	1			1000	250
Provide electrical drawings and equipment manuals	1			500	250
<u>ADD LWCO WARRIEX CONTROLS (Per Pre Bid)</u>	<u>1</u>			<u>400</u>	<u>800</u>
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3 8150	
4. Total Exempt Materials (add the amounts in column 2)					4 19654

	QUANTITY	UNIT PRICE		TOTAL COST	
		LABOR	MATERIALS	LABOR	MATERIALS
5-6. NON-EXEMPT MATERIALS					
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7	
8. Total Non-Exempt Materials (add the amounts in column 6)					8
9. Subtotal A (add lines 3, 7 and 8)					9 8150
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10 5298	
11. Applicable Contracting Tax Rate				11 10.7 %	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 567
13. Subtotal B (add lines 4, 9 and 12)					13 28371.00
14. 100% Performance and Payment Bonds Cost					14 531.00
15. Estimated Total Cost (add lines 13 and 14)					15 28702.00

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY COST ESTIMATE WORKSHEET

DATE PREPARED:

PRELIMINARY

ACTUAL

PREPARED BY:

James Wilson

SYSTEM:

SHEET

OF

PROJECT LOCATION:

DRAWING NO.

PROJECT DESCRIPTION:

Preliminary cost estimate to drill and equip a replacement well. Well drilling and equipment pricing taken directly from recently drilled wells in Coolidge (Wells 11 & 13)

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL	
C O N T R A C T W O R K	Purchase Property (1 acre)	314	1	\$ 70,000.00	\$ 70,000	
	Drill 2000' deep well and install 18" louverd casing	314	1	679,433.00	679,433	
	3-phase power to site	325	1	25,000.00	25,000	
	Install SES and MCC with SCADA controls and programing	325	1	126,680.00	126,680	
	Site grading, drainage, dry well and catch basin	314	1	55,000.00	55,000	
	Onsite underground piping and discharge header	343	1	45,000.00	45,000	
	Construct 8' block wall with rolling gate	314	1	45,000.00	45,000	
	Install pump, motor, colum pipe and discharge head	325	1	93,872.00	93,872	
	Contracting Tax (4.5%)			1	51,299.33	51,299
	Performance and Payment Bond (2%)			1	22,799.70	22,800
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				
					\$ 1,214,084	
M A T E R I A L S	Cla-Valve	325	2	\$ 4,500.00	\$ 9,000	
	8" Meter	325	1	5,057.00	5,057	
	Miscelaneous Materials	325	1	15,000.00	15,000	
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345				
	TAXABLE METERS	346				
	METERS	346				
TOTAL MATERIALS					\$ 29,057	
L A B O R						
	TESTING FEE	343	1	\$ 5,000.00	5,000	
	PERMIT FEE	343	1	15,000.00	15,000	
	SURVEY FEE	343	1	4,500.00	4,500	
	FIELD INSPECTION	343	1	5,500.00	5,500	
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345				
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345				
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345					
TOTAL LABOR					\$ 30,000	
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					\$ 1,273,141	
OVERHEAD					305,554	
TOTAL	REFUNDABLE PORTION <input type="checkbox"/>	NON-REFUNDABLE PORTION <input type="checkbox"/>	COST ESTIMATE		\$ 1,578,695	

COOLIDGE AIRPORT SCOPE OF WORK

Background:

The Coolidge Airport Water system consists of two wells capable of producing approximately 350 gpm each that pump directly into a hydro pneumatic distribution system. As part of a recent improvement project a new ground storage reservoir and booster station are being installed at Well #1. The new facilities will allow both wells to pump into the reservoir and then boost out into the distribution system to maintain more stable system pressures and flow rates. A new service entrance section is required due to the additional load of the new booster station. New well controls are required due to the operational changes made to the distribution system.

General:

Contractor must minimize power outages due to the criticality of the system. Outages should not exceed 6 hours and must be approved in advance by Arizona Water Company. Booster pump panels and controls are included with the pre-manufactured booster pump skid and are not a part of this scope of work.

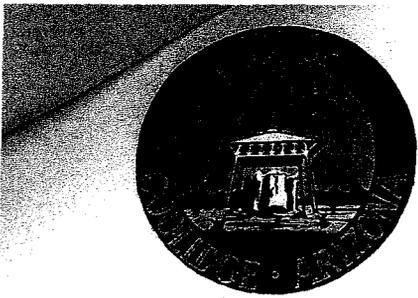
Scope Of Work:

Under the scope of this contract the Contractor will,

1. Design and install a new 400 amp SES.
2. Tie customer provided booster starter panel(s) into new SES.
3. Design and install tank level based controls for both wells #1 and #2.
4. Provide and install an Endress Hauser pressure transmitter with stand and enclosure. (Water connections to be performed by AWC.)
5. Provide and install Moore Industries SPA control relay.
6. Provide and install NEMA 3R enclosure with interior mounted 120V duplex receptacle and sized to accommodate customer provided Sensaphone 2000 phone dialer and all other well controls.
7. Provide and install all required electrical, control conduit and wires.
8. Start-up and calibrate the system.
9. Provide electrical red lines and all equipment manuals.

Control Description:

- Each well must have independent start/stop user adjustable set points based on tank level information provided by the pressure transmitter to the SPA relay.
- The 4-20mA signal from the tank level transmitter to be looped through input #1 on the customer provided Sensaphone 2000 phone dialer.



City of Coolidge

130 W. Central Avenue
Coolidge, Arizona 85228
(520) 723-5361

TDD: (520) 723-4653 / Fax: (520) 723-7910

January 5, 2010

RECEIVED
JAN 7 2010

ARIZONA WATER COMPANY
PHOENIX - ENGINEERING

Arizona Water Company
Mr. Ray Murrieta
448 W. Central Avenue
Coolidge, AZ 85128

Dear Mr. Murrieta:

Please accept my apology for the delay in responding to your request for feedback on the plans to install a new storage tank and booster station at the Coolidge Municipal Airport.

Staff from the Fire Department, Growth Management, Airport and the City Managers office have reviewed the plans and cannot identify any issues of concern at this time. The City's goal is to continue to support Arizona Water Company's efforts to obtain water pressures and fire flows to support fire suppression activities at the airport. It appears that these plans continue us on the way to obtain this goal.

Once again, please accept my apology for the delay in responding. If you have any questions or require additional information please feel free to contact me at 520-723-6014 or jilld@coolidgeaz.com.

Sincerely,

Jill Dusenberry
Assistant City Manager

City Court 110 W. Central Ave. (520) 723-3091	Library 160 W. Central Av (520) 723-6030	Public Works 411 W. S. 1 st . St. (520) 723-4882	Parks & Recreation 670 W. Pima Ave. (520) 723-4551	Growth Management 141 W. Main St. (520) 723-6075	Fire Department 103 W. Pinkley (520) 723-5361
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Contract No No
Job Authorization No: C01AA80

Special Construction Proposal

Date: <u>5/19/2010</u>	
Billing Address:	Work Location:
Customer: <u>Arizona Water Company</u>	<u>3473 S. Coolidge Airport rd</u>
Attention: <u>Barbara Pouen</u>	<u>County PINAL</u>
<u>PO Box 29006</u>	<u>COOLIDGE, AZ</u>
<u>Phoenix, AZ 85038</u>	

Description and/or specifications of work to be performed by Qwest under this Proposal ("Work"):

Cutting in a 50pr loop on an existing cable, placing 114' of 25pr cable by trenching 60' and boring 54' under a paved road. the job will place 1144' of c-wire and pull a 3pr drop in a customer conduit.

Advance Payment (required before work begins): \$2,028.00

Total Charges: Two Thousand Twenty-Eight Dollars and 00/100

*For the Work performed hereunder, Customer will be responsible for these Charges only, unless a Change Order is signed by both parties in accordance with Section 4 below. All changes shall be paid prior to commencement of the Work ("Advance Payment"). If, in Qwest's sole discretion, Qwest approves a Purchase Order in lieu of Advance Payment, Qwest will submit an invoice of charges to Customer upon full execution of the Agreement (or Change Order). For **Governmental Customers only**, Qwest will submit an invoice of charges upon completion of the Work. All Customers will pay the invoice within forty five (45) days of receipt. All past due undisputed accounts will be assessed a late fee at 14% APR. No Work shall commence prior to receipt of Advance Payment or acceptance by Qwest of a Purchase Order. Notwithstanding, Customer shall also be responsible for foreign, federal, state and local taxes assessed in connection with the Work, including without limitation, all use, sales, value added, surcharges, excise, franchises, commercial, gross receipts, license, privilege or other similar charges, whether charged to or against Qwest or Customer, but excluding any taxes based on Qwest's net income.

*Note: If applicable, the Work proposed here is separate from any work that may be performed pursuant to any other order or agreement, including but not limited to a Pre-Service Request for cell site provisioning. The Proposal may be withdrawn by Qwest if not accepted by the Customer within 30 days. **Upon execution by both parties, this Proposal and the attached Terms and Conditions shall constitute a binding agreement upon the parties.**

Qwest Corporation
 Authorized Signature _____
 Name Printed/Typed: Dale VanGulick
 Title: Supervisor General Accounting
 Date: _____

Customer
 Authorized Signature 
 Name Printed/Typed: FRED SCHNEIDER
 Title: VP- ENGINEERING
 Date: 5-20-2010

NOTE: CONTRACT TERMS AND CONDITIONS ARE PRINTED ON PAGE 2 OF THIS DOCUMENT.



The Proposal, these Terms and Conditions and all terms and conditions in the applicable tariff, catalog, or price schedules constitute the entire agreement between the parties (the "Agreement") and supersede all previous agreements between Qwest and Customer relating to the Work and related subject matter hereof. No other terms and conditions are applicable, including but not limited to terms and conditions attached to Customer's Purchase Order (PO). In the event that any applicable tariffs, catalogs, price schedules, rules or statutes prohibit performance in accordance with the terms of the Agreement, or have the effect of modifying, superseding, or suspending provisions of the Agreement prior to performance by a Party hereunder, then to the extent of such inconsistency, the Agreement may become null and void, and the Parties may elect to enter into a new agreement or an amendment of the Agreement to conform to such tariffs, catalogs, price lists, rules or statutes.

1. **Customer Responsibilities.** Customer shall furnish all applicable surveys and a description of the Customer site. Customer shall be responsible for, and secure and pay for all necessary permits, approvals, easements, assessments and any other charges required for the Work to be performed under the Agreement on the Customer's Premises. Customer agrees to provide copies of the same, along with any filing information if applicable, to Qwest upon demand.

2. **Concealed/Subsurface Conditions.** Should concealed conditions be encountered below the surface of the ground, or in an existing structure, during the performance of the Work, differing materially from those ordinarily encountered and generally recognized as inherent in the Work, the Agreement Charges shall be equitably adjusted by Change Order upon written claim by either party made within twenty (20) days after the first observance of such conditions.

3. **Safety and Environmental.** Customer understands and acknowledges that should Qwest encounter a hazardous substance and determine that such substance presents a health or physical hazard, Qwest may, without penalty, discontinue work under this contract.

4. **Changes.** Changes in the Work, an adjustment to the proposal price or the timeframe for the Work shall be made by Change Order specifically stated in writing between the parties. The cost or credit to the Customer from a change shall be determined by mutual agreement.

5. **Termination.** In the event Customer elects to abandon the project and terminate this contract for Customer's convenience, Qwest shall be paid for all Work executed and any reasonable expense sustained as of the date of termination.

6. **Title to Equipment and Facilities.** Title to, and ownership of all lines, equipment and other property installed or constructed by Qwest in connection with the Agreement or the provisioning of Service is and remains with Qwest. Customer does not own facilities placed as a result of the Work performed under the Agreement, those facilities are owned solely by Qwest.

7. **Other Communications Services.** The Agreement is independent, separate, and distinct from any local exchange or other communications or other service Qwest currently provides, or may provide in the future to Customer, whether or not Qwest provides or may provide such services to Customer using the Qwest equipment and facilities to which the Agreement

refers. Customer shall be responsible for paying for all other local exchange or other services separate from the payment requirements of the Agreement.

8. **Warranty.** Qwest shall perform the Work in a professional manner, consistent with industry standards, and shall conform to the specifications set forth herein. All workmanship for the Work performed under the Agreement is guaranteed against defects for a period of six (6) months from the date of completion. **THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING BUT NOT LIMITED TO, ANY OTHER WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AS APPLICABLE TO THE WORK PERFORMED UNDER THE AGREEMENT.** The exclusive remedy for a breach of this warranty shall be that Qwest will re-perform any part of the Work which is found to be defective. Qwest shall not be responsible for damage to its work by other parties or for improper use of the equipment by others.

9. **General.** This Agreement shall be governed by the state within in which the facilities are located, or in the case of interstate facilities the laws of the State of New York, without regard to its choice of law principles; provided however, that Work may also be subject to the Communications Act of 1934, as amended or applicable State tariff, catalogs or price lists. Neither party's failure to insist upon strict performance of any provision of this Agreement shall be construed as a waiver of any of its rights hereunder. Customer may not assign this Agreement or any of its rights or obligations hereunder without the prior written consent of Qwest, which consent will not be unreasonably withheld. Customer may not assign to a reseller or a communications carrier under any circumstances. This Agreement is intended solely for Qwest and its affiliates and Customer and it shall not benefit or be enforceable by any other person or entity. All amendments to this Agreement shall be in writing and signed by the parties' authorized representatives. Electronic or facsimile signatures in connection with this Agreement shall be recognized and treated the same as the original. Qwest may act in reliance upon any instruction, instrument, or signature reasonably believed by Qwest to be genuine and Customer agrees that any employee of Customer who gives any written notice or other instruction has the authority to do so.

10. **For Qwest Affiliate Transactions Only.** If under applicable law, this Agreement, or notice thereof, must be filed with a governmental entity, including but not limited to a state public utility commission, this Agreement shall not become effective with respect to any jurisdiction having such requirements until the filings have occurred.



5/19/2010

Arizona Water Company
Attn: Barbara Pouen
PO Box 29006
Phoenix, AZ 85038

Re: COOLIDGE, AZ

BAN Number C01AA80

Barbara Pouen,

Please review the attached special construction Proposal and the Terms and Conditions. If acceptable, return a signed copy and a form of payment for the total charges in the amount of \$2,028.00. Please note, your job will not be scheduled until we are in receipt of the above.

Send all documents and payments to:

Qwest Asset Accounting - BART
5325 Zuni Street
Room 379
Denver, CO 80221

Documents to include:

- Signed Proposal
- Payment (check or Purchase Order)

After we have received the above from you, we will return one fully executed copy for your records. The fully executed special construction Proposal, including the attached Terms and Conditions, will constitute the agreement between you and Qwest for the Work.

If you are providing a Purchase Order as a form of payment, please sign, date and return the Purchase Order for the amount of \$2,028.00.

If you have any questions regarding the scheduling of the work to be performed, please contact Qwest representative, Ron Sprague at 520 426 6766.

If you are interested in an electronic payment option, Electronic Funds Transfer (EFT) is available and instructions will be provided to you upon request.

Asset Accounting Operations
Email: sconstr@qwest.com
720-578-8673
303-480-2324 fax

enclosures

SAN CARLOS IRRIGATION PROJECT

JOB NAME: ARIZONA WATER CO. WELL#1
JOB ADDRESS: AVIATION RD. AND COOLIDGE AIRPORT RD. WELL#1
CITY / DISTRICT: COOLIDGE, AZC **SCIP JOB#:** 10-082-C03

CUSTOMER CONTACT INFORMATION:

NAME: ARIZONA WATER CO. WELL#1 **PHONE NUMBER:** 602-240-6860
CELL NUMBER: **FAX NUMBER:** 602-294-2169
MAILING ADDRESS: 448 W. CENTRAL AVENUE
CITY / DISTRICT: COOLIDGE, AZ
EXISTING SCIP ACCOUNT NUMBER (IF APPLICABLE):

SERVICE INFORMATION:

TYPE OF REQUEST: NEW SERVICE SERVICE UPGRADE MAINTENANCE/REHAB OTHER
CATEGORY: RESIDENTIAL DOMESTIC WELL SMALL COMMERCIAL
 LARGE COMMERCIAL INDUSTRIAL **OVERHEAD:** **UNDERGROUND:**
SIZE OF SERVICE: **SECONDARY VOLTAGE:**
EXISTING METER NUMBER (IF APPLICABLE):

(SCIP) CONSTRUCTION DESCRIPTION:

UPGRADE POLE# 30161 WITH 40"W AND INSTALL DOWNGUY AT PT.1. UPGRADE 3-37.5KVA XFRM TO 3-100KVA XFRM AT PT.2. REMOVE EXISTING QUAD AND INSTALL +20' 2-#2/0 QUAD FROM PT.1 TO PT.2. INSTALL BAR TYPE C.T.'S AND INSTALL THREE PHASE COMMERCIAL DEMAND METER AT PT.3.

ARCHEOLOGY CLEARANCE: YES

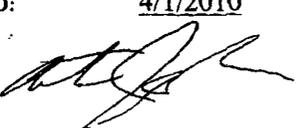
(CUSTOMER) CONSTRUCTION DESCRIPTION:

CUSTOMER TO PROVIDE AND INSTALL 400A 477/480 COMMERCIAL RATED METER PANEL WITH 4" RIGID METALLIC RISER. MOUNTED ON METAL RACK. METER AND SERVICE EQUIPMENT MANUFACTURED BY ALS IS PRE-APPROVED BY THE SCIP METER DEPARTMENT.

ESTIMATE IS VALID FOR (6) MONTHS AFTER APPROVAL DATE:

ESTIMATED COST:	BILLING OFFICE NOTES/STAMP:
ESTIMATED MATERIAL COST =	\$2,575.62
MATERIAL OVERHEAD AT 15% =	\$386.34
TOTAL MATERIAL COST =	\$2,961.96
TOTAL EQUIPMENT =	\$916.00
ESTIMATED LABOR COST =	\$1,666.00
LABOR OVERHEAD AT 30% =	\$499.80
TOTAL LABOR COST =	\$2,165.80
TOTAL ESTIMATED COST =	\$6,043.76
ESTIMATED MAN-HOURS =	48

CONSTRUCTION NOTES:

ESTIMATED BY: Jennifer Navaho
DATE ESTIMATED: 4/1/2010
APPROVED BY: 
DATE APPROVED: 4-23-2010

DATE RECEIVED:
DATE COMPLETED:
FOREMAN SIGNATUR

UNITED STATES DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs
San Carlos Irrigation Project (SCIP)

ELECTRIC SERVICE CONTRACT / APPLICATION / REQUEST FOR SERVICE

BILLING OFFICE
PO Box 250, Coolidge, AZ 85228
1-800-648-8659 Press #2 - Fax - (520)723-4726

NEW CONSTRUCTION & ENGINEERING
13805 N Arizona Blvd, Coolidge, AZ 85228
(520) 723-6202 - Fax - (520) 723-9408

Official Use Only:		
Connect Date:	Customer #:	Service ID #:

REQUEST FOR TAXPAYER IDENTIFICATION NUMBER

In accordance with the Debt Collection Improvement Act of 1996, you are required to provide your taxpayer identification number. This number may be used to make payments (refunds) or for purposes of collecting and reporting on any delinquent amounts arising out of your relationship with the Federal Government.

- | | | | |
|---|--|--|---|
| <p>(MARK ALL THAT APPLY)</p> <p><input type="checkbox"/> New Customer</p> <p><input type="checkbox"/> New Construction</p> <p><input type="checkbox"/> Connect/Reconnect (service fees apply)</p> | <p>(MARK ALL THAT APPLY)</p> <p><input checked="" type="checkbox"/> Existing Customer</p> <p><input checked="" type="checkbox"/> Service Upgrade</p> <p><input type="checkbox"/> Reread Meter (service fees apply)</p> | <p>(MARK ALL THAT APPLY)</p> <p><input type="checkbox"/> Final Disconnect</p> <p><input type="checkbox"/> Relocate Meter Panel</p> <p><input type="checkbox"/> Meter Test (service fees apply)</p> | <p>(MARK ALL THAT APPLY)</p> <p><input type="checkbox"/> Seasonal Disconnect</p> <p><input type="checkbox"/> Remove Service</p> <p><input type="checkbox"/> Existing Customer (Relocating to different address in SCIP service territory)</p> |
|---|--|--|---|

Customer Name (print): Arizona Water Company		SSN/TID: 86-0119837	
Phone #: Home	Cell	Work 602-240-6860	Fax 602-294-2169
Billing Address:	448 W. Central Ave. - Coolidge, AZ 85128		
Service Location	Coolidge Airport Well No. 1 (SE 1/4 of the NE 1/4 of Sec.4 - T. 6 S., R. 9 E.)		
Closest Cross Street(s):	Coolidge Airport Rd. & Beechcraft Rd.		
Other Responsible Party: Fred Schneider, AWC VP of Eng.		SSN/TID: 86-0119837	
Contractor Name (print): Felix Construction		Phone #: 480-464-0011	
Applicant certifies that he/she is Owner <input type="checkbox"/> Leaser <input type="checkbox"/> Agent <input checked="" type="checkbox"/> of the service location: (please initial)			

FAILURE TO KEEP MAILING ADDRESS AND PHONE NUMBERS UP TO DATE ARE SUBJECT TO DISCONNECT IF MAIL IS RETURNED BY THE POST OFFICE.

(Name of nearest relative not living with you)	
Name:	Phone #:
Address:	Cell #:

QUALIFICATIONS FOR LIFE SUSTAINING NEED FOR ELECTRICITY – kidney/hemo/peritoneal dialysis, ventilators/oxi meters (not small nebulizers), C-Pap, O₂ concentrators, feeding/infusion pumps. Must have Doctors written recommendation. **Must be renewed annually.** INITIAL IF THIS APPLIES:

New Construction **New Service** **Service Upgrade** **Commercial/Industrial**
 (Fill out all that apply)

Type of Service

Residential Commercial/Industrial Special/Other

Service Needed/Connect Date: 6-1-2010 Date of Disconnect: _____ Date of Reconnect: _____

Site Built Mobile Home Other Well/Booster A/C All Electric

New/Existing Specifications

Phase: Three Single 480 volts 200 amps 96 KVA
 Underground Overhead

Upgrade Specifications (If Applicable)

Phase: Three Single 480 volts 400 amps 192 KVA
 Underground Overhead

Additional Construction Fees May Apply

All services must be inspected/re-inspected and a clearance called into the Business Office by the governing building safety authority before reconnection by SCIP for either one of the following reasons: (1) service is disconnected for the purpose of Maintenance, Relocation, or Service Upgrades to be made on the customer's side of the meter OR (2) service is turned off for any reason over a six (6) month (or longer) time period. EXCEPTION: Seasonal customers may be extended to twelve months as in accordance with Section 8.6 of the SCIP Operations Manual.

IF ANY REQUESTS ARE FOR AFTER-HOUR SERVICES, OVERTIME CHARGES WILL APPLY.

Security Deposit:	\$ _____	Ck/MO # _____	
Connection Fee:	\$ _____	Receipt # _____	
Advance Construction Charge:	\$ _____		
Total Charges:	\$ _____		

"HAVING HEREBY APPLIED FOR ELECTRICAL SERVICE FROM SAN CARLOS IRRIGATION PROJECT, I DO HEREBY AGREE TO CONFORM WITH ALL RATES, RULES, AND REGULATIONS PROMULGATED IN THE CODE OF FEDERAL REGULATIONS (25 CFR 175) ESTABLISHED BY THE SECRETARY OF THE INTERIOR GOVERNING THE DELIVERY AND SALE OF ELECTRICAL POWER AND ENERGY BY SAID PROJECT AND TO MAKE PAYMENTS FOR SERVICES RENDERED IN A TIMELY MANNER."

Applicant/Agent:	<u></u> Signature	Date: <u>3-16-10</u>
Other Responsible Party:	<u></u> Signature	Date: <u>3-16-10</u>
Application Received By:	_____ Signature	Date: _____
Contract Prepared By:	_____ Signature	Date: _____

Allow a minimum of 8 weeks notice prior to requested service date for commercial, industrial or development loads. Allow a minimum of 6 weeks after payment is received in full, for construction to begin. In addition to the deposit and connection fees shown above, a construction advance payment may be required before installation can be made, lines extended, or service connected.



ARIZONA WATER COMPANY

IN PUT DIVISION INFORMATION
DIVISION ADDRESS
DIVISION PHONE NUMBERS

PROPOSAL/CONTRACT

CONTRACTOR: <i>CENTRAL ARIZONA Pipeline Contractor's Inc</i>	SYSTEM: PV
ADDRESS: <i>PO BOX 338 Coolidge, AZ 85128</i>	W.A. No(s): 1-4706
	BID DUE DATE: October 15, 2010

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

- Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
- Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
- Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
- Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
- Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
- Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statutes ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
- Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
- The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
- Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
- Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 14 calendar days after the Commencement Notice is issued.
- Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
- The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

1- Contractor to obtain all nessary permits required to relocate the storage tank from Vally Farms to the Coolidge airport. 2- Contractor to pay for all compaction testing required . AWC will not pay for failed testing.

CONTRACTOR <i>CENTRAL ARIZONA Pipeline Contractor's Inc</i>	PROPOSAL/CONTRACT ACCEPTED: ARIZONA WATER COMPANY
By: <i>Clinton White</i>	By: <i>Frederic K Schweiger</i>
Print Name: <i>CLINTON WHITE</i>	Print Name: <i>FREDERIC K SCHWEIGER</i>
Title: <i>PRESIDENT</i>	Title: <i>VP- engineering</i>
Date: <i>10-15-10</i>	Date: <i>10-20-10</i>

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we Central Arizona Pipeline Contractors, Inc.
P.O. Box 338, Coolidge, AZ 85228 (Here insert full name and address or legal title of Contractor)

as **Principal**, hereinafter called the **Principal**, and Washington International Insurance Company
1200 Arlington Heights Road #400, Itasca, IL 60143 (Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of NH
as **Surety**, hereinafter called the **Surety**, are held and firmly bound unto Arizona Water Company, 220 E.
2nd Street, Casa Grande, AZ 85122 (Here insert full name and address or legal title of Owner)

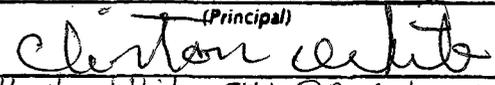
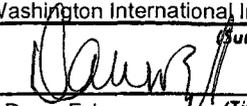
as **Obligee**, hereinafter called the **Obligee**, in the sum of Ten Percent of Bid Amount

Dollars (\$10% of Bid Amount),
for the payment of which sum well and truly to be made, the said **Principal** and the said **Surety**, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the **Principal** has submitted a bid for (Here insert full name, address and description of project)
Construct Concrete Slab for Water Tank - Relocate Water Tank From Valley Farms to Coolidge Airport

NOW, THEREFORE, if the **Obligee** shall accept the bid of the **Principal** and the **Principal** shall enter into a Contract with the **Obligee** in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the **Principal** to enter such Contract and give such bond or bonds, if the **Principal** shall pay to the **Obligee** the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the **Obligee** may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this 15th day of October 2010

	<u>Central Arizona Pipeline Contractors, Inc.</u> <small>(Principal)</small> <small>(Seal)</small>
<small>(Witness)</small>	 <u>Clinton White</u> <small>(Title)</small> <u>PRESIDENT</u>
	<u>Washington International Insurance Company</u> <small>(Surety)</small> <small>(Seal)</small>
 <small>(Witness)</small>	 <u>Dawn Fykes</u> <small>(Title)</small> <u>Attorney-in-Fact</u>

AIA CAUTION: You should sign an original AIA document which has this caution printed in red. An original assures that changes will not be obscured as may occur when documents are reproduced.

NAS SURETY GROUP

NORTH AMERICAN SPECIALTY INSURANCE COMPANY
WASHINGTON INTERNATIONAL INSURANCE COMPANY

GENERAL POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, THAT North American Specialty Insurance Company, a corporation duly organized and existing under laws of the State of New Hampshire, and having its principal office in the City of Manchester, New Hampshire, and Washington International Insurance Company, a corporation organized and existing under the laws of the State of Arizona and having its principal office in the City of Itasca, Illinois, each does hereby make, constitute and appoint:

MICHAEL J. MESENBRINK, DAVID J. HICKMAN,

JERI LYNN THOMPSON, MARIA LUCERO and DAWN FYKES

JOINTLY OR SEVERALLY

Its true and lawful Attorney(s)-in-Fact, to make, execute, seal and deliver, for and on its behalf and as its act and deed, bonds or other writings obligatory in the nature of a bond on behalf of each of said Companies, as surety, on contracts of suretyship as are or may be required or permitted by law, regulation, contract or otherwise, provided that no bond or undertaking or contract or suretyship executed under this authority shall exceed the amount of:

TWENTY-FIVE MILLION (\$25,000,000.00) DOLLARS

This Power of Attorney is granted and is signed by facsimile under and by the authority of the following Resolutions adopted by the Boards of Directors of both North American Specialty Insurance Company and Washington International Insurance Company at meetings duly called and held on the 24th of March, 2000:

"RESOLVED, that any two of the President, any Executive Vice President, any Vice President, any Assistant Vice President, the Secretary or any Assistant Secretary be, and each or any of them hereby is authorized to execute a Power of Attorney qualifying the attorney named in the given Power of Attorney to execute on behalf of the Company bonds, undertakings and all contracts of surety, and that each or any of them hereby is authorized to attest to the execution of any such Power of Attorney and to attach therein the seal of the Company; and it is

FURTHER RESOLVED, that the signature of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be binding upon the Company when so affixed and in the future with regard to any bond, undertaking or contract of surety to which it is attached."



By [Signature]
Steven P. Anderson, President & Chief Executive Officer of Washington International Insurance Company &
Vice President of North American Specialty Insurance Company



By [Signature]
David M. Layman, Vice President of Washington International Insurance Company &
Vice President of North American Specialty Insurance Company

IN WITNESS WHEREOF, North American Specialty Insurance Company and Washington International Insurance Company have caused their official seals to be hereunto affixed, and these presents to be signed by their authorized officers this 12th day of June, 2008.

North American Specialty Insurance Company
Washington International Insurance Company

State of Illinois ss:
County of Du Page

On this 12th day of June, 2008, before me, a Notary Public personally appeared Steven P. Anderson, President and CEO of Washington International Insurance Company and Vice President of North American Specialty Insurance Company and David M. Layman, Vice President of Washington International Insurance Company and Vice President of North American Specialty Insurance Company, personally known to me, who being by me duly sworn, acknowledged that they signed the above Power of Attorney as officers of and acknowledged said instrument to be the voluntary act and deed of their respective companies.



[Signature]
Donna D. Sklens, Notary Public

I, James A. Carpenter, the duly elected Assistant Secretary of North American Specialty Insurance Company and Washington International Insurance Company, do hereby certify that the above and foregoing is a true and correct copy of a Power of Attorney given by said North American Specialty Insurance Company and Washington International Insurance Company, which is still in full force and effect.

IN WITNESS WHEREOF, I have set my hand and affixed the seals of the Companies this 15th day of October, 2010.

[Signature]

James A. Carpenter, Vice President & Assistant Secretary of Washington International Insurance Company &
North American Specialty Insurance Company



ARIZONA WATER COMPANY

INPUT DIVISION INFORMATION
DIVISION ADDRESS
DIVISION PHONE NUMBERS

PROPOSAL/CONTRACT

CONTRACTOR: WEBER GROUP LC	SYSTEM: COOLIDGE
ADDRESS: 16825 S. WEBER DRIVE	W.A. No(s): 1-4706
CHANDLER, ARIZONA 85226	BID DUE DATE: April 19, 2010

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

- Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
- Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
- Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
- Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
- Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
- Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statutes ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
- Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
- The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
- Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
- Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within _____ calendar days after the Commencement Notice is issued.
- Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
- The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR WEBER GROUP LC	PROPOSAL/CONTRACT ACCEPTED: ARIZONA WATER COMPANY
By: <i>Fred Tregaskes</i>	By: <i>James Wilson</i>
Print Name: FRED TREGASKES	Print Name: JAMES WILSON
Title: PRESIDENT	Title: SR. ENGINEER
Date: 7-20-10	Date: 7/20/10



ARIZONA WATER COMPANY

INPUT DIVISION INFORMATION
DIVISION ADDRESS

PROPOSAL/CONTRACT

CONTRACTOR: WEBER GROUP LC	SYSTEM: COOLIDGE
AZ CONTRACTOR LICENSE NO: _____ CLASSIFICATION: _____	W.A. No(s): 1-4706
ADDRESS: 16825 S. WEBER DRIVE CHANDLER, ARIZONA 85226	BID DUE DATE: April 19, 2010
	BID BOND REQUIRED <input type="checkbox"/> Yes <input type="checkbox"/> No

DESCRIPTION OF PROJECT: **INSTALL A SKID MOUNTED BOOSTER STATION WITH TWO 2HP VFD PUMPS AND TWO 40HP FIRE PUMPS PER THE ATTACHED QUOTE DATED 4/19/10**

	QUANTITY	UNIT PRICE		TOTAL COST	
		LABOR	MATERIALS	LABOR	MATERIALS
1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)					
Install skid mounted booster station w/ 2-2HP VFD pumps and 2-40HP fire pumps	1		\$51,695.00		\$ 51,695
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	0
4. Total Exempt Materials (add the amounts in column 2)					4
					51,695
5-6. NON-EXEMPT MATERIALS					
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5)				7	
8. Total Non-Exempt Materials (add the amounts in column 6)					8
9. Subtotal A (add lines 3, 7 and 8)					9
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10	
11. Applicable Contracting Tax Rate				11	
12. Contracting Tax (multiply the amount on line 10 by line 11)					12
13. Subtotal B (add lines 4, 9 and 12)					13
14. 100% Performance and Payment Bonds Cost					14
15. Estimated Total Cost (add lines 13 and 14)					15

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

Weber Group L.C.

W A T E R R E S O U R C E S

16825 South Weber Drive, Chandler, Arizona 85226, Office (480) 961-1141, Fax (480) 961-0290
 18403 W. McDowell Road, Goodyear, Arizona, 85338, Office (623) 853-9901, Fax (623) 853-9902
 2838 W. Ruthrauff Road, Tucson, Arizona 85705, Office (520) 887-2170, Fax (520) 408-0832

Quotation

Customer: Arizona Water Company	From: Fred Tregaskes
Attn: James Wilson	Date: 4/19/2010
Phone: 602-240-6860	Quote No.:
Fax:	Project: Coolidge Airport Skid Mounted Booster Station
	Job No.

Weber Group is pleased to offer the following quotation for your review and consideration:

ITEM NO.	QTY.	DESCRIPTION	UNIT PRICE	UNIT	TOTAL
	1 LS	Skid mounted booster station consisting of the following equipment: 2 - 2 HP booster pumps designed for 25 GPM at 70 PSI 2 - 40 HP booster (fire flow) pumps designed for 750 GPM at 60 PSI 1 - 12 inch suction header with three 6 inch outlets, three 2 inch outlets 1 - 12 inch discharge header with three 6 inch outlets, three 2 inch outlets 2 - 6 inch suction piping with butterfly valves 2 - 6 inch discharge piping with check valves, butterfly valves 2 - 2 inch suction piping with butterfly valves 2 - 2 inch discharge piping with check valves, butter valves Spare inlet and outlet pipes will have flanges or caps as necessary Welded steel skid, Tnemec coated. Color to be determined All pipe will be sandblasted and Tnemec coated Electrical system 1 - 2 HP VFD drive for lead pump 2 - 2 HP across the line starters for second and future third pump 1 - Pressure transmitter 2 - 40 HP starter cabinets w/fusible disconnects for the fire pumps 2 - NEMA 4 pressure switches to control the 40 HP pumps 1 - Air conditioner to accommodate the heat generated by the VFD	\$51,695.00	1 LS	\$51,695.00
		Subtotal			\$51,695.00

TERMS AND CONDITIONS:

- a. Payment terms: Net 30 days
- b. Validity of quotation: 30 days
- c. Warranty: Standard 1 year from start-up date
- d. Delivery: Pending NTP
- e. Freight: F.O.B. Jobsite
- f. Tax: **All quotes are plus any applicable tax**
- g. Quantities Listed: Customer will only be invoice for Qty. consumed.

EQUIPMENT AND LABOR TOTAL AMOUNT

\$51,695.00

Thank you for the opportunity to be of service. Please sign, date and return with P.O. number and we will proceed with project.

Best Regards,
Fred Tregaskes

President

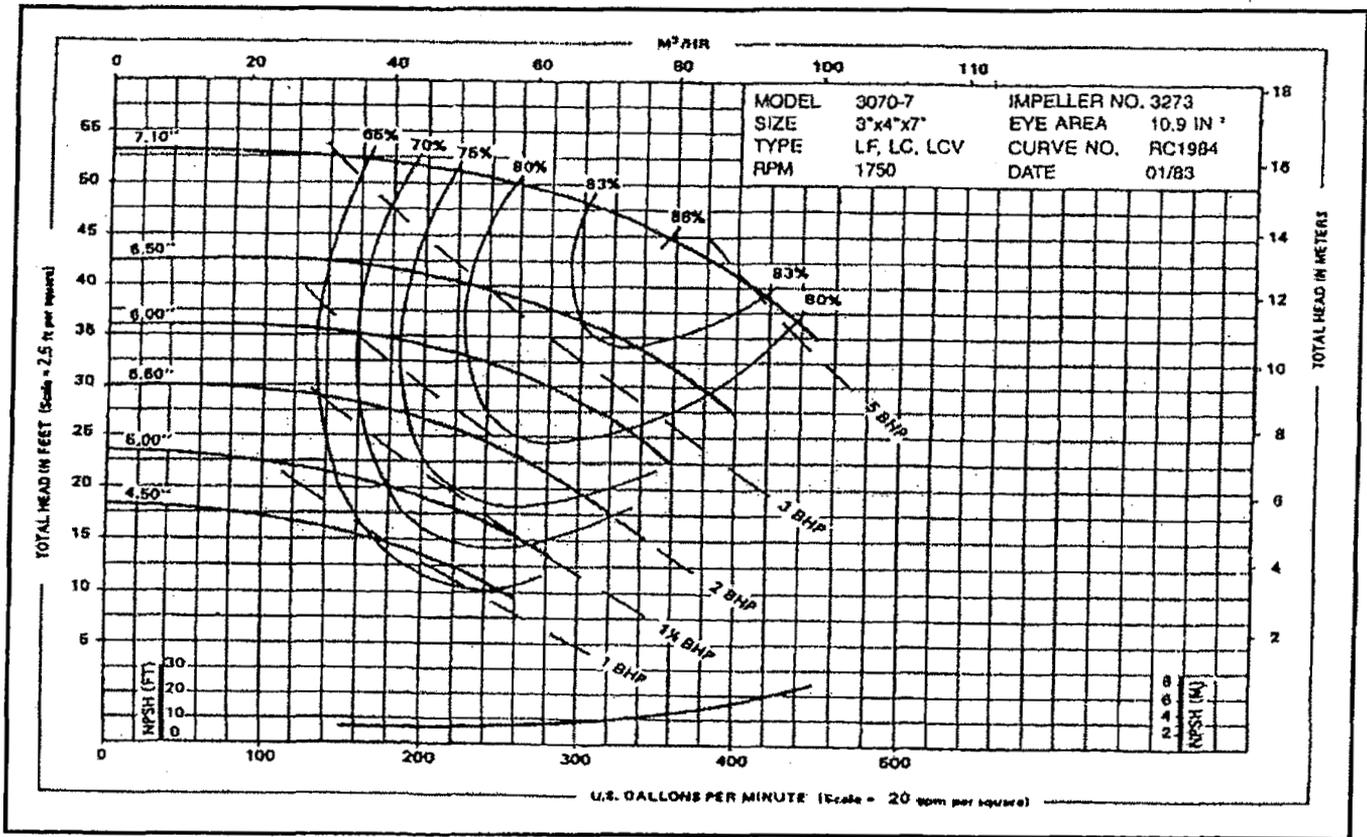
AUTHORIZED BY: _____ DATE: _____ P.O. NO.: _____

TITLE: _____



LC - 30707 - 1750 RPM - Performance Curve

Project:	Tag #	P.O. #	By:
Location:	Model: 30707	Cust Ref#	Date: 5/14/2010
Contractor:	Stages: 1	Agent/Rep:	Rev. #
Engineer:	Service:	Doc #	Qty:



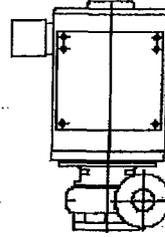
Conditions of Service			Motor Data		
Flow:	Temp:	Suct. Press:	HP: 40	Voltage: 208-230/460	Eff:
TDH:	S.G.:	Dis. Press:	RPM: 1750	Phase: Three phase	S.F.: 1.15
Fluid:	Visc.:	Diff. Press:	Encl.: ODP	Hz: 60	

GRUNDFOS 

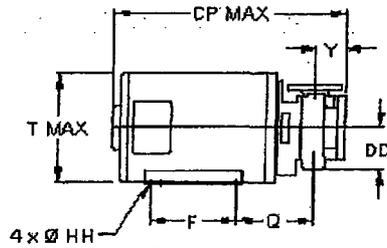
LC - 30707 - Dim. Dwg

NOT FOR CONSTRUCTION,
Unless certified and referenced on order.

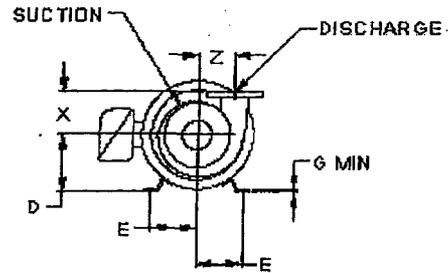
Project:	Model: 30707	P.O. #	By:
Location:	Rotation: Clockwise	Cust Ref#	Date: 5/14/2010
Contractor:	Qty:	Agent/Rep:	Rev. #
Engineer:	Service:	Tag #	Doc #



PLAN



SIDE VIEW



END VIEW

6-x-4

Units	FRAME	SUCT	DISCH	CP	D	DD	E	F	G	HH	Q	T	X	Y	Z	Weight
inches	324JM	4	3	33	8	5-7/8	6-1/4	10-1/2	5/16	21/32	10-5/8	15-1/8	6	4-5/32	4-7/8	490
Conditions of Service							Motor Data									
Flow:	Fluid:	HP: 40		Encl.: ODP		Phase: Three phase		Eff:								
TDH:	Temp:	RPM: 1750		Hz: 60		Voltage: 208-230/460		S.F.: 1.15								

Big Pump

GOULDS PUMPS
Unit Dimensions

HSC
End Suction Cast Iron Pumps
MODEL : HSC20

Hydraulic Data					Motor Data	HSC Model	Qty.
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH _r	Voltage / Phase / Enclosure		
53 US g.p.m.	25 US g.p.m.	217 ft	162 ft	6 ft	208-230V 3PH TEFC	HSC20	1

Submittal Prepared for: WEBER GROUP Job: _____
 Engineer: _____ Contractor: _____
 Submittal Prepared by: ERIC NELSON Company: KARAM BROS., INC.
 Submittal Date: 2010-04-16 Approved by: _____ Date: _____

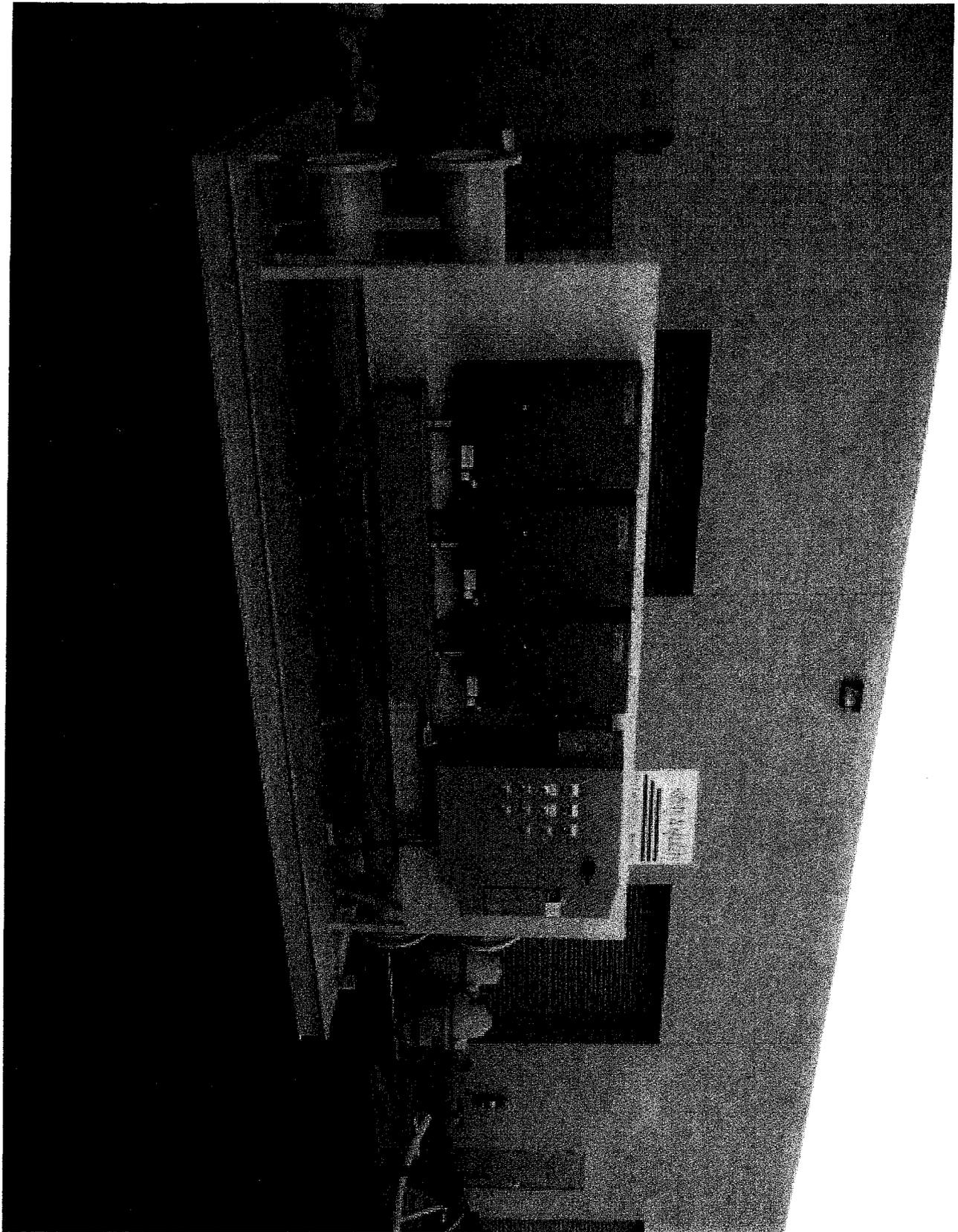
Model	HP	Length	Width	Height	Wt. (lbs.)
HSC07	¾	15	8	9	53
HSC10	1	16	8	9	58
HSC15	1½	17	8	9	72
HSC20	2	19	8	9	75

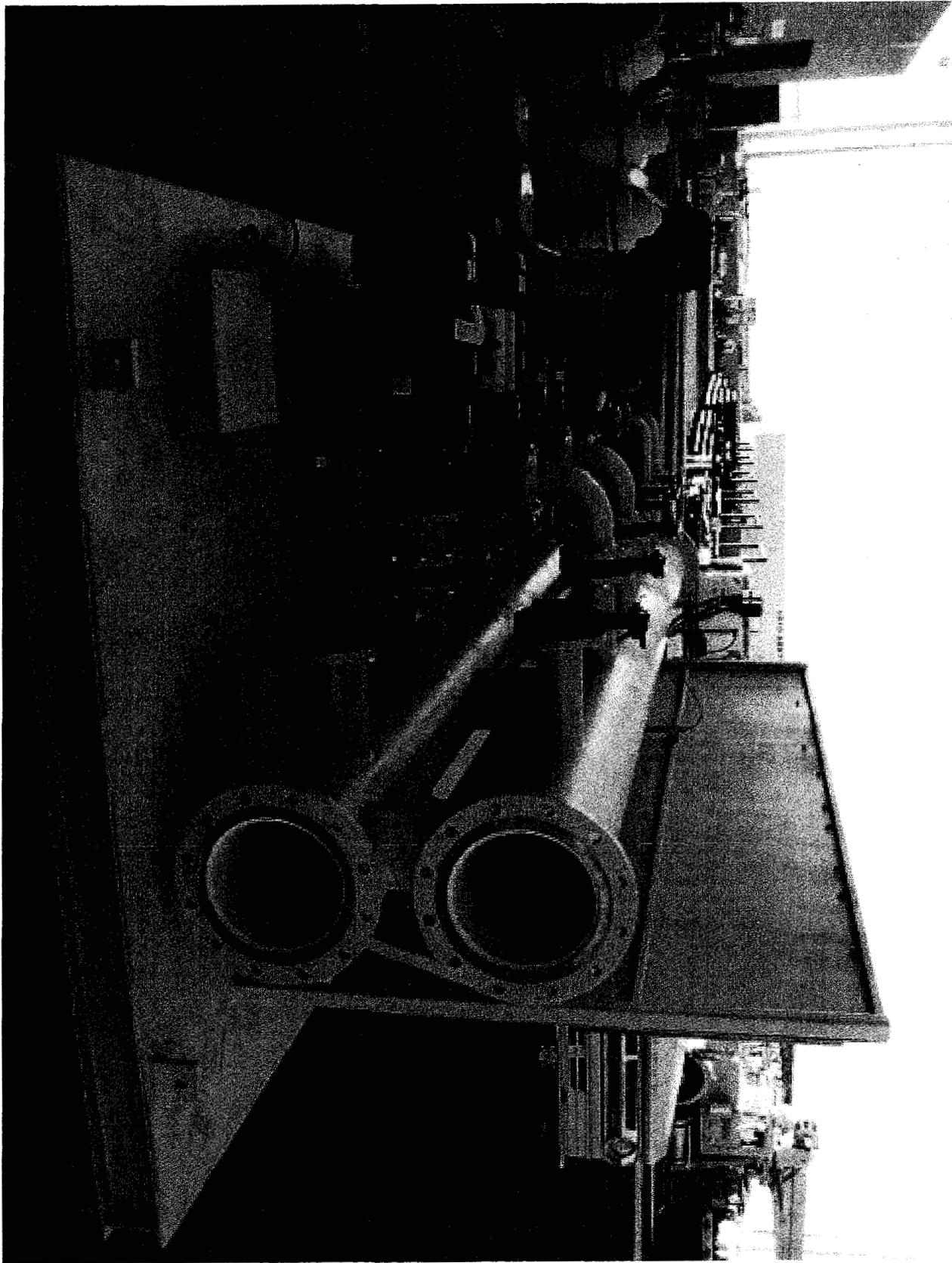


(All dimensions are in inches and weight in lbs. Do not use for construction purposes.)

Small Pump

Dimension	Value	Dimension	Value











R·A·M·M

Geotechnical Engineering Report
250,000 Gallon Water Storage Tank
Coolidge Airport Tank Site
Near 4th Street and "C" Street
Coolidge, Arizona
RAMM Project No. G15908



Expires 3/31/2010



R·A·M·M

RICKER • ATKINSON • McBEE • MORMAN & ASSOCIATES, INC.

Geotechnical Engineering • Construction Materials Testing

Arizona Water Company
3805 North Black Canyon Highway
Phoenix, Arizona 85015

June 12, 2008

Attention: Mike Loggins

Subject: Geotechnical Engineering Report
250,000 Gallon Water Storage Tank
Coolidge Airport Tank Site
Near 4th Street and "C" Street
Coolidge, Arizona

RAMM Project No. G15908

Attached to this letter is the Geotechnical Engineering Report for the proposed 250,000 Gallon Water Storage Tank, to be located in Coolidge, Arizona.

The proposed project will include construction of a 250,000 gallon water storage tank. The results of our field explorations; laboratory testing; and engineering analysis, evaluation and recommendations are presented in the report.

The attached report was prepared based on project and site data available at this time and was prepared in a manner and to the standards of local geotechnical engineering practice. Our services did not include evaluations for the presence of hazardous materials, area subsidence resulting from groundwater withdrawal or other geologic hazards.

If you have any questions, please do not hesitate to call.

Respectfully submitted,
RICKER, ATKINSON, MCBEE, MORMAN & ASSOCIATES, INC.



Expires - 3/31/2010

By: Kenneth L. Ricker, P.E.

AND

Kip E. Reese, E.I.T.

/dcw

Copies to: Addressee (5) (mloggins@azwater.com)

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Expires 3/31/2010

REPORT



INTRODUCTION

This report presents the results of our geotechnical engineering services for the proposed 250,000 Gallon Water Storage Tank, to be located in Coolidge, Arizona. The scope of our services included performing a field exploration program, laboratory analysis and geotechnical engineering evaluation, analysis and recommendations. The geotechnical recommendations presented herein include those for anticipated excavation conditions, site development, and material use and requirements. We would be pleased to discuss with you any additional recommendations you may require. In addition, we are available to review project specifications and plans for conformance with our recommendations at no charge to you.

This firm should be notified for additional evaluation and recommendations if the project design parameters (location, depth, size, etc.) are changed, and/or where site use or conditions encountered during construction differ from those presented herein.

PROPOSED CONSTRUCTION

The proposed development will include construction of a 250,000 gallon water storage tank. The tank will be 18 feet high and 50 feet in diameter. The tank will have steel walls and floors. The walls will be supported by concrete reinforced ring footings and the floor supported on a sand layer and prepared subgrade. The proposed tank will have ring wall loads of 3 to 4 kips per linear foot, and product live plus dead loads on the steel bottoms of about 1500 psf.

SITE CONDITIONS

The Water Storage Tank site is located east of the Coolidge Airport near 4th Street and "C" Street, in Coolidge, Arizona. At the time of our investigation the site was a relatively flat undeveloped parcel adjacent to an existing well site. Vegetative cover consisted of sparse to moderate amounts of desert shrub and grasses.

FIELD EXPLORATIONS

Subsurface conditions were explored by drilling one test boring to a depth of 30 feet, at the location shown on the Site Plan in Appendix A. The test boring was drilled with a CME 75 drill rig using seven-inch diameter, hollow-stem augers. The drilling equipment and crew were

provided by D&S Drilling, Inc. The test boring location was determined in the field by our field technician. During the field explorations representative undisturbed and disturbed samples were obtained, the field explorations logged and soils field-classified by our field technician, who also directed the drill crew. The relatively undisturbed samples (ring samples) were obtained by driving a 3-inch diameter, ring-lined, open-end sampler into the soil with a 140-pound hammer dropping 30 inches. In addition to drilling and sampling, continuous penetration testing using a 2-inch diameter rod and the 140-pound hammer dropping 30 inches was performed and extended to a depth of 3.6 feet adjacent to the test boring location. The results of our field explorations are presented in the Test Boring Log in Appendix A.

LABORATORY ANALYSIS

Representative samples obtained during the field explorations were subjected to the following tests in our laboratory.

<u>Type of Test</u>	<u>Type of Sample</u>	<u>Number of Samples Tested</u>
Compression	Undisturbed	1
Swell Potential	Remolded	1
Percent Passing No. 200 Sieve & Plasticity Index	Representative	1
pH, Minimum Resistivity	Representative	1
Moisture Content/Dry Density *	Undisturbed Ring	5

* Reported in the Test Boring Logs.

The results of the laboratory analysis are presented in Appendix B.

SUBSURFACE CONDITIONS

The results of the test borings are presented in Appendix A in the Test Boring Log. In general, the surface and near-surface soils extending to the maximum depth of our exploration (30.0 feet) consisted of clayey sand to sandy clay. The soils were medium dense to dense, were stiff to very stiff, had medium to high plasticity, had intermittent light cementation and had zones of light to moderate cementation. Moisture contents were described as slightly damp to moist. No groundwater was encountered in the test boring at the time of drilling.

DISCUSSIONS OF TEST RESULTS

A remolded sample of the near surface soils from the site exhibited moderate swell potentials following wetting when tested in the laboratory. An undisturbed sample from anticipated foundation grades was found to undergo some compression during loading to approximate foundation loads. Upon wetting at approximate foundation loads, these soils underwent some additional compression.

FOUNDATION DESIGN RECOMMENDATIONS

Water Storage Tank:

The proposed water storage tank shell can be supported on concrete ring wall footings. The footings may be founded on undisturbed site soils, and/or compacted fill. The ring wall footing may be designed using an allowable bearing pressure of 2000 psf provided the bottom of the footing is at least 2.0 feet below the lowest adjacent finished grade within 5 feet of the perimeter of the tank. The ring wall footing should be at least 12 inches wide. The tank floor should be founded on a layer of sand supported on undisturbed and/or recompacted site soils and may be designed using an allowable bearing pressure of 2000 psf (for a full tank). Site soils may be used as fill, provided they are moisture conditioned and compacted at a moisture content at optimum to 3 percent above optimum, and material greater than 6 inches in size is removed.

Based on anticipated tank loads and site soil conditions, it is estimated that total tank settlement will be on average 0.50 inches. In order to control settlement once the product is placed in the tanks, we recommend that during water testing of the tank, the tank be filled in 25% volume increments with each increment held for 12 hours, except the final increment, which should be held for 72 hours. During the testing, the tank bottom elevation should be monitored at three equally spaced points based on an off-site bench mark. Should extensive movements occur, this firm should be notified so the data can be evaluated and supplemental recommendations developed.

The allowable bearing capacity should be applied to maximum, design dead plus live loads and may be increased by one-third when considering temporary loads such as transient wind or seismic loads. A one-third increase may also be used for toe pressures due to eccentric or lateral

loadings, assuming the entire footing bearing surface remains in compression. The weight of the footing concrete below grade may be neglected in dead load computations. A soil profile type S_C may be used in seismic design per UBC 1997 Edition. A Site Class designation of C should be used for the site per Table 1615.1.1 of the 2000, 2003 and 2006 International Building Code (IBC). The soil profile and site class designations are based on the geology of the area which includes the presence of dense material to depths over 100 feet in the immediate vicinity of the site.

The estimated total and differential footing settlements for the loading conditions described above are less than ½ inch if soils below footing level remain at or below the construction moisture content. Additional post-construction, differential settlement of equal magnitude could occur if bearing soils become wet after construction. Positive drainage away from the perimeter of the facilities is essential to minimize the potential for moisture infiltration into bearing soils.

Lateral Earth Pressures:

The following tabulation presents the recommended lateral earth pressures and base friction values which should be used in the lateral design of footings and retaining walls. The lateral pressures are equivalent fluid pressures for average anticipated conditions.

Backfill Pressures:	
Unrestrained walls-----	35 psf/ft
Restrained walls-----	55 psf/ft
Passive Pressures:	
Continuous-----	350 psf/ft
Coefficient of Base Friction:	
Concrete to soil-----	0.45
Steel to soil -----	0.25

The above equivalent fluid pressures are for vertical walls with horizontal backfills and do not include temporary loads imposed by compaction equipment or permanent loads resulting from backfill swell pressures, hydrostatic pressures or surcharge loads. All retaining walls should contain weep holes to reduce the potential for the buildup of hydrostatic pressures.

SITE DEVELOPMENT RECOMMENDATIONS

Surface Drainage:

Most soils will undergo some degree of volume change as the result of wetting. The degree of volume change will depend on the type of soil, swell potential, natural soils structure or degree of compaction (if a fill). These volume changes could result in movements in overlying facilities and non-structure elements including sidewalks, planters, screen walls, etc. Therefore, good site and surface drainage away from these elements is required. In addition, water should not be allowed to pond within 10 feet of the facilities or other elements which are sensitive to movements. The facilities excavation backfill must be well compacted to minimize the possibility of moisture infiltration through this zone.

Excavatability:

The excavatability of site materials is difficult to evaluate based only on the exploration equipment used during this design report. Therefore, we recommend that the contractor evaluate the excavatability of site materials by performing test excavations with the size and type of equipment the contractor plans on using at the site. For design purposes the following paragraph presents our best analysis as to the excavatability of site soils.

The near surface soils to a depth of at least 15 feet can probably be removed with conventional excavating equipment. Deeper excavations may be slower and more difficult to accomplish due to the presence of cementation. OSHA requires all excavations over five feet in depth, in which personnel are to enter, be either braced or sloped in accordance with OSHA regulations.

Workability:

Wetting site soils such that moisture contents are at or above optimum could result in some soil pumping under dynamic loadings such as heavy construction equipment driving over the area. In the new facility areas where pumping has occurred, the area should be allowed to dry until soils are workable without pumping or the wetted areas removed and replaced with drier site soils.

Corrosion Potential:

As part of this investigation, laboratory pH, and Minimum Resistivity testing of site soils was conducted. Based on these results, there appears to be a high potential for corrosion to buried metal structures and pipelines, in contact with site soils. The results of the laboratory testing are included in Appendix B, and should be made available to material suppliers and corrosion experts for review.

MATERIALS SUITABILITY AND REQUIREMENTS

Site Materials:

The near surface site soils may be used as fill and in backfill areas provided these soils are placed and compacted at a moisture content at optimum to 3 percent above optimum and are free of organic materials, debris, rubble and material greater than 6 inches in size.

Imported Soils:

Fill required beyond that available from site sources should be imported soils meeting the following requirements:

Minimum Passing No. 4 Sieve -----30%
Maximum Particle Size ----- 6 inches
Maximum Swell Potential----- 1.5%*

* Based on a sample which is remolded to 95% of the ASTM D698 maximum dry density at a moisture content of 2 percent below optimum, placed under a surcharge load of 100 psf and wetted.

SITE PREPARATION AND GRADING PROCEDURES

Water Storage Tank Area:

Recommendations presented in the previous sections of this report are based upon the following site preparation and grading procedures. Therefore, all earthwork should be accomplished with observation and testing by a qualified technician under the direction of a registered geotechnical/materials engineer. The following apply to the areas within and extending 5 feet beyond the storage tank areas.

1. Clear and grub the site by removing and disposing of all vegetation, any trash and debris, and any rubble and remnants of any former developments.
2. Prepare the ground surface in fill areas and in areas cut to grade by scarifying, moisture conditioning and compacting the exposed site soils to a depth of 8 inches.
3. Moisture condition and place all fill and backfill materials required to achieve specified grades. Fill materials should be moisture conditioned, placed and compacted in horizontal lifts of thicknesses compatible with the compaction equipment being used.
4. Compact subgrade, fill, backfill, subbase fill or base material to the following minimum percent compaction of the ASTM D698 maximum dry density in each lift:

<u>Material</u>	<u>Minimum Percent Compaction</u>
Soil	
Below foundations -----	95
Below tank bottom -----	100

5. Moisture content of soil and base materials at the time of compaction should be:

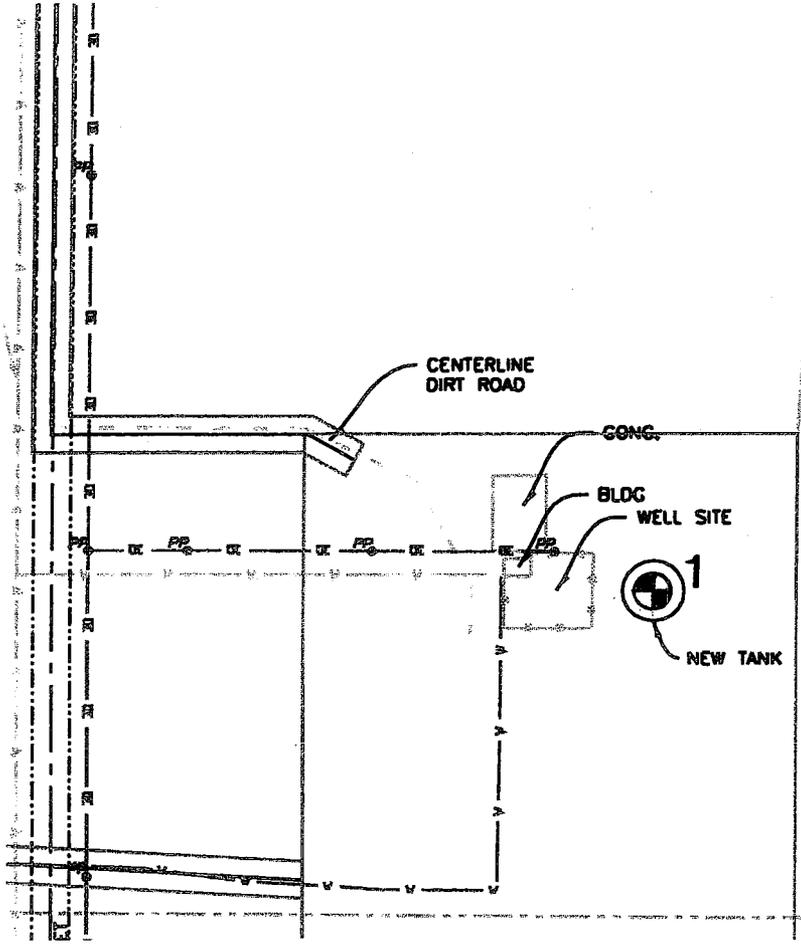
<u>Type</u>	<u>Area of Use</u>	<u>Moisture Content</u>
On-Site	Tank Bottom	Optimum to optimum plus 3%
On-Site	Below Foundations	Optimum of optimum plus 3%
Import	Tank Bottom	Optimum plus or minus 3%
Import	Below Foundations	Optimum plus or minus 3%

6. Any soils which are disturbed or overexcavated by the contractor outside the limits of the plans or specifications should be replaced with materials compacted as specified above.

APPENDIX A
FIELD EXPLORATIONS



RAMSAY



Test Boring Location 

Not To Scale

SITE PLAN

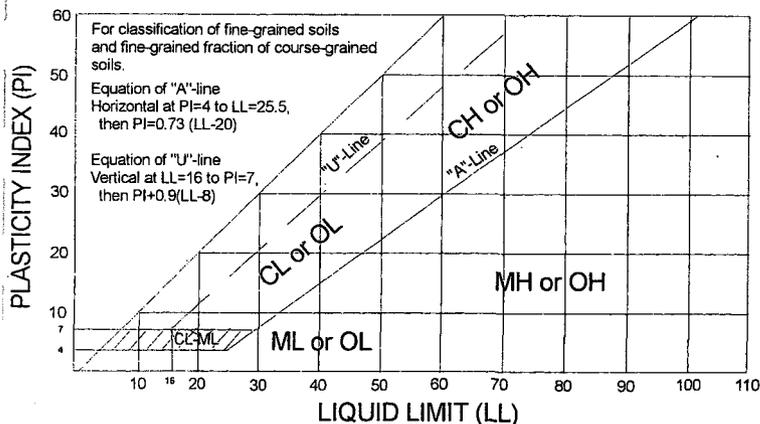
LEGEND

ASTM Designation: D2487-00

(Based on Unified Soil Classification System)

CLASSIFICATION OF SOILS

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests				Soil Classification		
				Group Symbol	Name	
COARSE-GRAINED SOILS More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines	$Cu > 4$ and $1 < Cc < 3$	GW	Well graded gravel	
			$Cu < 4$ and/or $1 > Cc > 3$	GP	Poorly graded gravel	
		Gravels with Fines More than 12% fines	Fines classify as ML or MH	GM	Silty gravel	
			Fines classify as CL or CH	GC	Clayey gravel	
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	$Cu > 6$ and $1 < Cc < 3$	SW	Well-graded sand	
			$Cu < 6$ and/or $1 > Cc > 3$	SP	Poorly graded sand	
Sands with Fines More than 12% fines		Fines classify as ML or MH	SM	Silty sand		
		Fines classify as CL or CH	SC	Clayey sand		
FINE-GRAINED SOILS 50% or more passes the No. 200 Sieve		Sils and Clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line	CL	Lean clay
			$PI < 4$ or plots below "A" line	ML	Silt	
	Organic		$\frac{\text{Liquid Limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic clay Organic silt	
	Sils and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay	
			PI plots below "A" line	MH	Elastic silt Organic clay	
		Organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic silt	
		HIGHLY ORGANIC SOILS Primarily organic matter, dark in color, and organic odor			PT	Peat



TEST BORING LOG DEFINITIONS

Blows per foot using 140 pound hammer with 30 inch free-fall.

Depth, feet	Blows/Foot		Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
	C	N/R					

C = Continuous Penetration Resistance (2 inch diameter rod)

N = Standard Penetration Resistance (ASTM D1586)

R = Penetration Resistance (3 inch diameter ring line sampler)

U.S. STANDARD SERIES SIEVE: 200, 40, 10, 4

GRAIN SIZES: SAND, GRAVEL

CLEAR SQUARE SIEVE OPENINGS: 3/4", 3", 12"

SILTS & CLAYS DISTINGUISHED ON BASIS OF PLASTICITY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

MOISTURE CONDITION (INCREASING MOISTURE →)

DRY SLIGHTLY DAMP DAMP MOIST (Plastic Limit) VERY MOIST WET (SATURATED) (Liquid Limit)

CONSISTENCY CORRELATION

CLAYS & SILTS	BLOWS/FOOT*
VERY SOFT	0-2
SOFT	2-4
FIRM	4-8
STIFF	8-16
VERY STIFF	16-32
HARD	OVER 32

RELATIVE DENSITY CORRELATION

SANDS & GRAVELS	BLOWS/FOOT*
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

*Number of blows of 140 lb hammer falling 30" to drive a 2" O.D. (1-3/8" I.D.) split-spoon sampler (ASTM D1586).

TEST BORING LOG

Project: Coolidge Airport Tank Site - Coolidge, AZ TEST BORING: 1
 Elevation: Not Determined Datum: --- Date: 5-9-08

Depth, feet	Blows/Foot		Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
	C	N/R					
19							
37							
58							
5		50/7"	R	107	5	SC/CL	Clayey Sand to Sandy Clay; brown, slightly damp to moist, medium dense to dense, stiff to very stiff, medium to high plasticity, intermittent light cementation, zones of light to moderate cementation.
		50/10"	R	105	12		
10							
		38	R	111	16		
15							
		50/11"	R	107	6		
20							
		50/10"	R	111	15		
25							

- Continued -

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Coolidge Airport Tank Site - Coolidge, AZ TEST BORING: 1-cont.
 Elevation: Not Determined Datum: --- Date: 5-9-08

Depth, feet	Blows/Foot		Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Visual Description
	C	N/R					
30						SC/ CL	Clayey Sand to Sandy Clay; - continued
35							Stopped test drilling at 30 feet. No groundwater encountered.
40							
45							
50							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

APPENDIX B
LABORATORY ANALYSIS



RAMM

LABORATORY TEST RESULTS

Date: 14-May-08

SAMPLE SOURCE: 1 @ 1.5'-2.5'

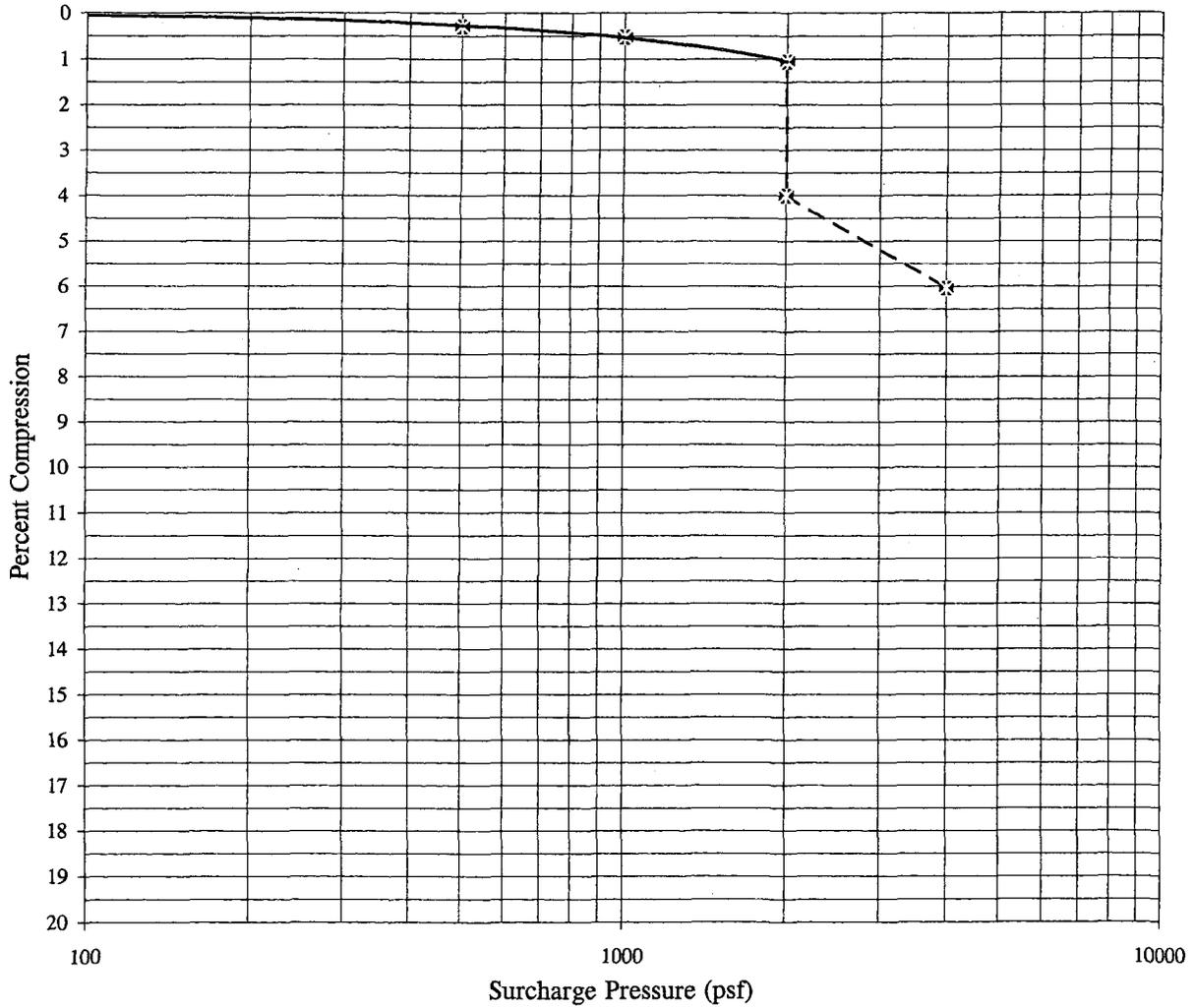
TESTING PERFORMED: Compression (ASTM D2435) - Driven Ring Sample

SAMPLED BY: RAMM/Miller

RESULTS:

Dry Density (pcf): 107

Moisture Content (%): 5



REMARKS: Sample submerged at 2000 psf.

LABORATORY TEST RESULTS

Date: 14-May-08

SAMPLE SOURCE: As noted below

TESTING PERFORMED: Percent Passing No. 200 Sieve, Atterberg Limits, Percent Expansion
(ASTM D1140, D4318, D4546)

SAMPLED BY: RAMM/Miller

RESULTS:

Sample Source	Percent Retained No. 4 Sieve	Percent Passing No. 200 Sieve	Liquid Limit	Plasticity Index	Percent Expansion*	Remolded Dry Density (pcf)	Remolded Moisture Content (%)
1 @ 0'-3'	0	46	34	20	2.9	110	12

* Based upon sample remolded to 95% of the estimated maximum dry density at 2% below the estimated optimum moisture content, with a surcharge pressure of 100 psf.

LABORATORY TEST RESULTS

Date: 14-May-08

SAMPLE SOURCE: As noted below

TESTING PERFORMED: pH, Minimum Resistivity (ADOT 236a)

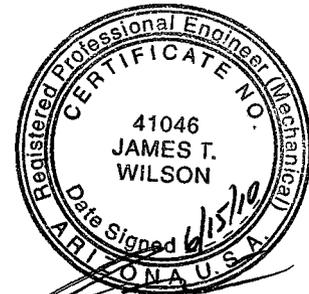
SAMPLED BY: RAMM/Miller

RESULTS:

<u>Sample Source</u>	<u>pH</u>	<u>Minimum Resistivity (ohm-cm)</u>
1 @ 0'-3'	7.7	338

Coolidge Airport Booster Station Master Water Report

May 3, 2010



EXPIRES 6/30/10

Prepared By: James. T. Wilson, P.E.

Arizona Water Company
PO Box 29006
Phoenix, AZ 85038-9006

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Exhibit A – Peak Day WaterCAD report	5
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Introduction

The Coolidge Airport Water System encompasses approximately 1100 acres located approximately 7 miles southeast of the Town of Coolidge in portions of Sections 4 and 5, Township 5 South, Range 9 East of the Gila and Salt River Base and Meridian. Figure 1 shows the location of the Airport.

The Airport water system was established prior 1943 as a military training base and was later acquired and managed by the City of Coolidge until 2006 when the City requested that Arizona Water Company take over operation of the water system. The water system is registered as a non-transient non-community system with service to nine commercial customers and a single fire hydrant. There are no permanent residential customers.

Water System

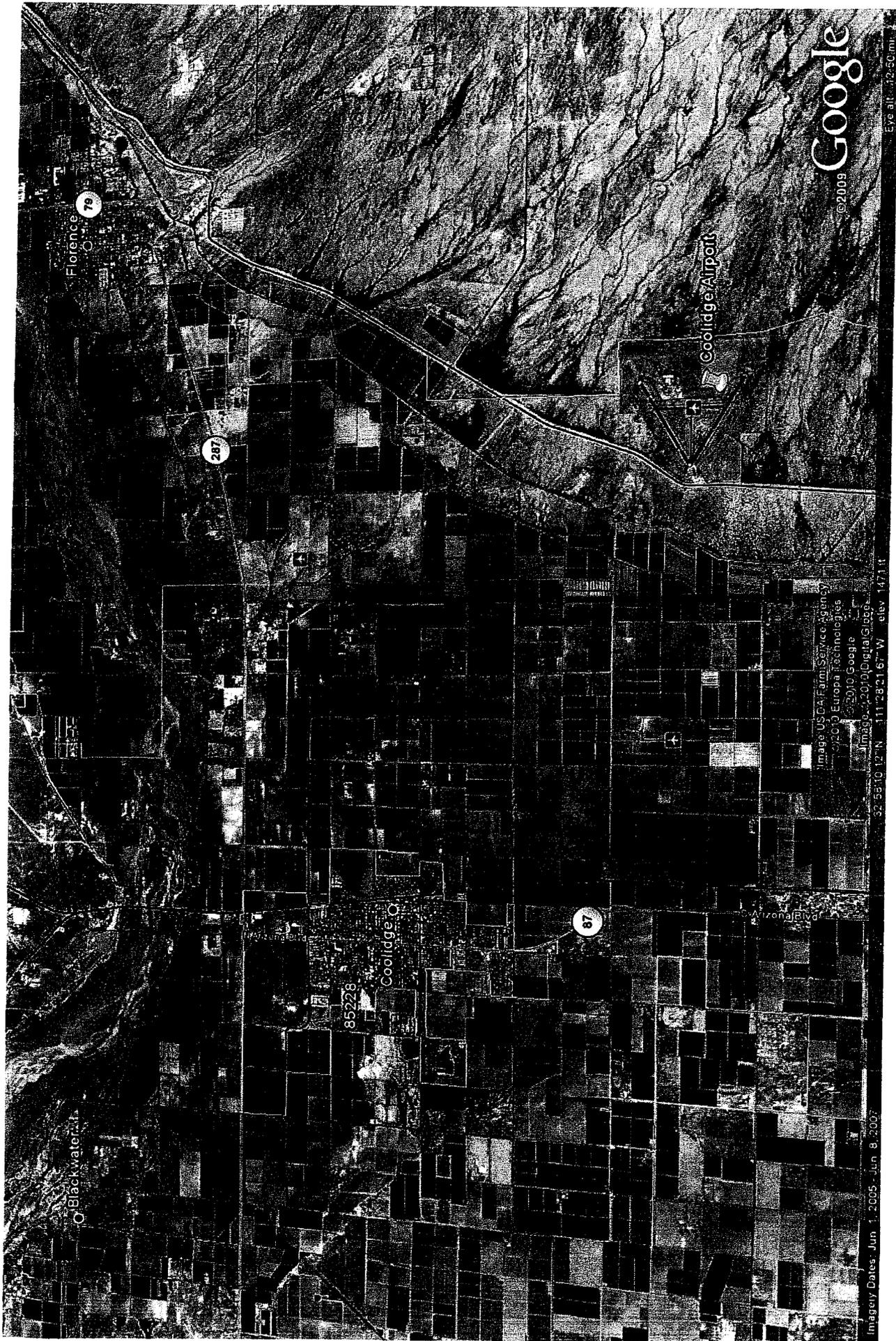
The existing system consists of two wells (55-620899 & 55-620900) that produce 350 GPM each. Both wells are currently controlled by system pressure and pump directly into the distribution system through a hydro-pneumatic tank. There is currently no ground storage. Operation of the wells based on system pressure has resulted in increased cycling of the wells and decreased life span of the pumping equipment. The proposed storage tank and booster station will reduce cycling of the well equipment and stabilize system pressures and flows.

The proposed improvements include re-using an existing 15,000 gallon storage tank that was recently removed from service from our Valley Farms Water System (ADEQ File No. 20090132) and new booster station. The new booster station will have two 2HP VFD pumps and two 40HP fire pumps. Only one 2HP pump is required to meet peak day demand and one 40HP pump required to meet fire flow demands. The other pumps are provided for redundancy and system reliability. The booster station will also be constructed to accommodate two additional pumps for future growth and expansion of the water system.

Design Criteria

This report will address and analyze the proposed Coolidge Airport water system during "Peak Day", "Peak Hour" and "Peak Hour plus Fire Flow" demand scenarios. Below is a list of design criteria used for the analysis.

- Average day system demand = 8900 gpd.
- Peak day/average day demand factor = 2.0
- Peak hour/average day demand factor = 4.0
- Fire Flow: 350 gallons per minute (gpm) for 2 hours.
- Hazen-Williams friction factor = 130
- Maximum allowable water pressure (w/o PRV) = 100 psi.
- Minimum acceptable water pressure for peak day demand at meter = 45 psi.
- Minimum acceptable water pressure for peak day plus fire flow demand at meter = 20 psi.
- Peak Day maximum pipe velocity = 5.0 ft/s.
- Fire Flow maximum pipe velocity = 10 ft/s.



Florence

76

287

Coolidge Airport

85228

Coolidge

87

Arizona Blvd

Blackwater

Image: US Dept. of Agriculture
©2010 Europa Technologies
©2010 Google
Image: 2010 DigitalGlobe

32.531013° N 111.282167° W elev. 1471 ft

©2009 Google

Eye alt. 12.50 mm

Image Dates: Jun 1, 2005 - Jun 8, 2007

Distribution System Analysis

The water system analysis was performed using WaterCAD V8i. The model layout is shown on the next page in Figure 2. Three different models were analyzed for Peak Day, Peak Hour and Peak Hour plus Fire Flow scenarios. The tables below summarize each analysis. The WaterCAD reports for each analysis can be found in the back of this report as exhibits 1-3.

It is important to note that in all three analysis junctions 29-33 all have pressures less than 20 psi. These junctions are located on the suction side of the booster pumps between the storage tank and pumps and are not considered part of the distribution system.

**Table 1
Peak Day System Summary**

Operating Conditions - ADPM Demand	
Maximum System Pressure	75.3 psig
Minimum System Pressure	70.1 psig
Maximum Velocity (P-59)	0.13 ft/s
Flow at Hydrant (J-15)	0.0 gpm
Pressure at Hydrant (J-15)	75.3 psig

**Table 2
Peak Hour System Summary**

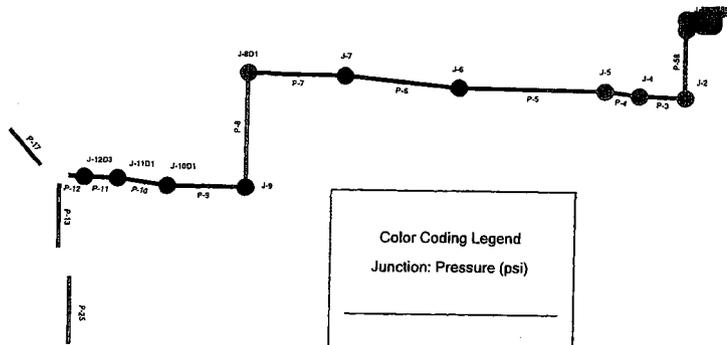
Operating Conditions - ADPM Demand	
Maximum System Pressure	75.2 psig
Minimum System Pressure	70.1 psig
Maximum Velocity (P-59)	0.26 ft/s
Flow at Hydrant (J-15)	0.0 gpm
Pressure at Hydrant (J-15)	75.2 psig

**Table 3
Peak Hour plus Fire Flow System Summary**

Operating Conditions - ADPM Demand	
Maximum System Pressure	70.1 psig
Minimum System Pressure	20.2 psig
Maximum Velocity (P-59)	7.92 ft/s
Flow at Hydrant (J-15)	675 gpm
Pressure at Hydrant (J-15)	24.7 psig

The existing fire flow rate is limited by the total well production capacity of 350 gpm with one well out of service. The addition of the ground storage tank will increase the available fire flow by 60 gpm with half of the tank capacity held in reserve for fire protection. The fire flow analysis indicates that a maximum of 675 gpm is available while maintaining the minimum 20 psi system requirement.

Figure 2
WaterCAD Model



Color Coding Legend
Junction: Pressure (psi)

●	<= 20.0
●	<= 30.0
●	<= 40.0
●	<= 50.0
●	<= 60.0
●	<= 70.0
●	Other

Color Coding Legend
Pipe: Diameter (in)

—	<= 2.0
—	<= 4.0
—	<= 6.0
—	<= 8.0
—	<= 12.0
—	Other

Exhibit A

Peak Day WaterCAD Report

FlexTable: Junction Table (CL Airport.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
26	J-2	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
28	J-3	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
30	J-4	1,589.00	<None>	<Collection: 0 items>	0	1,750.99	70.1
32	J-5	1,589.00	<None>	<Collection: 0 items>	0	1,750.99	70.1
34	J-6	1,585.00	<None>	<Collection: 0 items>	0	1,750.98	71.8
36	J-7	1,580.00	<None>	<Collection: 0 items>	0	1,750.98	74.0
38	J-8D1	1,580.00	<None>	<Collection: 1 items>	1	1,750.97	74.0
40	J-9	1,580.00	<None>	<Collection: 0 items>	0	1,750.97	74.0
42	J-10D1	1,579.00	<None>	<Collection: 1 items>	1	1,750.96	74.4
44	J-11D1	1,578.00	<None>	<Collection: 1 items>	1	1,750.96	74.8
46	J-12D3	1,577.00	<None>	<Collection: 1 items>	2	1,750.96	75.3
48	J-13	1,577.00	<None>	<Collection: 0 items>	0	1,750.96	75.3
50	J-14D2	1,577.00	<None>	<Collection: 1 items>	1	1,750.96	75.3
52	J-15	1,577.00	<None>	<Collection: 0 items>	0	1,750.96	75.3
54	J-16	1,587.00	<None>	<Collection: 0 items>	0	1,750.88	70.9
56	J-17	1,577.00	<None>	<Collection: 0 items>	0	1,750.96	75.3
58	J-18D1	1,577.00	<None>	<Collection: 1 items>	1	1,750.96	75.3
60	J-19	1,577.00	<None>	<Collection: 0 items>	0	1,750.96	75.3
67	J-22	1,587.00	<None>	<Collection: 0 items>	0	1,750.87	70.9
69	J-23D2	1,587.00	<None>	<Collection: 1 items>	1	1,750.85	70.9
71	J-24D3	1,587.00	<None>	<Collection: 1 items>	2	1,750.85	70.9
73	J-25	1,577.00	<None>	<Collection: 0 items>	0	1,750.96	75.3
77	J-27	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
87	J-29	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
89	J-30	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
91	J-31	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
93	J-32	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
95	J-33	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
98	J-34	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
100	J-35	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
102	J-36	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
104	J-37	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
106	J-38	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
124	J-40	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
126	J-41	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
135	J-43D2	1,589.00	<None>	<Collection: 1 items>	1	1,751.00	70.1

FlexTable: Pipe Table (CL Airport.wtg)

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
31	P-3	155.22	J-2	J-4	6.0	PVC	130.0	False	10	0.12
33	P-4	116.25	J-4	J-5	6.0	PVC	130.0	False	10	0.12
35	P-5	496.17	J-5	J-6	6.0	PVC	130.0	False	10	0.12
37	P-6	387.99	J-6	J-7	6.0	PVC	130.0	False	10	0.12
39	P-7	329.90	J-7	J-8D1	6.0	PVC	130.0	False	10	0.12
41	P-8	394.23	J-8D1	J-9	6.0	PVC	130.0	False	9	0.10
43	P-9	264.17	J-9	J-10D1	6.0	PVC	130.0	False	9	0.10
45	P-10	170.67	J-10D1	J-11D1	6.0	PVC	130.0	False	8	0.09
47	P-11	118.27	J-11D1	J-12D3	6.0	PVC	130.0	False	7	0.08
49	P-12	77.77	J-12D3	J-13	6.0	PVC	130.0	False	5	0.06
51	P-13	282.93	J-13	J-14D2	6.0	PVC	130.0	False	4	0.05
53	P-14	39.09	J-14D2	J-15	6.0	PVC	130.0	False	3	0.03
57	P-16	46.55	J-13	J-17	6.0	PVC	130.0	False	1	0.01
59	P-17	221.81	J-17	J-18D1	6.0	PVC	130.0	False	1	0.01
61	P-18	42.91	J-15	J-19	6.0	PVC	130.0	False	3	0.03
68	P-22	189.99	J-16	J-22	3.0	PVC	130.0	False	3	0.12
70	P-23	537.32	J-22	J-23D2	3.0	PVC	130.0	False	3	0.12
72	P-24	59.63	J-23D2	J-24D3	6.0	PVC	130.0	False	2	0.02
74	P-25	296.90	J-19	J-25	6.0	PVC	130.0	False	3	0.03
75	P-26	2,098.07	J-25	J-16	3.0	PVC	130.0	False	3	0.12
78	P-27	33.73	J-3	J-27	8.0	PVC	130.0	False	-12	0.07
90	P-29	9.20	J-29	J-30	12.0	Steel	130.0	False	0	0.00
92	P-30	9.95	J-30	J-31	12.0	Steel	130.0	False	0	0.00
94	P-31	9.50	J-31	J-32	12.0	Steel	130.0	False	0	0.00
96	P-32	9.04	J-32	J-33	12.0	Steel	130.0	False	0	0.00
97	P-33	11.56	J-33	PMP-4	6.0	Steel	130.0	False	0	0.00
99	P-34	12.71	PMP-4	J-34	6.0	Steel	130.0	True	0	0.00
101	P-35	9.36	J-34	J-35	12.0	Steel	130.0	False	-12	0.03
103	P-36	9.63	J-35	J-36	12.0	Steel	130.0	False	-12	0.03
105	P-37	9.48	J-36	J-37	12.0	Steel	130.0	False	-12	0.03
107	P-38	9.40	J-37	J-38	12.0	Steel	130.0	False	-12	0.03
110	P-41	19.99	J-29	T-1	12.0	PVC	130.0	False	-12	0.03
112	P-43	12.01	J-32	PMP-3	6.0	Steel	130.0	False	0	0.00
113	P-44	12.32	PMP-3	J-35	6.0	Steel	130.0	True	0	0.00
116	P-47	12.54	J-30	PMP-2	1.5	Steel	130.0	False	0	0.00
117	P-48	11.75	PMP-2	J-37	1.5	Steel	130.0	True	0	0.00
118	P-49	12.24	J-29	PMP-1	1.5	Steel	130.0	False	12	2.09
119	P-50	12.17	PMP-1	J-38	1.5	Steel	130.0	True	12	2.09
127	P-53	19.88	J-40	J-41	12.0	PVC	130.0	False	12	0.03
128	P-54	20.39	J-41	J-27	12.0	PVC	130.0	False	12	0.03
129	P-55	16.02	J-41	HT-1	12.0	PVC	130.0	True	0	0.00
132	P-57	11.80	J-34	J-40	12.0	PVC	130.0	False	12	0.03
136	P-58	234.08	J-2	J-43D2	6.0	PVC	130.0	False	-10	0.12
137	P-59	34.84	J-43D2	J-3	6.0	PVC	130.0	False	-12	0.13

Exhibit B
Peak Hour WaterCAD Report

Project Inventory: CL Airport.wtg

Title
 Engineer
 Company
 Date 3/17/2010
 Notes

Scenario Summary

ID	144
Label	Peak Hour Demand
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	Peak Hour Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Flushing	<I> Base Flushing
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	<I> Base Calculation Options
Transient Solver Calculation Options	<I> Base Calculation Options

Network Inventory

Pipes	44	-Constant Speed - No Pump Curve	4
Junctions	36	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	1	-Variable Speed/Torque	0
-Circular	1	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	PRV's	0
Reservoirs	0	PSV's	0
Pumps	4	PBV's	0
-Constant Power	0	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Standard (3 Point)	4	GPV's	0
-Standard Extended	0	Isolation Valves	0
-Custom Extended	0	Spot Elevations	0
-Multiple Point	0		

Transient Network Inventory

Air Valves	0	Rupture Disks	0
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Project Inventory: CL Airport.wtg

Transient Network Inventory			
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	1	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		
Pressure Pipes Inventory			
1.5 (in)	8.00 ft	8.0 (in)	33.73 ft
3.0 (in)	2,825.38 ft	12.0 (in)	112.09 ft
6.0 (in)	3,777.38 ft	All Diameters	6,756.57 ft

FlexTable: Junction Table (CL Airport.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
26	J-2	1,589.00	<None>	<Collection: 0 items>	0	1,750.98	70.1
28	J-3	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
30	J-4	1,589.00	<None>	<Collection: 0 items>	0	1,750.98	70.1
32	J-5	1,589.00	<None>	<Collection: 0 items>	0	1,750.97	70.1
34	J-6	1,585.00	<None>	<Collection: 0 items>	0	1,750.94	71.8
36	J-7	1,580.00	<None>	<Collection: 0 items>	0	1,750.92	73.9
38	J-8D1	1,580.00	<None>	<Collection: 1 items>	2	1,750.90	73.9
40	J-9	1,580.00	<None>	<Collection: 0 items>	0	1,750.88	73.9
42	J-10D1	1,579.00	<None>	<Collection: 1 items>	2	1,750.87	74.4
44	J-11D1	1,578.00	<None>	<Collection: 1 items>	2	1,750.87	74.8
46	J-12D3	1,577.00	<None>	<Collection: 1 items>	5	1,750.86	75.2
48	J-13	1,577.00	<None>	<Collection: 0 items>	0	1,750.86	75.2
50	J-14D2	1,577.00	<None>	<Collection: 1 items>	3	1,750.86	75.2
52	J-15	1,577.00	<None>	<Collection: 0 items>	0	1,750.86	75.2
54	J-16	1,587.00	<None>	<Collection: 0 items>	0	1,750.56	70.8
56	J-17	1,577.00	<None>	<Collection: 0 items>	0	1,750.86	75.2
58	J-18D1	1,577.00	<None>	<Collection: 1 items>	2	1,750.86	75.2
60	J-19	1,577.00	<None>	<Collection: 0 items>	0	1,750.86	75.2
67	J-22	1,587.00	<None>	<Collection: 0 items>	0	1,750.53	70.8
69	J-23D2	1,587.00	<None>	<Collection: 1 items>	3	1,750.46	70.7
71	J-24D3	1,587.00	<None>	<Collection: 1 items>	3	1,750.46	70.7
73	J-25	1,577.00	<None>	<Collection: 0 items>	0	1,750.86	75.2
77	J-27	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
87	J-29	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
89	J-30	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
91	J-31	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
93	J-32	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
95	J-33	1,589.00	<None>	<Collection: 0 items>	0	1,605.00	6.9
98	J-34	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
100	J-35	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
102	J-36	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
104	J-37	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
106	J-38	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
124	J-40	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
126	J-41	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
135	J-43D2	1,589.00	<None>	<Collection: 1 items>	3	1,751.00	70.1

FlexTable: Pipe Table (CL Airport.wtg)

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
31	P-3	155.22	J-2	J-4	6.0	PVC	130.0	False	21	0.23
33	P-4	116.25	J-4	J-5	6.0	PVC	130.0	False	21	0.23
35	P-5	496.17	J-5	J-6	6.0	PVC	130.0	False	21	0.23
37	P-6	387.99	J-6	J-7	6.0	PVC	130.0	False	21	0.23
39	P-7	329.90	J-7	J-8D1	6.0	PVC	130.0	False	21	0.23
41	P-8	394.23	J-8D1	J-9	6.0	PVC	130.0	False	19	0.21
43	P-9	264.17	J-9	J-10D1	6.0	PVC	130.0	False	19	0.21
45	P-10	170.67	J-10D1	J-11D1	6.0	PVC	130.0	False	17	0.19
47	P-11	118.27	J-11D1	J-12D3	6.0	PVC	130.0	False	15	0.16
49	P-12	77.77	J-12D3	J-13	6.0	PVC	130.0	False	10	0.11
51	P-13	282.93	J-13	J-14D2	6.0	PVC	130.0	False	8	0.09
53	P-14	39.09	J-14D2	J-15	6.0	PVC	130.0	False	6	0.06
57	P-16	46.55	J-13	J-17	6.0	PVC	130.0	False	2	0.02
59	P-17	221.81	J-17	J-18D1	6.0	PVC	130.0	False	2	0.02
61	P-18	42.91	J-15	J-19	6.0	PVC	130.0	False	6	0.06
68	P-22	189.99	J-16	J-22	3.0	PVC	130.0	False	6	0.25
70	P-23	537.32	J-22	J-23D2	3.0	PVC	130.0	False	6	0.25
72	P-24	59.63	J-23D2	J-24D3	6.0	PVC	130.0	False	3	0.03
74	P-25	296.90	J-19	J-25	6.0	PVC	130.0	False	6	0.06
75	P-26	2,098.07	J-25	J-16	3.0	PVC	130.0	False	6	0.25
78	P-27	33.73	J-3	J-27	8.0	PVC	130.0	False	-23	0.15
90	P-29	9.20	J-29	J-30	12.0	Steel	130.0	False	0	0.00
92	P-30	9.95	J-30	J-31	12.0	Steel	130.0	False	0	0.00
94	P-31	9.50	J-31	J-32	12.0	Steel	130.0	False	0	0.00
96	P-32	9.04	J-32	J-33	12.0	Steel	130.0	False	0	0.00
97	P-33	11.56	J-33	PMP-4	6.0	Steel	130.0	False	0	0.00
99	P-34	12.71	PMP-4	J-34	6.0	Steel	130.0	True	0	0.00
101	P-35	9.36	J-34	J-35	12.0	Steel	130.0	False	-23	0.07
103	P-36	9.63	J-35	J-36	12.0	Steel	130.0	False	-23	0.07
105	P-37	9.48	J-36	J-37	12.0	Steel	130.0	False	-23	0.07
107	P-38	9.40	J-37	J-38	12.0	Steel	130.0	False	-23	0.07
110	P-41	19.99	J-29	T-1	12.0	PVC	130.0	False	-23	0.07
112	P-43	12.01	J-32	PMP-3	6.0	Steel	130.0	False	0	0.00
113	P-44	12.32	PMP-3	J-35	6.0	Steel	130.0	True	0	0.00
116	P-47	12.54	J-30	PMP-2	1.5	Steel	130.0	False	0	0.00
117	P-48	11.75	PMP-2	J-37	1.5	Steel	130.0	True	0	0.00
118	P-49	12.24	J-29	PMP-1	1.5	Steel	130.0	False	23	4.18
119	P-50	12.17	PMP-1	J-38	1.5	Steel	130.0	True	23	4.18
127	P-53	19.88	J-40	J-41	12.0	PVC	130.0	False	23	0.07
128	P-54	20.39	J-41	J-27	12.0	PVC	130.0	False	23	0.07
129	P-55	16.02	J-41	HT-1	12.0	PVC	130.0	True	0	0.00
132	P-57	11.80	J-34	J-40	12.0	PVC	130.0	False	23	0.07
136	P-58	234.08	J-2	J-43D2	6.0	PVC	130.0	False	-21	0.23
137	P-59	34.84	J-43D2	J-3	6.0	PVC	130.0	False	-23	0.26

Exhibit C

Peak Hour plus Fire Flow WaterCAD Report

Project Inventory: CL Airport.wtg

Title
 Engineer
 Company
 Date 3/17/2010
 Notes

Scenario Summary

ID	146
Label	Peak Hour + Fire
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	Peak Hour + Fire
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	<I> Base Fire Flow
Flushing	<I> Base Flushing
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	<I> Base Calculation Options
Transient Solver Calculation Options	<I> Base Calculation Options

Network Inventory

Pipes	44	-Constant Speed - No Pump Curve	4
Junctions	36	-Constant Speed - Pump Curve	0
Hydrants	0	-Shut Down After Time Delay	0
Tanks	1	-Variable Speed/Torque	0
-Circular	1	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	PRV's	0
Reservoirs	0	PSV's	0
Pumps	4	PBV's	0
-Constant Power	0	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Standard (3 Point)	4	GPV's	0
-Standard Extended	0	Isolation Valves	0
-Custom Extended	0	Spot Elevations	0
-Multiple Point	0		

Transient Network Inventory

Air Valves	0	Rupture Disks	0
------------	---	---------------	---

Project Inventory: CL Airport.wtg

Transient Network Inventory			
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	0	-Sinusoidal (Head)	0
-Towards Wye	0	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	1	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
1.5 (in)	8.00 ft	8.0 (in)	33.73 ft
3.0 (in)	2,825.38 ft	12.0 (in)	112.09 ft
6.0 (in)	3,777.38 ft	All Diameters	6,756.57 ft

FlexTable: Junction Table (CL Airport.wtg)

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand Collection	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
26	J-2	1,589.00	<None>	<Collection: 0 items>	0	1,740.47	65.5
28	J-3	1,589.00	<None>	<Collection: 0 items>	0	1,750.66	69.9
30	J-4	1,589.00	<None>	<Collection: 0 items>	0	1,734.59	63.0
32	J-5	1,589.00	<None>	<Collection: 0 items>	0	1,730.19	61.1
34	J-6	1,585.00	<None>	<Collection: 0 items>	0	1,711.41	54.7
36	J-7	1,580.00	<None>	<Collection: 0 items>	0	1,696.72	50.5
38	J-8D1	1,580.00	<None>	<Collection: 1 items>	2	1,684.23	45.1
40	J-9	1,580.00	<None>	<Collection: 0 items>	0	1,669.38	38.7
42	J-10D1	1,579.00	<None>	<Collection: 1 items>	2	1,659.44	34.8
44	J-11D1	1,578.00	<None>	<Collection: 1 items>	2	1,653.04	32.5
46	J-12D3	1,577.00	<None>	<Collection: 1 items>	5	1,648.64	31.0
48	J-13	1,577.00	<None>	<Collection: 0 items>	0	1,645.77	29.8
50	J-14D2	1,577.00	<None>	<Collection: 1 items>	3	1,635.42	25.3
52	J-15	1,577.00	<None>	<Collection: 1 items>	675	1,634.00	24.7
54	J-16	1,587.00	<None>	<Collection: 0 items>	0	1,633.70	20.2
56	J-17	1,577.00	<None>	<Collection: 0 items>	0	1,645.77	29.8
58	J-18D1	1,577.00	<None>	<Collection: 1 items>	2	1,645.77	29.8
60	J-19	1,577.00	<None>	<Collection: 0 items>	0	1,634.00	24.7
67	J-22	1,587.00	<None>	<Collection: 0 items>	0	1,633.67	20.2
69	J-23D2	1,587.00	<None>	<Collection: 1 items>	3	1,633.59	20.2
71	J-24D3	1,587.00	<None>	<Collection: 1 items>	3	1,633.59	20.2
73	J-25	1,577.00	<None>	<Collection: 0 items>	0	1,633.99	24.7
77	J-27	1,589.00	<None>	<Collection: 0 items>	0	1,750.97	70.1
87	J-29	1,589.00	<None>	<Collection: 0 items>	0	1,604.97	6.9
89	J-30	1,589.00	<None>	<Collection: 0 items>	0	1,604.97	6.9
91	J-31	1,589.00	<None>	<Collection: 0 items>	0	1,604.97	6.9
93	J-32	1,589.00	<None>	<Collection: 0 items>	0	1,604.96	6.9
95	J-33	1,589.00	<None>	<Collection: 0 items>	0	1,604.96	6.9
98	J-34	1,589.00	<None>	<Collection: 0 items>	0	1,751.04	70.1
100	J-35	1,589.00	<None>	<Collection: 0 items>	0	1,751.05	70.1
102	J-36	1,589.00	<None>	<Collection: 0 items>	0	1,751.05	70.1
104	J-37	1,589.00	<None>	<Collection: 0 items>	0	1,751.05	70.1
106	J-38	1,589.00	<None>	<Collection: 0 items>	0	1,751.05	70.1
124	J-40	1,589.00	<None>	<Collection: 0 items>	0	1,751.03	70.1
126	J-41	1,589.00	<None>	<Collection: 0 items>	0	1,751.00	70.1
135	J-43D2	1,589.00	<None>	<Collection: 1 items>	3	1,749.33	69.4

FlexTable: Pipe Table (CL Airport.wtg)

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen-Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
31	P-3	155.22	J-2	J-4	6.0	PVC	130.0	False	696	7.89
33	P-4	116.25	J-4	J-5	6.0	PVC	130.0	False	696	7.89
35	P-5	496.17	J-5	J-6	6.0	PVC	130.0	False	696	7.89
37	P-6	387.99	J-6	J-7	6.0	PVC	130.0	False	696	7.89
39	P-7	329.90	J-7	J-8D1	6.0	PVC	130.0	False	696	7.89
41	P-8	394.23	J-8D1	J-9	6.0	PVC	130.0	False	694	7.87
43	P-9	264.17	J-9	J-10D1	6.0	PVC	130.0	False	694	7.87
45	P-10	170.67	J-10D1	J-11D1	6.0	PVC	130.0	False	692	7.85
47	P-11	118.27	J-11D1	J-12D3	6.0	PVC	130.0	False	689	7.82
49	P-12	77.77	J-12D3	J-13	6.0	PVC	130.0	False	685	7.77
51	P-13	282.93	J-13	J-14D2	6.0	PVC	130.0	False	683	7.75
53	P-14	39.09	J-14D2	J-15	6.0	PVC	130.0	False	680	7.72
57	P-16	46.55	J-13	J-17	6.0	PVC	130.0	False	2	0.02
59	P-17	221.81	J-17	J-18D1	6.0	PVC	130.0	False	2	0.02
61	P-18	42.91	J-15	J-19	6.0	PVC	130.0	False	6	0.06
68	P-22	189.99	J-16	J-22	3.0	PVC	130.0	False	6	0.25
70	P-23	537.32	J-22	J-23D2	3.0	PVC	130.0	False	6	0.25
72	P-24	59.63	J-23D2	J-24D3	6.0	PVC	130.0	False	3	0.03
74	P-25	296.90	J-19	J-25	6.0	PVC	130.0	False	6	0.06
75	P-26	2,098.07	J-25	J-16	3.0	PVC	130.0	False	6	0.25
78	P-27	33.73	J-3	J-27	8.0	PVC	130.0	False	-698	4.46
90	P-29	9.20	J-29	J-30	12.0	Steel	130.0	False	705	2.00
92	P-30	9.95	J-30	J-31	12.0	Steel	130.0	False	705	2.00
94	P-31	9.50	J-31	J-32	12.0	Steel	130.0	False	705	2.00
96	P-32	9.04	J-32	J-33	12.0	Steel	130.0	False	0	0.00
97	P-33	11.56	J-33	PMP-4	6.0	Steel	130.0	False	0	0.00
99	P-34	12.71	PMP-4	J-34	6.0	Steel	130.0	True	0	0.00
101	P-35	9.36	J-34	J-35	12.0	Steel	130.0	False	-705	2.00
103	P-36	9.63	J-35	J-36	12.0	Steel	130.0	False	0	0.00
105	P-37	9.48	J-36	J-37	12.0	Steel	130.0	False	0	0.00
107	P-38	9.40	J-37	J-38	12.0	Steel	130.0	False	0	0.00
110	P-41	19.99	J-29	T-1	12.0	PVC	130.0	False	-705	2.00
112	P-43	12.01	J-32	PMP-3	6.0	Steel	130.0	False	705	8.00
113	P-44	12.32	PMP-3	J-35	6.0	Steel	130.0	True	705	8.00
116	P-47	12.54	J-30	PMP-2	1.5	Steel	130.0	False	0	0.00
117	P-48	11.75	PMP-2	J-37	1.5	Steel	130.0	True	0	0.00
118	P-49	12.24	J-29	PMP-1	1.5	Steel	130.0	False	0	0.00
119	P-50	12.17	PMP-1	J-38	1.5	Steel	130.0	True	0	0.00
127	P-53	19.88	J-40	J-41	12.0	PVC	130.0	False	705	2.00
128	P-54	20.39	J-41	J-27	12.0	PVC	130.0	False	698	1.98
129	P-55	16.02	J-41	HT-1	12.0	PVC	130.0	True	7	0.02
132	P-57	11.80	J-34	J-40	12.0	PVC	130.0	False	705	2.00
136	P-58	234.08	J-2	J-43D2	6.0	PVC	130.0	False	-696	7.89
137	P-59	34.84	J-43D2	J-3	6.0	PVC	130.0	False	-698	7.92

Exhibit D

Well and Tank Analysis

ARIZONA WATER COMPANY

DIVISION: 1 Coolidge

SYSTEM	MONTH (2005)	PEAK HOUR DEMAND (gpd)	PEAK DAY DEMAND (gpd)	MAXIMUM PRODUCTION (gpd) LESS ONE WELL	1/3 OF AVAILABLE STORAGE (gpd)	NET GAIN or (LOSS) (gpm)
CL Airport	June	29,420	14,710	504,000	2,500	342

No additional production required

<u>Source of Supply</u>	<u>Production (gpm)</u>	<u>Tank Name</u>	<u>Storage (gal)</u>
Well #1	350	Airport #1	15,000
Well#2	350		
TOTAL PRODUCTION:	700	TOTAL STORAGE:	15,000

Out-of-Service

Design Statement for Well Production:

The water distribution system must have sufficient well capacity to meet the peak day demand for three consecutive days with one well out-of-service. One-half of the total storage is available to meet the three peak days with the remaining storage held in reserve for fire protection.

ARIZONA WATER COMPANY

**DAY ONE
STORAGE CALCULATIONS
SYSTEM - Coolidge Airport**

* PRODUCTION (Gallons) = 504,000
 PEAK DAY PEAK MONTH (Gallons) = 29,420
 AVERAGE DAY PEAK MONTH (Gal/day) = 14,710
 HOURLY DEMAND (Peak Day) = 613

*HOURLY SOURCE OF SUPPLY = 21000

TIME	% OF AVERAGE HOUR	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS	
		USE	FROM SOURCE	TO STORAGE		
8-9 am	40	0.25	21	20.75	20.75	20.75
9-10 am	110	0.67	21	20.33	15.00	15.00
10-11 am	135	0.83	21	20.17	15.00	15.00
11-12 noon	110	0.67	21	20.33	15.00	15.00
12-1 am	100	0.61	21	20.39	15.00	15.00
1-2 pm	100	0.61	21	20.39	15.00	15.00
2-3 pm	110	0.67	21	20.33	15.00	15.00
3-4 pm	115	0.70	21	20.30	15.00	15.00
4-5 pm	145	0.89	21	20.11	15.00	15.00
5-6 pm	240	1.47	21	19.53	15.00	15.00
6-7 pm	285	1.75	21	19.25	15.00	15.00
7-8 pm	275	1.69	21	19.31	15.00	15.00
8-9 pm	200	1.23	21	19.77	15.00	15.00
9-10 pm	110	0.67	21	20.33	15.00	15.00
10-11 pm	60	0.37	21	20.63	15.00	15.00
11-12 mid.	40	0.25	21	20.75	15.00	15.00
12-1 am	20	0.12	21	20.88	15.00	15.00
1-2 am	10	0.06	21	20.94	15.00	15.00
2-3 am	20	0.12	21	20.88	15.00	15.00
3-4 am	25	0.15	21	20.85	15.00	15.00
4-5 am	35	0.21	21	20.79	15.00	15.00
5-6 am	35	0.21	21	20.79	15.00	15.00
6-7 am	40	0.25	21	20.75	15.00	15.00
7-8 am	40	0.25	21	20.75	15.00	15.00
TOTAL	2,400	15				

Minimum Storage Requirements	0 Gallons
*** Fire Flow Requirements	7,500 Gallons
TOTAL STORAGE REQUIRED	7,500 Gallons
TOTAL STORAGE AVAILABLE	15,000 Gallons
ADDITIONAL STORAGE REQUIRED	0 Gallons

ARIZONA WATER COMPANY

**DAY TWO
STORAGE CALCULATIONS
SYSTEM - Coolidge Airport**

* PRODUCTION (Gallons) = 504,000
 PEAK DOMESTIC DEMAND PEAK MONTH (Gallons) = 29,420
 AVERAGE PEAK DOMESTIC DEMAND (Gal/day) = 14,710 *HOURLY SOURCE OF SUPPLY = 21000
 AVERAGE HOURLY DEMAND (Peak Day)= 613

TIME	% OF AVERAGE HOUR	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS	
		USE	FROM SOURCE	TO STORAGE		
8-9 am	40	0.25	21	20.75	15.00	15.00
9-10 am	110	0.67	21	20.33	15.00	15.00
10-11 am	135	0.83	21	20.17	15.00	15.00
11-12 noon	110	0.67	21	20.33	15.00	15.00
12-1 am	100	0.61	21	20.39	15.00	15.00
1-2 pm	100	0.61	21	20.39	15.00	15.00
2-3 pm	110	0.67	21	20.33	15.00	15.00
3-4 pm	115	0.70	21	20.30	15.00	15.00
4-5 pm	145	0.89	21	20.11	15.00	15.00
5-6 pm	240	1.47	21	19.53	15.00	15.00
6-7 pm	285	1.75	21	19.25	15.00	15.00
7-8 pm	275	1.69	21	19.31	15.00	15.00
8-9 pm	200	1.23	21	19.77	15.00	15.00
9-10 pm	110	0.67	21	20.33	15.00	15.00
10-11 pm	60	0.37	21	20.63	15.00	15.00
11-12 mid.	40	0.25	21	20.75	15.00	15.00
12-1 am	20	0.12	21	20.88	15.00	15.00
1-2 am	10	0.06	21	20.94	15.00	15.00
2-3 am	20	0.12	21	20.88	15.00	15.00
3-4 am	25	0.15	21	20.85	15.00	15.00
4-5 am	35	0.21	21	20.79	15.00	15.00
5-6 am	35	0.21	21	20.79	15.00	15.00
6-7 am	40	0.25	21	20.75	15.00	15.00
7-8 am	40	0.25	21	20.75	15.00	15.00
TOTAL	2,400	15				

Minimum Storage Requirements	0 Gallons
*** Fire Flow Requirements	7,500 Gallons
TOTAL STORAGE REQUIRED	7,500 Gallons
TOTAL STORAGE AVAILABLE	15,000 Gallons
ADDITIONAL STORAGE REQUIRED	0 Gallons

ARIZONA WATER COMPANY

**DAY THREE
STORAGE CALCULATIONS
SYSTEM - Coolidge Airport**

* PRODUCTION (Gallons) = 504,000
 PEAK DOMESTIC DEMAND PEAK MONTH (Gallons) = 29,420
 AVERAGE PEAK DOMESTIC DEMAND (Gal/day) = 14,710
 AVERAGE HOURLY DEMAND (Peak Day)= 613

*HOURLY SOURCE OF SUPPLY = 21000

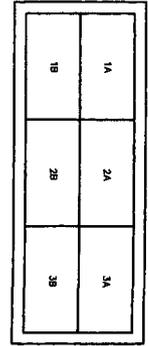
TIME	% OF AVERAGE HOUR	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS	
		USE	FROM SOURCE	TO STORAGE		
8-9 am	40	0.25	21	20.75	15.00	15.00
9-10 am	110	0.67	21	20.33	15.00	15.00
10-11 am	135	0.83	21	20.17	15.00	15.00
11-12 noon	110	0.67	21	20.33	15.00	15.00
12-1 am	100	0.61	21	20.39	15.00	15.00
1-2 pm	100	0.61	21	20.39	15.00	15.00
2-3 pm	110	0.67	21	20.33	15.00	15.00
3-4 pm	115	0.70	21	20.30	15.00	15.00
4-5 pm	145	0.89	21	20.11	15.00	15.00
5-6 pm	240	1.47	21	19.53	15.00	15.00
6-7 pm	285	1.75	21	19.25	15.00	15.00
7-8 pm	275	1.69	21	19.31	15.00	15.00
8-9 pm	200	1.23	21	19.77	15.00	15.00
9-10 pm	110	0.67	21	20.33	15.00	15.00
10-11 pm	60	0.37	21	20.63	15.00	15.00
11-12 mid.	40	0.25	21	20.75	15.00	15.00
12-1 am	20	0.12	21	20.88	15.00	15.00
1-2 am	10	0.06	21	20.94	15.00	15.00
2-3 am	20	0.12	21	20.88	15.00	15.00
3-4 am	25	0.15	21	20.85	15.00	15.00
4-5 am	35	0.21	21	20.79	15.00	15.00
5-6 am	35	0.21	21	20.79	15.00	15.00
6-7 am	40	0.25	21	20.75	15.00	15.00
7-8 am	40	0.25	21	20.75	15.00	15.00
TOTAL	2,400	15				

Minimum Storage Requirements	0 Gallons
*** Fire Flow Requirements	7,500 Gallons
TOTAL STORAGE REQUIRED	7,500 Gallons
TOTAL STORAGE AVAILABLE	15,000 Gallons
ADDITIONAL STORAGE REQUIRED	0 Gallons

THIS DRAWING MUST BE FIELD VERIFIED BEFORE USE
DRAWING NOT TO SCALE UNLESS SCALE BAR IS PRESENT

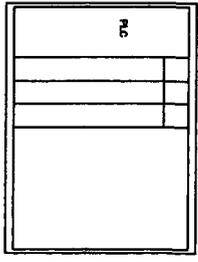
EXTERIOR SYMBOLS

- W-1 WFG DATA NAMEPLATE: 2" X 4"
- W-2 PANEL NAME NAMEPLATE: 2" X 7"
- W-3 DEVICE NAMEPLATE: 1.5" X 3"
- W-4 BILL OF MATERIAL SYMBOL
- W-5 PUSH BUTTON
- W-6 LIGHT #-COLOR INDICATION: LIGHT GREEN, A#-NUMBER, W#-WHITE
- W-7 TWO POSITION SELECTOR SWITCH
- W-8 THREE POSITION SELECTOR SWITCH
- W-9 FOUR POSITION SELECTOR SWITCH
- W-10 SPEED POTENTIOMETER
- W-11 EMERGENCY STOP
- W-12 PROCESS INDICATOR



INTERIOR SYMBOLS

- I-1 CONTROL RELAY: 4 POLE (DECC RH SERIES)
- I-2 CONTROL RELAY: 3 POLE (DECC RH SERIES)
- I-3 CONTROL RELAY: 2 POLE (DECC RH SERIES)
- I-4 TRIP RELAY (DECC RTE SERIES)
- I-5 TERMINAL STRIP
- I-6 TERMINAL BLOCK (USAN PROGRAM CONTACT)
- I-7 CIRCUIT BREAKER
- I-8 AC GROUND BUS
- I-9 DC GROUND BUS



- 1X4 WIRE WAY
- 2X4 WIRE WAY
- 3X4 WIRE WAY

INSTRUMENT IDENTIFICATION TABLE

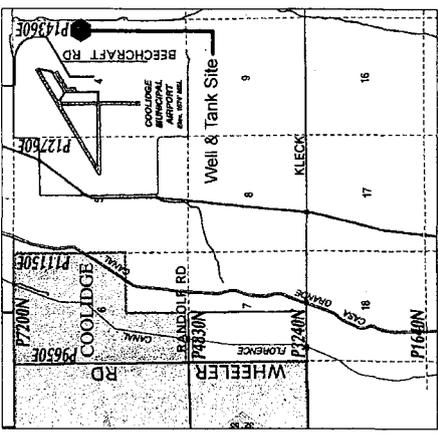
LETTER	FIRST LETTER	DESCENDING LETTERS
A	ANALYSIS	ALARM
B	BURNER	CONTROL
C	CONDUCTIVITY	CONTROL START
D	DEVIATION	CONTROL STOP
E	VOLTAGE (EMF)	CONTROL START, INCREASE
F	FLOW RATE, RATIO (FRACTION)	CONTROL STOP, DECREASE
G	GRAVIMETER	CONTROL START, INCREASE
H	HAND	CONTROL STOP, DECREASE
I	CURRENT (ELECTRICAL)	CONTROL START, INCREASE
J	POWER, SPAN	CONTROL STOP, DECREASE
K	TEMPERATURE	CONTROL START, INCREASE
L	LEVEL	CONTROL STOP, DECREASE
M	MOTOR, MANUAL	CONTROL START, INCREASE
N	NOISE	CONTROL STOP, DECREASE
O	PRESSURE	CONTROL START, INCREASE
P	RADIATION	CONTROL STOP, DECREASE
Q	QUALITY	CONTROL START, INCREASE
R	SPEED, FREQUENCY, MOTION, SAFETY	CONTROL STOP, DECREASE
S	TEMPERATURE	CONTROL START, INCREASE
T	TEMPERATURE	CONTROL STOP, DECREASE
U	WEIGHT, FORCE, TORQUE	CONTROL START, INCREASE
V	VIBRATION, VALVE	CONTROL STOP, DECREASE
W	WEIGHT, FORCE, TORQUE	CONTROL START, INCREASE
X	EVENT, STATUS, FREQUENCY, Y-Axis	CONTROL STOP, DECREASE
Y	POSITION, DIMENSION, Z-Axis	CONTROL START, INCREASE
Z		CONTROL STOP, DECREASE

WIRE COLOR TABLE

TYPE	RANGE/CONTROL (HOT)	INSULATION COLOR
AC POWER/CONTROL (HOT)	120 VAC HOT	BLACK
AC POWER (NEUTRAL)	120 VAC NEUTRAL	WHITE
AC CONTROL	120 VAC COMMON	RED
ISOLATED DC GROUND	GROUND	GREEN W/YELLOW STRIPE
AC GROUND	GROUND	GREEN
DC POWER	DC SOURCE	BLUE
DC POWER	COMMON	WHITE W/BLUE STRIPE
AC POWER/CONTROL	EXTERNAL 120 VAC	ORANGE
TEMPORARY	EXTERNAL	WHITE W/ORANGE STRIPE
TEMPORARY	TEMPORARY	PURPLE
LOW VOLTAGE AC CONTROL	24 VAC SOURCE	BROWN
LOW VOLTAGE AC CONTROL	COMMON	BROWN W/WHITE STRIPE
AC POWER	480 VAC PHASE A	BROWN
AC POWER	480 VAC PHASE B	ORANGE
AC POWER	480 VAC PHASE C	YELLOW
#18 AND TIEIN	ANALOG	RED (POSITIVE) BLACK (NEGATIVE)

NO.	BY	DATE	REVISIONS	QUANTITY	DES	WATER SERVICES DEPARTMENT	ARIZONA WATER COMPANY	COOLIDGE AIRPORT WELL No.1	LEVEL CONTROL PANEL	DATE: OCTOBER 2010
					ZEW	WATER SERVICES DEPARTMENT	ARIZONA WATER COMPANY	COOLIDGE AIRPORT WELL No.1	LEVEL CONTROL PANEL	SHEET 2 OF 8
					ZEW			INSTALL TANK AND PUMP STATION	SYMBOLS AND LEGENDS 1	CAD FILE: LEGEND.DWG

REVISION	ENGINEERING COMPANY	PROJECT NO.	PROJECT NAME	DATE	CAD FILE NAME	DWG NUMBER	REMARKS
1							



T.G.S., R.E.
SCALE: N.T.S.
VICINITY MAP

OWNER/DEVELOPER/ENGINEER
ARIZONA WATER COMPANY
POST OFFICE BOX 20005
PHOENIX, ARIZONA 85068-0005
VOICE: (602) 240-8880 FAX: (602) 240-6078
CONTACT: JAMES WILSON

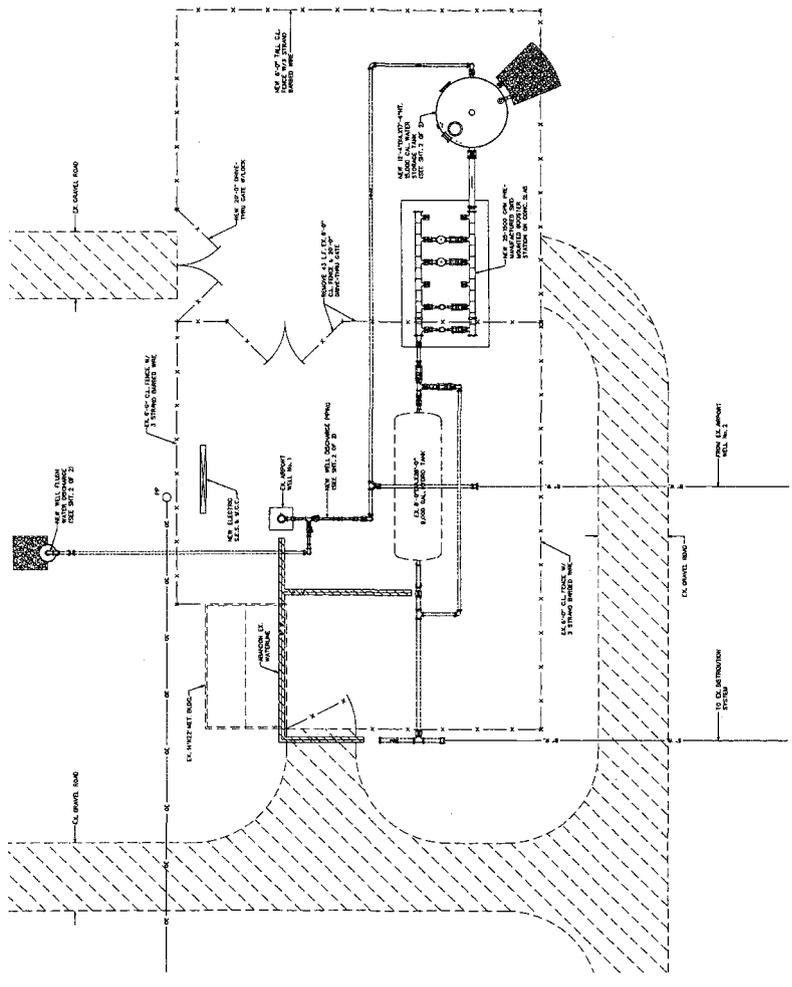
ASSESSOR PARCEL
ASSESSOR PARCEL NO. 410-39-001

APPROVAL FOR CONSTRUCTION
ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
DATE: 12/1/10 BY: [Signature]

LEGEND
--- EX. WATER LINE
--- EX. OH. ELEC. LINE

ARIZONA WATER COMPANY
3805 N. BLACK DANTON HWY., POST OFFICE BOX 29006
PHOENIX, ARIZONA 85038-0006
(602) 249-6880

PROJECT NO.	263-1100
DATE	4-23-2010
SCALE	AS SHOWN
DRAWN BY	JPK
CHECKED BY	JPK
SHEET	1 OF 2
PROJECT	CL-349



SITE PLAN

FOUNDATIONS/CONCRETE/REINFORCING NOTES

1. SITE PREPARATION & MATERIALS SHALL CONFORM TO THE GEOTECHNICAL ENGINEERING REPORT BY R.A.A.K. & ASSOCIATES INC DATED 6-12-2008.
2. SOIL PRESSURE 1500 PSF PER IRC 1804.2, CLASS 4 MATERIAL.
3. ALL WALLS OF CONCRETE SHALL BE REINFORCED WITH 4 #5 BARS PER 12" SLUMP 5".
4. ASTM A615, GRADE 60 DEFORMED BARS.

5. CONCRETE COVER TO REINFORCING:
 - A. CONCRETE AGAINST EARTH-----1 1/2"
 - B. OTHER-----1"
6. LAP SPICES-48 BAR DIAMETERS & STAGGER SPACES.

WATER STORAGE TANK NOTES

1. THE STORAGE TANK OVERFLOW PIPE SHALL BE THE SAME DIAMETER AS THE INLET PIPE.
2. PROVIDE A MINIMUM AIR GAP OF 2 TIMES THE PIPE DIAMETER @ THE TANK OVERFLOW & TANK DRAIN.
3. THE TANK OVERFLOW ROOF VENT & TANK DRAIN SHALL BE SCREENED W/ 1/2" X 1/2" NON-CORRODIBLE WIRE MESH.
4. THE STORAGE TANK SHALL BE PLACED UPON ADEQUATELY COMPACTED BASE MATERIAL.
5. THE STORAGE TANK LIQUID LEVEL SHALL BE INDICATED BY A TARGET & TARGET BOARD ON THE OUTSIDE SURFACE OF THE TANK.
6. THE STORAGE TANK SHALL BE DEFLECTED IN ACCORDANCE WITH AISC ENGINEERING BULLETIN NO. 8 BEFORE BEING FORCED INTO SERVICE.
7. BRIDGE TO TANK WALL SHALL BE CONSTRUCTED THROUGH A TANK.
8. THE STORAGE TANK BASES MUST BE WITHIN A 100 YD. SPECIAL FLOOD HAZARD AREA. THE SITE WILL BE GRACED TO DRAIN AWAY FROM THE TANK.
9. THE STORAGE TANK WILL BE COATED AS PER AISC SPECIFICATION 0-12-02, AWWA SPECIFICATION D102, & NSF STANDARD 61.

GENERAL NOTES

1. NEW PIPING SHALL BE SPECIFIED IN ACCORDANCE WITH AISC ENGINEERING BULLETIN NO. 8 BEFORE BEING PLACED INTO SERVICE.
2. ALL MATERIALS AND PRODUCTS USED IN WATER SYSTEM INCLUDING SURFACE COATINGS & PAINTS, SHALL CONFORM TO NSF STANDARD 61 & CURRENT AWWA D102.
3. CONSTRUCTION MATERIALS USED IN WATER SYSTEM SHALL BE LEAD-FREE AS PER A.A.C. RB-4-504 AND RB-1-91(143).
4. ALL MECHANICAL JOINT FITTINGS ARE TO HAVE MEGA-LUGS.
5. POLYWRAP ALL D.I.P. BELOW GRADE.
6. ALL ELEC. J-BOXES SHALL BE A MIN. OF 6" ABOVE CONC. SLAB.
7. USE ROWLEY PIPE SUPPORTS OR EQUIVALENT AT LOCATIONS NOTED BY P.S. ON BOOSTER STATION PLAN. SECURE EACH PIPE SUPPORT W/ (2) 1/2"x3" WEDGE ANCHORS.
8. BOLTS & NUTS SHALL BE ASTM A307 GRADE B.



263-1100
4-23-2010
AS SHOWN
JPK
CL-349

WA1-4722

ARIZONA WATER COMPANY

WORK AUTHORIZATION

W.A. NUMBER: 1-4722
 P.E. NUMBER: CG
 BUDGET ITEM NO.: Special #3
 SHEET NO.: 1 of 2

SYSTEM: CASA GRANDE	WORK TO START BY: UPON AUTHORIZATION
DIVISION: CASA GRANDE	WORK TO BE FINISHED BY: WITHIN 30 DAYS
TAX CODE: 0403	

DESCRIPTION OF WORK:

Pull and replace the pump at Casa Grande Well #21. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

Production has dropped from 580 gpm to 240 gpm.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	4,500	James Wilson <i>gw 3/1/10</i>	2/18/10
LABOR	3,000	REVIEWED BY: <i>ML 3-1-10</i>	2-19-10
CONTRACT PORTION	25,971	Mike Loggins	
OVERHEAD	3,113	APPROVED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 36,584	Fred Schneider <i>FS 2-22-10</i>	2-22-10
FUNDS RECEIVED:		APPROVED BY:	
CONTRIBUTIONS RECEIVED	0	Joe Harris <i>JH 2/22/10</i>	2/22/10
REFUNDABLE ADVANCES RECEIVED	0	FOR SPECIAL BUDGET ITEM UNDER \$10,000 --	
TOTAL CONTRIBUTIONS/ADVANCES	0	FOR SPECIAL BUDGET ITEM EXCEEDING \$10,000 --	
NET CASH REQUIRED	\$ 36,584	William M. Garfield <i>WMG 2-24-2010</i>	2-24-2010
		William Garfield	
		AUTHORIZED BY:	
		R. H. Nicholson, Jr.	APPROVED VIA FAX 02/26/2010

COMMENTS:

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
 Authorized by **FRED SCHNEIDER**
 Date 2/26/2010

AFH

ARIZONA WATER COMPANY

W.A. NUMBER: 1-4722
 P.E. NUMBER: CG
 BUDGET ITEM NO.: Special #3
 SHEET NO.: 2 of 2

WORK AUTHORIZATION - DETAIL SHEET

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
		325	National M12LC 11-stage bowl assembly	325

PROJECT DESCRIPTION:

Pull and replace the pump at Casa Grande Well #21

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Labor to pull and replace pump	325	1	\$ 6,800.00	\$ 6,800
	Simflow SJ10C 13-stage pump		1	6,887.00	6,887
	Misc. Materials		1	300.00	300
	Video Well		2	650.00	1,300
	Install SCH 80 2" PVC sounding line		640	1.30	832
	3/4" SCH 80 PVC sounding line		640	0.50	320
	1/4" Stainless Steel air line		640	1.75	1,120
	8"x20' Column pipe		6	475.00	2,850
	3"x1-15/16"x20 Tube and Shaft assembly		2	731.00	1,462
	Brush and bail well		20	205.00	4,100
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				

TOTAL CONTRACT WORK \$ 25,971

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Lacos IHB 0450 sand separator	325	1	\$ 4,500.00	\$ 4,500
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
SERVICE CONNECTIONS: SINGLE-SHORT	345				
METERS	346				

TOTAL MATERIALS \$ 4,500

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	20	150.00	3,000
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			

TOTAL LABOR \$ 3,000

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 33,471

OVERHEAD 3,113

TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 36,584

AFH

CG 21

240 gpm rev.

1-4722

1/25/10

AVG STATIC 275
AVG DYNAMIC 510

TOP OF PUMP 650'

KLIN TO DOUBLE CHECK
WELL HEAD PRESSURES & FLOW
1/25/10.

TDH @ 750 gpm

TDH = LIFT + COLUMN LOSS + STAT PRESS + MISC

TDH_h = 509' + 3.2 * 6.5 + 50 * 2.71 + 20'

TDH_h = 663'

TDH_l = ⁴³⁰ 399 + 3.2 * 6.5 + 30 * 2.31 + 20'

TDH_l = 509' 540'

MAX 700 gpm TO 9000
UNDER PLANT DESIGN
LIMIT OF 4050 gpm.

DESIGN CONDITIONS

TDH ⁷⁰⁰ 509' - ~~663~~' @ 750 gpm
~~540' - 663'~~

SHAFT HP ≈ 12 HP.

* MIN DRAWDOWN W/ ALL WELLS @ 507 gpm.

* TDH = ⁴³⁰ ~~399~~ + (3.2 * 6.5) + (30 * 2.31) + 20'

TDH = ~~586~~ ⁵⁹⁵ 595' @ 700 gpm.

* ~~CHECK FLOW & CURVE @ 666 & 504' TDH.~~

AT THESE TDH VALUES EXISTING PUMP SHOULD
PRODUCE 800-1100 gpm HOWEVER IT HAS
CONSISTANTLY PRODUCED 600 gpm.

BAD CHECK VALVES? HERE IN COLUMN?

~~690 TDH @ 600 gpm (EXISTING)~~

LOOK FOR STAMP CURVE PUMP.

14264

CAMPA

LOW
PRESS

1/27/10

SIMPLE 5510C 13 STG.
 BEST PUMP Q CURVE IN TDH RANGE.

	FLOW	TDH
EX. PUMP TDH	540	690'
MAX. CALC. TDH.	605	663
MIN. CALC. TDH.	780	540
DESIGN TDH	700	586

SAMPAD

STRETCH/NATURAL:

$$\frac{HL}{2.9} [K C_1 - C_2 + C_3 (1 - \frac{1}{2} \frac{L}{H})]$$

H = TDH/1000
 L = COLUMN LENGTH = 650
 K = THROTT FACT. = 6.75
 C₁ =

500 SPRING SHOOT

$$\begin{aligned} \text{THROTT.} &= (K \cdot \text{TDH}) + (W \cdot S) \\ &= (6.75 \cdot 863) + (10.02 \cdot 650) \\ T &= 12338 \text{ LBS} \end{aligned}$$

~~TDH = 863~~
 SHUT OFF
 W = SHUT WT 10.02 lb/ft

$$\text{HP} = 131_{\text{MAX}} + 12_{\text{SHUT}} = 143 \text{ HP. } \text{VHS FROM KTR, OVP MOTOR.}$$

~~* ROAD HEAD PRESSURE EXCEEDS VIBRAC PUMP PRESS.~~

~~INSTALL SURFACE PUMP PLANT~~

~~663' - 420 - 37.65 = 422' @ 182,750~~

CG 21 WELL CLEAN

3/25/10

Ni \leq 9.0 ppm

As \approx 12 - 15 ppb

PUMP SETTINGS 650

1200 BOTTOM OF HOLE

FOCUS ON CENTRAL PORTION OF WELL 550-650

16" BITUM VENTURE WELL ACID CLEAN 550-650

WELL CLEANER

$$115^2 \cdot 4 \cdot .17 = 178 \text{ gal}$$

$$.15 \cdot 178 = 27 \text{ gal well cleaner}$$

$$.85 \cdot 178 = 150 \text{ gal acid} + 50 \text{ gal for annulus}$$

$$.5 \cdot 2000 = 1000$$

$$4 \cdot 200 = 800$$

$$\# 2050 \text{ FOR CLEAN}$$

WELLS



ARIZONA WATER COMPANY

CONTRACT

CONTRACTOR: WEBER GROUP LC

DATE OF CONTRACT: February 18, 2010

Address: 16825 S. WEBER DRIVE

SYSTEM: Casa Grande

CHANDLER, AZ 85226

W.A. #: 1-4722

DESCRIPTION OF WORK:

PULL AND REPLACE THE PUMP AT CASA GRANDE WELL #21 AS PER THE ATTACHED PROPOSAL, DATED FEBRUARY 16, 2010.

WORK SHALL BE COMPLETED ON OR BEFORE 30 CALENDAR DAYS AFTER COMMENCEMENT NOTICE IS ISSUED.

(See Paragraph 4, below).

TOTAL COST (including taxes): \$16,909.00

THIS CONTRACT is made by and between ARIZONA WATER COMPANY, an Arizona corporation, (hereinafter referred to as the "Company"), and the CONTRACTOR named above.

- 1. The Contractor hereby certifies that it has read the Company's most recent General Conditions of Contract (copy attached), Construction Specifications and Standard Specification Drawings ("AWC Specifications") and related construction drawings, and understands that all provisions of said AWC Specifications, and related construction drawings, apply to work covered under this Contract, and which, by this reference, are incorporated herein.
2. The Contractor agrees, as an independent contractor, to furnish all of the labor, tools and certain materials required to perform the work described above for the Company, in accordance with the General Conditions of Contract and related construction drawings.
3. The Company agrees to furnish to the Contractor, without any cost to Contractor, certain equipment and materials necessary to be used or expended in the performance of said work, as follows: NONE.
4. Work shall not commence upon this Contract until a written Commencement Notice has been given to the Contractor by the Company. In the event the Commencement Notice is not given to the Contractor by the Company within ninety (90) calendar days from the date of this Contract, the Contractor has the option to cancel the Contract by giving written notice of cancellation to the Company.

Upon the satisfactory completion of the work within the Contract time limit, the Company agrees to pay, in cash, to the Contractor the total cost of the work, including all taxes.

SPECIAL CONDITIONS:

THIS SIGNED CONTRACT TO SERVE AS THE COMMENCEMENT NOTICE

ARIZONA WATER COMPANY

Company

By: James T. Wilson, PE
Title: Senior Engineer

afh

WEBER GROUP LC

Contractor

By: Fred Rogales
Title: PRESIDENT

PROPOSAL

INCLUDING LABOR AND MATERIALS

In response to the Invitation To Bid from Arizona Water Company (the "Company"), and in accordance with the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* (the "AWC Specifications") thereto, and all applicable plans, the undersigned Contractor hereby proposes and agrees to furnish and to do everything required by the terms and conditions of the Company's standard construction contract (the "Contract") to pull and replace the pump and motor at Casa Grande Well #1, Pinal County, Arizona, at the following unit and/or total prices for the work described:

ITEM	WORK	QUANTITY & UNIT PRICE	TOTAL
1.	Labor to pull and replace the pump and motor, and dispose of scrap materials.	1 ea. \$ 6800 ⁰⁰	\$ 6800 ⁰⁰
2.	Simflo SJ10C 13-stage pump assembly.	1 ea. \$ 6887 ⁰⁰	\$ 6887 ⁰⁰
3.	All miscellaneous materials including buckles, bandits and tape.	Lot. \$ 300 ⁰⁰	\$ 300 ⁰⁰
4.	Video well with downward and side scan, provide log and one VHS or DVD copy	1 ea. \$ 650 ⁰⁰	\$ 650 ⁰⁰
3.	2" SCH 80 PVC Sounding line	640 lf. \$ 1.30	\$ 832 ⁰⁰
4.	3/4" SCH 80 PVC Sounding line	640 lf. \$.50	\$ 320 ⁰⁰
5.	1/4" Stainless Steel air line with pressure guage secured to column with stainless steel bands.	640 lf. \$ 1.75	\$ 1120 ⁰⁰
6.	8" x 20' Column (price only)	1 ea. \$ 475 ⁰⁰	
7.	3"x1-15/16"x20' tube and shaft assembly	1 ea. \$ 731 ⁰⁰	
8.	Brush and Bail with cable tool rig (per hour price only)	1 hr. \$ 205 ⁰⁰	
			Subtotal \$ 16909 ⁰⁰
			Taxes _____
			Subtotal \$ 16909 ⁰⁰
100% Performance & Payment Bonds _____%			
			Total \$ 16909 ⁰⁰

All scrap materials including pump, column pipe and bailed materials to be disposed of by contractor.

The prices submitted in this Proposal are good for ninety (90) calendar days from the date of this Proposal. The work shall be completed within Forty Five (45) calendar days after the Commencement Notice is issued.

At the sole discretion of the Company, the 100% performance and payment bonds may not be required.

The Contractor represents that this Proposal, in all respects, is fair and honest, is submitted in good faith, and is not submitted in collusion with any other company, firm or individual. The Contractor represents that it is not in debt or default to the Company. The Contractor further represents that it has visited the site of the work and is knowledgeable of its environment. Within five (5) days of the Contractor receiving the Contract for the performance of this work, the Contractor will execute the Contract and return it to the appropriate Company office.

The Contractor agrees to provide the Company with a current Certificate of Insurance with coverage in the minimum amounts required by the General Conditions of Contract, before this Proposal will be accepted for consideration. It is understood and agreed that, if a claim is received by the Company in connection with the work performed under Contract with the Company, the claim will be referred to the insurance carriers of the Contractor and the Company in accordance with the General Conditions of Contract.

The Contractor is the holder of Arizona State Contractor's License No. _____, Classification CR.

Contractor's Complete Business Address

WEBER GROUP LC
16825 S. WEBER DR.
CHANDLER, AZ 85226

JTW

WEBER GROUP LC
Contractor

By: Jud Hughes
 Title: PRESIDENT
 Date: 2-16-10

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.

TUCSON
2838 W. Ruthrauff Rd.
Tucson, AZ 85705
Ph: 520-887-2170

Weber Group L.C.

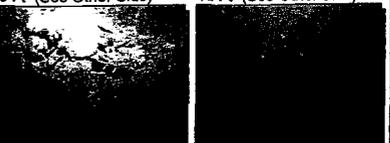
W A T E R R E S O U R C E S

Corporate Headquarters 16825 South Weber Drive Chandler, AZ 85226
Ph: 480-961-1141 Fax: 480-961-0290

GOODYEAR
18403 W. McDowell Rd.
Goodyear, AZ 85338
Ph: 520-887-2170

Well Video Report

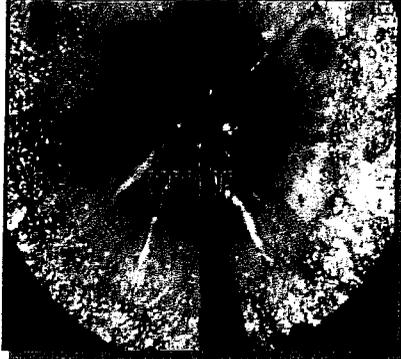
Client: Arizona Water Company	Survey Date: March 15, 2010
Address:	Invoice: 1020034 Run: 1
City: Casa Grande State: AZ Zip:	Well Name: Casa Grande #21
Requested By: Fred T. P.O.:	Well Owner: Az Water Co.
Copy To: Az Water Co. Kevin P.	Camera: CCV S.S. Color Camera - Long L.H.
Purpose: General Inspection	Zero Datum: Top of Casing
Location: Florence & Arizona	Depth: Vehicle: 95
Field: Pinal County	Type Perfs: Saw Cut
Perf Intervals: 3-1151	
1st Csg. O.D. 20 In. Csg Weight: From: 0 ft. To: 667 ft.	2nd Csg. O.D. 16 In. Csg Weight: From: 667 ft. To: 1151 ft.
Standing Water Level: 228 ft. Pumping Water Level: Pump Depth: O.D. Ref.: Measured	Casing Buildup: Moderate, Increasing W/ Depth
Operator: Nathan Reveles Lat.: 32° 52' 52.7" Long.: 111° 43' 05.9"	Sec: Twp: Rge:
Other Information:	

Wellbore Snapshots	True Depths: (DownView-Feet)	WELLBORE / CASING INFORMATION
1 Ft (See Other Side) 2 Ft (See Other Side) 	202'	Heavy cascading water.
	228'	Static water level
	300.6'	Down view of casing.
	361.5'	Side view of perforations plugged with build up.
3 Ft (See Other Side) 4 Ft (See Other Side) 	495.3'	Down view of casing.
	499.5'	Side view of perforations.
	667.1'	Possible 14" or 16" reduction or liner.
	669.7'	There are two square torch cut holes right below the reduction.
5 Ft (See Other Side) 6 Ft (See Other Side) 	684'	Large piece of build up and debris on the casing.
	800.5'	Side view of casing and build up.
	827.5'	Large piece of build up and what appears to be a piece of pvc.
7 Ft (See Other Side) 8 Ft (See Other Side) 	1151'	Camera could not go past 1151', debris and airline restricting the hole.
		GPS Elev. 1384'
		There were multiple spots in the casing with cascading water.
		There appeared to be light buildn up on the casing from 228' to 520',
9 Ft (See Other Side) 10 Ft (See Other Side) 		medium build up from 520' to 650', heavy build up from 650' to 700',
		& extra heavy build up from 700' to 1151'.
		The perforations appeared to be (from water level) partially open from
11 Ft (See Other Side) 12 Ft (See Other Side) 		228' to 300', plugged from 300' to 460', plugged to partially open from
		460' to 600' & plugged from 600' to 1151'.
		There were multiple spots with heavy build up and pvc debris.
		There was a piece of airline from 1142' to ????

Notes: There is a possible 14" or 16" reduction at 667'.

12 WELLBORE SHAPSHOTS

1 Ft (Enlargement)

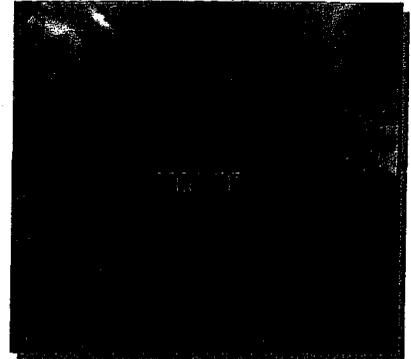


cascading water

2 Ft (Enlargement)



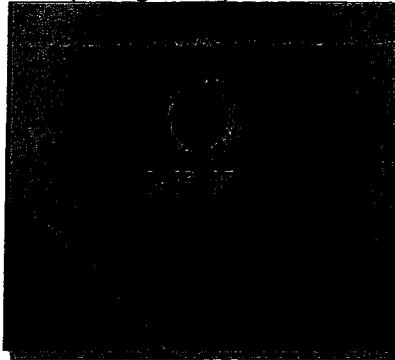
3 Ft (Enlargement)



4 Ft (Enlargement)



5 Ft (Enlargement)



6 Ft (Enlargement)



7 Ft (Enlargement)



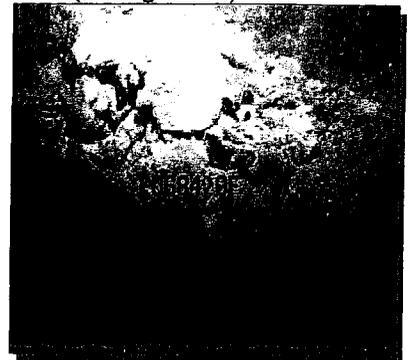
possible reduction

8 Ft (Enlargement)



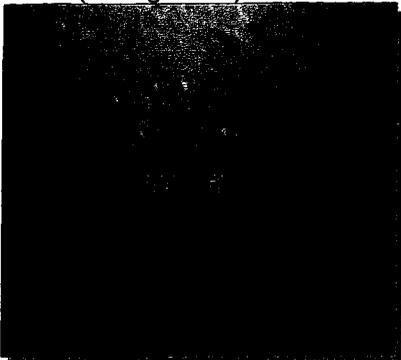
square torch cut hole

9 Ft (Enlargement)

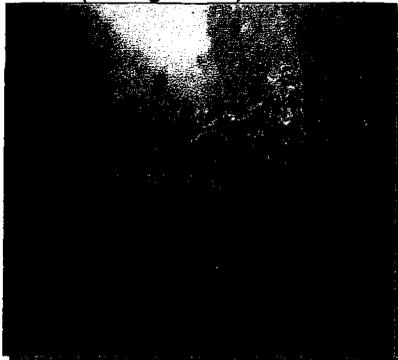


debris build up

10 Ft (Enlargement)

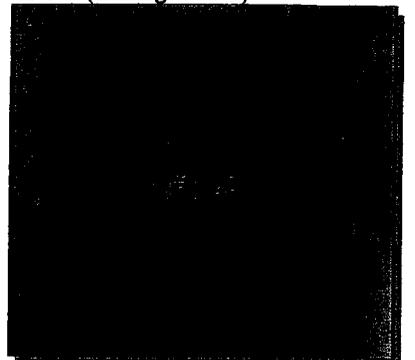


11 Ft (Enlargement)



debris build up

12 Ft (Enlargement)



RECEIVED

MAR 16 2010

ARIZONA WATER COMPANY
PHOENIX - ENGINEERING

SUBJECT Well #21 Video (water) DATE 3-15-10

130'	Saw cut from 5'
176'	cascading water
188'	cascading water
202'	Lot of cascading water
215'	heavy cascading water
225'	" " "
228'	Static water level
350'	Perfs mostly closed
400'	Perfs completely plugged
470'	Perfs starting to open up
500'	Perfs 50% open
540'	Perfs 60-70% open
630'	Perfs 95% plugged
660'	Build up on casing heavier
667'	Possible reduction
669'	Side view rectangular cuts on
	Possible liners
673'	Bar Hole (2)
682'	Debris
733'	Debris (PUC & Band, sounding castle)
1151'	Camera would go no further PUC possibly restricting hole

TUCSON
2838 W. Ruthrauff Rd.
Tucson, AZ 85705
Ph: 520-887-2170

Weber Group L.C.

Corporate Headquarters 16825 South Weber Drive Chandler, AZ 85226
Ph: 480-961-1141 Fax: 480-961-0290

GOODYEAR
18403 W. McDowell Rd.
Goodyear, AZ 85338
Ph: 520-887-2170

Well Video Report

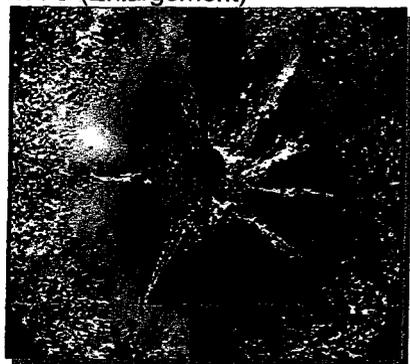
Client: **Arizona Water Company** Survey Date: **April 22, 2010**
 Address: _____ Invoice: **1020034** Run: **2**
 City: **Casa Grande** State: **AZ** Zip: _____ Well Name: **Casa Grande 21**
 Requested By: **Fred T.** P.O.: _____ Well Owner: **Az Water Co.**
 Copy To: **Az Water Co. Kevin P.** Camera: **CCV Color Flip Camera - Long L.H.**
 Purpose: **After Brushing & Chem Treatment** Zero Datum: **Top of Casing**
 Location: **I-10 and Florence Blvd, west on Florence past Arizola on the south side of the Rd.** Depth: **1167 ft.** Vehicle: **95**
 Field: **Pinal County** Type Perfs: **Saw Cut**
 Perf Intervals: **3-1167**
 1st Csg.O.D. **20 In.** Csg Weight: _____ From: **0 ft.** To: **669 ft.** 2nd Csg.O.D. **14 In.** Csg Weight: _____ From: **669 ft.** To: **1167 ft.**
 Standing Water Level: **254 ft.** Pumping Water Level: _____ Pump Depth: _____ O.D.Ref.: **Measured** Casing Buildup: **Light**
 Operator: **Nathan Reveles** Lat.: _____ Long.: _____ Sec: _____ Twp: _____ Rge: _____
 Other Information: _____

Wellbore Snapshots		True Depths: (DownView-Feet)	WELLBORE / CASING INFORMATION
1r Ft (See Other Side)	2l Ft (See Other Side)	203.6'	There is heavy cascading water at 203'.
		254.5'	Static water level
		290.8'	Down view of casing.
		320.4'	Side view of casing.
3e Ft (See Other Side)	4e Ft (See Other Side)	370.1'	Side view of casing.
		375.3'	Down view of casing.
		464.1'	Side view of casing.
		508.2'	Side view of open perforations.
5e Ft (See Other Side)	6e Ft (See Other Side)	585.3'	Side view of open perforations.
		669.1'	Side view of possible 14" or 16" reduction.
		740.6'	Side view of a corroded hole in the casing.
7e Ft (See Other Side)	8e Ft (See Other Side)	765.3'	Side view of open perf.
			There is cascading water at; 176', 188', 202' & 203'.
			The water was cloud/dirty from 380' to 800', extremely dirty from 800' to 970' & lost visibility at 970'.
9e Ft (See Other Side)	10n Ft (See Other Side)		There are small holes in the casing at 713'.
			There is a large hole in the casing at 740.6'.
			From water level the perforations appear to be partially open to mostly open from 254' to 500' & mostly open from 500' to 1167'.
11e Ft (See Other Side)	12e Ft (See Other Side)		The bottom was not visible, tagged bottom with camera at 1167'.

Notes: The water was dirty/cloudy from 380' to 970' and lost visibility at 970'.

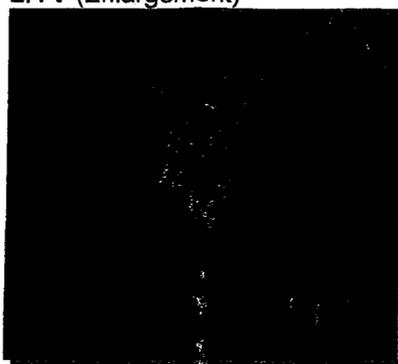
12 WELLBORE SHAPSHOTS

1r Ft (Enlargement)

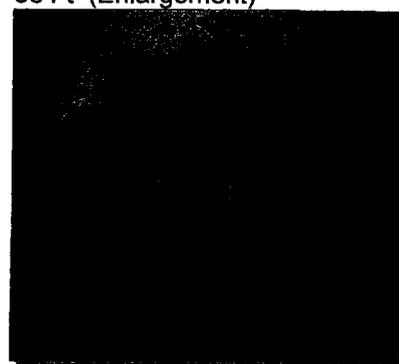


cascading water

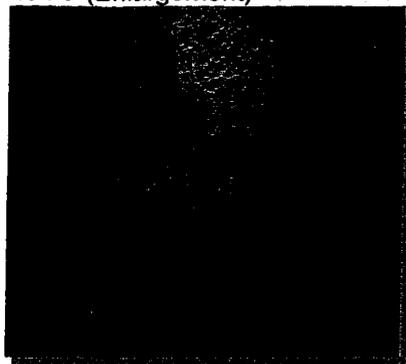
2l Ft (Enlargement)



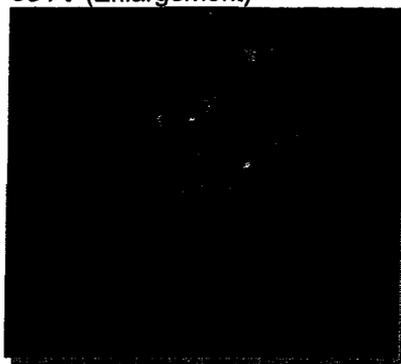
3e Ft (Enlargement)



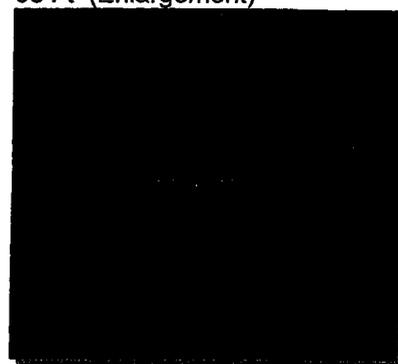
4e Ft (Enlargement)



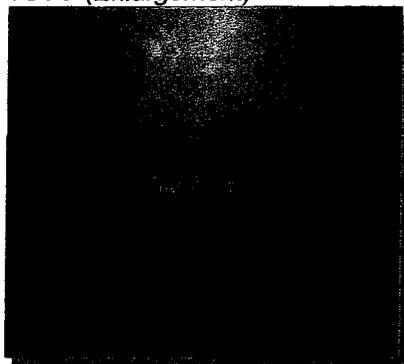
5e Ft (Enlargement)



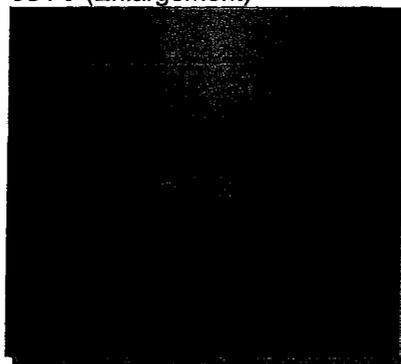
6e Ft (Enlargement)



7e Ft (Enlargement)

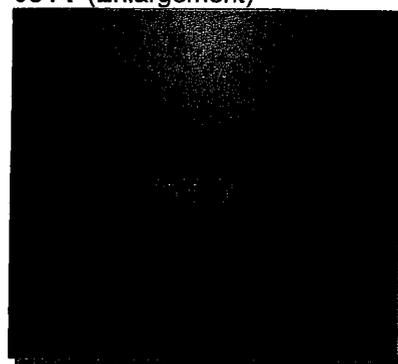


8e Ft (Enlargement)



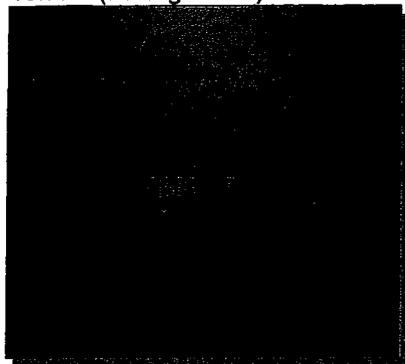
open perf

9e Ft (Enlargement)



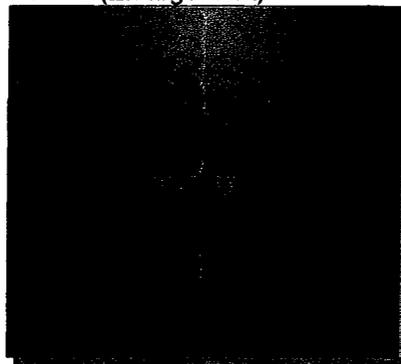
open perf

10n Ft (Enlargement)



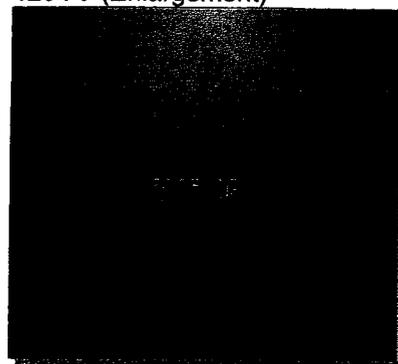
reduction

11e Ft (Enlargement)



hole in the casing

12e Ft (Enlargement)





ARIZONA WATER COMPANY

WELL RECORD

System: CG	Map Reference (e.g. Site Name): Casa Grande Well 21	Well No. 21
----------------------	---	-----------------------

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

COLUMN PIPE DATA		
Column Tread O.D. (inch): 8	Length (feet): 645	Thread Type: Taper
Threads Per Inch: 8	Thread Direction: RH	
Supplier: Weber Group LC		Date Installed: 5-17-10
Remarks: 27 each new 8 inch column pipe installed. Replace column nipple under discharge head.		

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

OIL TUBE DATA		
Oil Tube Thread I.D. (inch): 3	Threads Per Inch: 10	Thread Direction: RH
Supplier: Weber Group LC		Date Installed: 5-17-10
Remarks: Provided 6 new inner column, Az Water provided inner column from other site, it was new.		

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

SHAFT DATA		
Shaft Thread O.D. (inch): 1 15/16	Threads Per Inch: 10	Thread Direction: LH
Supplier: Weber Group LC		Date Installed: 5-17-10
Remarks: See inner column comments		

Company: AZ Water
 Name: James Wilson
 Date: 1/27/2010



Pump:

Size: SJ10C (13 stage)
 Type: VERTTURBINE
 Synch speed: 1800 rpm
 Curve:
 Specific Speeds:
 Dimensions:
 Vertical Turbine:
 Speed: 1770 rpm
 Dia: 8.122 in
 Impeller:
 Ns: 2341
 Nss: ---
 Suction: 6 in
 Discharge: 6 in
 Bowl size: 10 in
 Max lateral: 0.813 in **> .697**
 Thrust K factor: 6.75 lb/ft

Search Criteria:

Flow: 700 US gpm
 Head: 586 ft

Fluid:

Water
 SG: 1
 Viscosity: 0.8565 cP
 NPSHa: ---
 Temperature: 80 °F
 Vapor pressure: 0.5072 psi a
 Atm pressure: 14.7 psi a

Motor:

Standard: US
 Enclosure: TYPE_1
 Sizing criteria: Max Power on Design Curve
 Size: 150 hp
 Speed: 1800
 Frame: ---

Pump Limits:

Temperature: ---
 Pressure: 470 psi g
 Sphere size: 0.875 in
 Power: ---
 Eye area: ---

--- Data Point ---

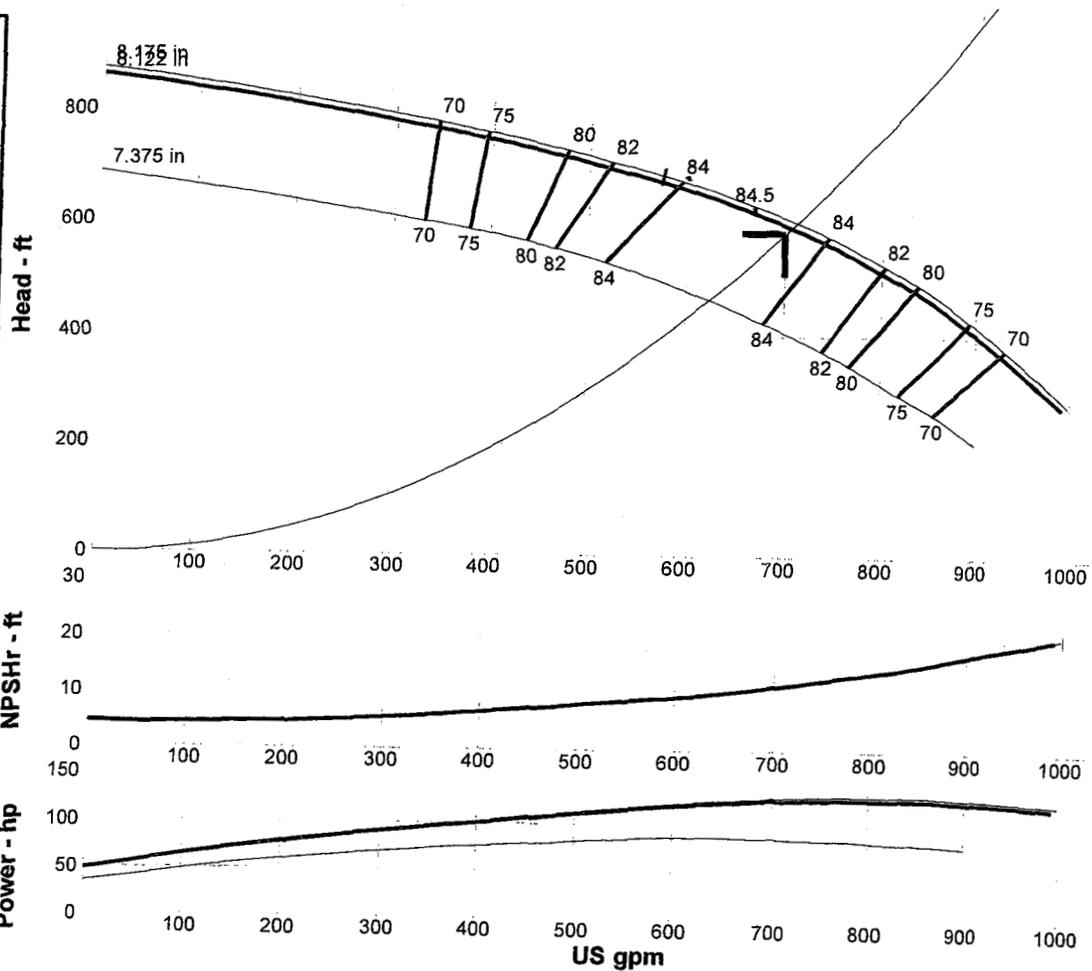
Flow: 700 US gpm
 Head: 599 ft
 Eff: 84.3%
 Power: 126 hp
 NPSHr: 11.7 ft

--- Design Curve ---

Shutoff head: 863 ft
 Shutoff dP: 373 psi
 Min flow: ---
 BEP: 84.5% @ 668 US gpm
 NOL power:
 128 hp @ 833 US gpm

--- Max Curve ---

Max power:
 131 hp @ 838 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
840	1770	476	79.4	127	15.2
700	1770	599	84.3	126	11.7
560	1770	683	83.2	116	9
420	1770	742	76.7	103	7.07
280	1770	787	57.3	86.6	5.77

Centrifugal-Action Sand Separators

IHB

Advanced and patented LAKOS design offers proven performance with low pressure loss. Removes sand and grit; new exclusive features improve performance to remove 50% more of finer particles, offering maximum protection. Independently tested. Proven superior for today's demanding filtration requirements.

Trouble-free operation keeps water clean and concentrates separated sand

No screens or filter elements to clean or replace; no routine maintenance

No backwashing; zero water loss options

Low and steady pressure loss: 3-12 psi (0.2-0.8 bar)

Space-saving profile

Swirlex internal accelerating slots for optimum sand-removal performance; patented

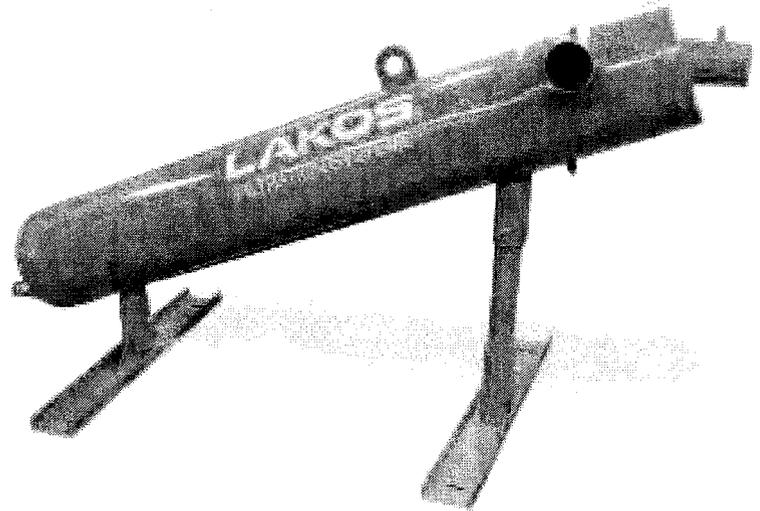
Vortube for enhanced sand separation/collection; patented

Grooved inlet/outlet connections for easy installation; flange adapters available

In-line inlet/outlet configuration for simplified piping

Unishell construction for easy installation

ASME Code option available



Flow range:
285 - 4,350 U.S. gpm
(65 - 988 m³/hr) per unit

Maximum standard
pressure rating:
150 psi (10.3 bar)

How-it-Works Illustration

Installation & Operating Instructions

Maintenance & Purging

Model Specifications

Engineering Specifications

LAKOS

Sand Separation Systems

Maintenance/Purging

LAKOS IHB Separators must be purged regularly to remove the separated sand from the temporary collection chamber.

All purge hardware should be installed prior to any elbow or turns in the purge piping.

Avoid "uphill" purging, which can clog purge piping and hinder effective sand evacuation.

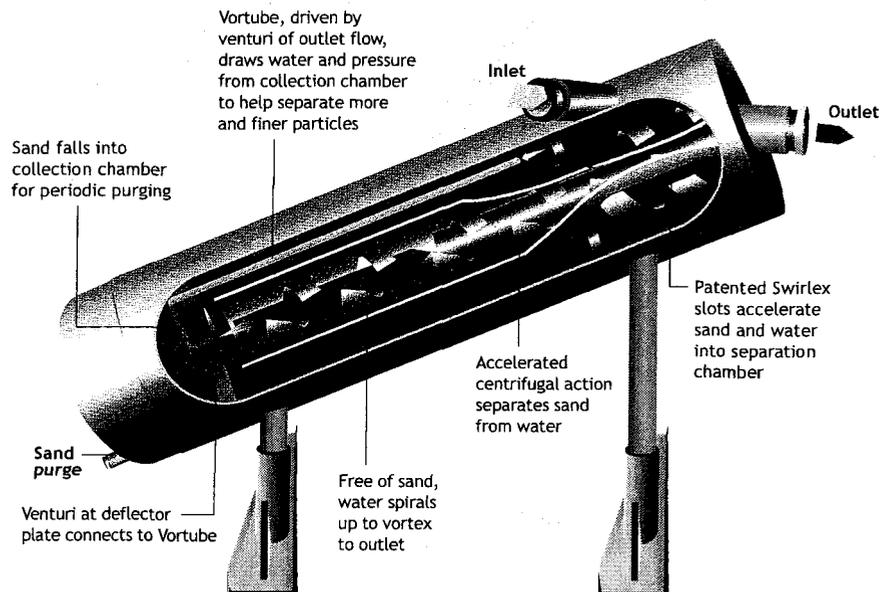
For best results, purging is recommended while the LAKOS Separator is in operation, utilizing system pressure to enhance sand evacuation.

LAKOS offers a durable, reliable automatic purging system to eliminate routine maintenance. Frequency of purging and duration of purging are both programmable to accommodate the specific needs of virtually any application.

Be sure to include an isolation valve prior to the automatic valve (available from LAKOS at an additional cost) to facilitate servicing of the automatic valve without system shut down.

Lakos Separators are manufactured and sold under one or more of the following U.S. Patents: 3,289,608; 3,512,651; 3,568,837; 3,701,425; 3,947,364; 3,963,073; 4,027,481; 4,120,795; 4,123,800; 4,140,638; 4,147,630; 4,148,735; 4,305,825; 4,555,333; 5,320,747; 5,338,341; 5,368,735; 5,425,876; 5,571,416; 5,578,203; 5,622,545; 5,653,874; 5,894,995; 6,090,276; 6,143,175; 6,167,960; 6,202,543; Des. 327,693; and corresponding foreign patents, including 600 12 329.4-08 (Germany) and EP 1 198 276 B1 (EU); other U.S. and foreign patents pending.

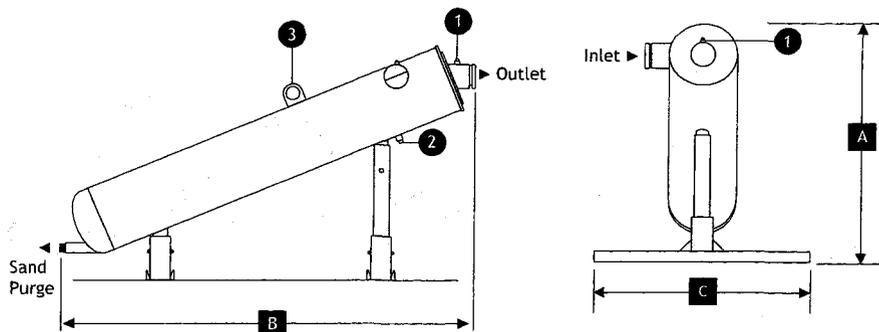
How It Works



Installation Instructions

- 1 LAKOS IHB Separators are shipped on a wooden skid with the two support legs detached. A large ring, located on the unit's side, is provided for hoisting as necessary.
- 2 A suitable foundation is necessary to accommodate the separator's weight including water (see chart, page 3). Tie-down bolts are recommended in the base of the legs. Prior to installation, inspect the inlet, outlet and purge of each unit for foreign objects that may have entered the unit during shipping or storage.
- 3 Proper purge hardware is required to flush separated sand from the separator. This equipment should be installed before start-up.
- 4 Pipe connections to the inlet and outlet of LAKOS IHB Separator should be a straight run of at least five pipe diameters to minimize turbulence and optimize performance. *Pipe size is not a factor in selecting the proper model of a LAKOS Separator.* Rather, all LAKOS Separators operate within a prescribed flow range.
- 5 Use appropriate hardware to match inlet and outlet size. Grooved couplings are not included with the separator. Inlet pressure to the LAKOS Separator must be at least equal to or greater than the anticipated pressure loss through the separator, plus 15 psi (1.0 bar), plus the required downstream pressure.
- 6 LAKOS IHB Separators are typically installed on the discharge of a pumping system. Consult your LAKOS representative for suction side installation. No other pressure or power is required to operate a LAKOS Separator.
- 7 In a pressurized system (vs. open discharge), pressure gauges are recommended at both inlet and outlet to monitor pressure loss and proper system flow. If the separator is operated at open discharge, a valve is recommended at the outlet, set to create a backpressure of 5 psi (0.3 bar).
- 8 Winterizing is important if the separator is to remain idle in freezing temperatures. Drain water as necessary to avoid bursting due to water-ice expansion.

IHB



1 Inlet/Outlet Pressure Gauge Taps

1/4-inch NPT female; required at both inlet and outlet for proper flow verification

2 Inspection/Drain Plug

1/2-inch NPT female; provides access to upper chamber for inspection of slot area; also allows for draining the upper chamber if necessary

3 Lifting Ring

For installation purposes

Dimensions

Model	A		B		C	
	in	mm	in	mm	in	mm
IHB-0285	45	1143	78-1/4	1994	40	1016
IHB-0450	52-1/2	1333	96-1/4	2445	40	1016
IHB-0500	52-1/2	1333	96-1/4	2445	40	1016
IHB-0810	61	1549	108	2743	40	1016
IHB-1275	72-1/2	1841	130	3302	40	1016
IHB-1950	79-1/4	2013	142	3607	40	1016

Specifications

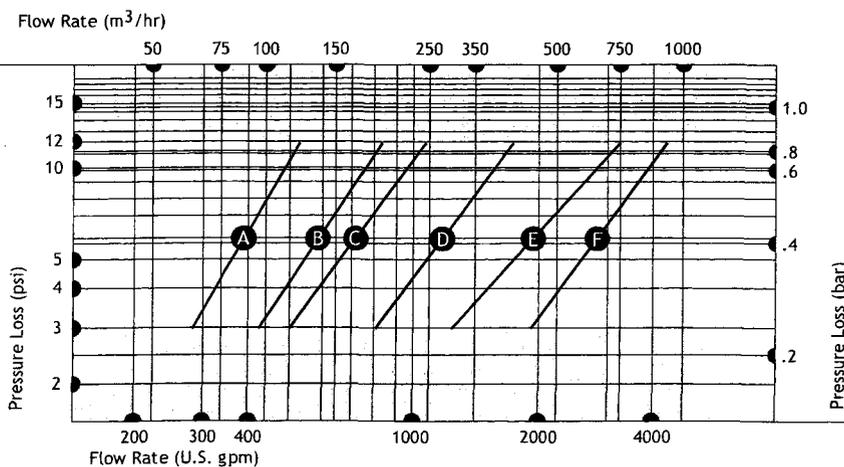
Model	Flow Range		Inlet/Outlet Grooved Coupling	Purge Size male N.P.T.	Collection Chamber Capacity		Weight		Weight with Water	
	U.S. gpm	m ³ /hr			gal	liters	lbs.	kg	lbs.	kg
IHB-0285	285-525	65-120	4"	1-1/2"	2.1	7.9	476	216	786	357
IHB-0450	450-825	102-187	6"	1-1/2"	2.8	10.6	699	318	1163	529
IHB-0500	500-1100	114-250	6"	1-1/2"	2.8	10.6	703	320	1167	531
IHB-0810	810-1670	184-379	8"	1-1/2"	6.2	23.5	966	439	1856	844
IHB-1275	1275-3100	290-704	10"	2"	11.5	43.5	1344	611	2960	1346
IHB-1950	1950-4350	443-988	12"	2"	15	56.8	1795	816	3933	1788

Note:
Maximum particle size: 3/8-inch (9 mm)

Also available with ANSI, DIN or JIS adapter flanges

Consult factory for higher flow rates.

Flow vs. Pressure Loss



- A IHB-0285
- B IHB-0450
- C IHB-0500
- D IHB-0810
- E IHB-1275
- F IHB-1950

Sample Specifications

Limited Warranty

All products manufactured and marketed by this corporation are warranted to be free of defects in material or workmanship for a period of at least one year from date of delivery. Extended warranty coverage applies as follows:

All LAKOS Separators: Five year warranty

All other components: 12 months from date of installation; If installed 6 months or more after ship date, warranty shall be a maximum of 18 months from ship date.

If a fault develops, notify us, giving a complete description of the alleged malfunction. Include the model number(s), date of delivery and operating conditions of subject product(s). We will subsequently review this information and, at our option, supply you with either servicing data or shipping instruction and returned materials authorization. Upon prepaid receipt of subject product(s) at the instructed destination, we will then either repair or replace such product(s), at our option, and if determined to be a warranted defect, we will perform such necessary product repairs or replace such product(s) at our expense.

This limited warranty does not cover any products, damages or injuries resulting from misuse, neglect, normal expected wear, chemically-caused corrosion, improper installation or operation contrary to factory recommendation. Nor does it cover equipment that has been modified, tampered with or altered without authorization.

No other extended liabilities are stated or implied and this warranty in no event covers incidental or consequential damages, injuries or costs resulting from any such defective product(s).

1365 North Clovis Avenue
Fresno, California 93727 USA
Telephone: (559) 255-1601
FAX: (559) 255-8093
Toll Free: (800) 344-7205
(USA, Mexico & Canada)
Internet: www.lakos.com
E-mail: info@lakos.com

Separator Type & Performance

The removal of specific unwanted sand from a pumped/pressurized water system shall be accomplished with a centrifugal-action vortex separator. Sand removal efficiency is principally predicated on the difference in specific gravity between the sand and the water. Performance is expected to be 98% removal of 74 microns and larger. Additionally, particles finer in size will also be removed, resulting in an appreciable aggregate removal of particles (up to 75%) as fine as 5 microns.

Performance Requirement

Separator performance must be supported by published independent test results from a recognized and identified test agency. Standard test protocol of upstream injection, downstream capture and separator purge recovery is allowed with 50-200 mesh particles to enable effective, repeatable results. Single-pass test performance must not be less than 95% removal. Model tested must be of the same flow-design series as specified unit.

Separator Design & Function

A tangential inlet and mutually tangential internal accelerating slots shall be employed to promote the proper velocity necessary for the removal of the separable sand. The internal accelerating slots shall be spiral-cut (Swirlex) for optimum flow transfer, laminar action and particle influence into the separation barrel. The separator's internal vortex shall allow this process to occur without wear to the accelerating slots.

Separated particle matter shall spiral downward along the perimeter of the inner separation barrel, in a manner which does not promote wear of the separation barrel, and into the solids collection chamber, located below the vortex deflector plate.

To ensure maximum particle removal characteristics, the separator shall incorporate a vortex-induced pressure relief line (Vortube), drawing specific pressure and water from the separator's sand collection chamber via the outlet flow's vortex/venturi effect, thereby efficiently encouraging sand into the collection chamber without requiring a continuous underflow or excessive system water loss.

System water shall exit the separator by following the center vortex in the separation barrel and spiral upward to the separator outlet.

Purging (Specified option only)

Evacuation of separated sand shall be accomplished automatically, employing a timer-activated motorized ball valve. The timer, programming switches and motorized actuator shall be mounted directly onto the valve. Straight-through valve design, with bronze valve body (also available optionally as a stainless steel valve body) and stainless steel ball in a teflon seat. NEMA 4 housing for indoor or outdoor installation. Valve size: _____

Separator Details

Inlet & outlet shall be grooved couplings, size: _____
Purge outlet shall be threaded, size: _____
The separator shall operate within a flow range of: _____
Pressure loss shall be between 3-12 psi (0.2-0.8 bar), consistent with the above flow range.

Separator Construction

The separator shall be of unishell construction with A-36, A-53B or equivalent quality carbon steel, minimum thickness of .25 inch (6.35 mm). Maximum operating pressure shall be 150 psi (10.3 bar), unless specified otherwise.

Paint coating shall be acrylic urethane, spray-on, gloss green.

As a specified option only: The separator shall be constructed in accordance with the standards of the American Society of Mechanical Engineers (ASME), Section VIII, Division 1 for pressure vessels. Certification shall be confirmed with the registered "U-stamp" on the body of the separator.

Separator Source & Identification

The separator shall be manufactured by LAKOS Filtration Systems, a division of Claude Laval Corporation in Fresno, California USA. Specific model designation is: _____

 Printed on recycled paper LS-623E (Rev.5 /08)

LAKOS
Sand Separation Systems



ARIZONA WATER COMPANY

CONSTRUCTION COMPLETION NOTICE

CONSTRUCTION
COMPLETION DATE:

6/21/10

WORK AUTHORIZATION NUMBER:

1-4722

THE FOLLOWING RECORD REQUIREMENTS ARE ATTACHED:

PREPARED BY

- | | |
|---|----|
| 1. CONSTRUCTION DRAWINGS WITH "AS BUILT" LOCATION OF PIPE, FITTINGS, ETC. MARKED IN RED | NA |
| 2. VALVE CARDS | NA |
| 3. HYDRANT CARDS WITH COPY OF COVER LETTER | NA |
| 4. MATERIALS INSTALLED OR RETIRED LISTED ON THE REVERSE SIDE OF THE W.A. WITH R.O.S. AND P.D.R. NUMBERS | KP |
| 5. PRESSURE AND LEAKAGE TEST RESULTS: | |

DATE TESTED	NA			
TIME STARTED				
TIME FINISHED				
PIPE DIAMETER				
FOOTAGE TESTED				
ALLOWABLE LEAKAGE				
LEAKAGE OBSERVED				
PRESSURE AT TEST POINT				
COMPANY EMPLOYEE OBSERVING TEST (print)				
INITIALS OF EMPLOYEE				

6. DISINFECTION SAMPLING:

INITIAL SAMPLING	DATE	6-8-10			
(minimum 50 ppm available chlorine)	TIME	9:00 AM			
	PPM Cl ₂	200			
AFTER 24 HOURS DETENTION TIME	DATE	6-9-10			
(minimum 10 ppm free chlorine)	TIME	9:00 AM			
	PPM Cl ₂	50			
AFTER SUFFICIENT FLUSHING	DATE	6-9-10			
(water is clear and system Cl ₂ residual is measured)	TIME	9:30 AM			
	PPM Cl ₂	0			
BACTERIOLOGICAL SAMPLE(S)	DATE	6-9-10			
	TIME	9:42 AM			

ATTACHED Yes No Yes No Yes No Yes No

I certify that construction on the above Work Authorization was completed as of the date shown above and for which all materials have been accounted. I further certify that I have inspected the work done and have found it to be satisfactory and in accordance with Company specifications.

John P. ...
Division Manager or Operations Superintendent (signature)

10-22-10
Date of Notice

ATTACH TO CONSTRUCTION & ENGINEERING FILE COPY OF WORK AUTHORIZATION

WA1-4730

ARIZONA WATER COMPANY
WORK AUTHORIZATION

SCANNED

W.A. NUMBER:
 P.E. NUMBER:
 BUDGET ITEM NO.:
 SHEET NO.:

1-4730
 CL
 Special #4
 1 of 2

SYSTEM: Coolidge	WORK TO START BY: UPON AUTHORIZATION
DIVISION: Coolidge	WORK TO BE FINISHED BY: WITHIN 30 DAYS
TAX CODE: 2102	

DESCRIPTION OF WORK:

Pull and replace the pump at Coolidge Well #10. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

Production has dropped off from 900 gpm to 200 gpm.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	James Wilson <i>gw 3/11/10</i>	3/8/10
LABOR	3,000	REVIEWED BY: <i>Mr. Loggins</i>	3-8-10
CONTRACT PORTION	19,347	Mike Loggins <i>ML 3-15-10</i>	
OVERHEAD	2,078	APPROVED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 24,425	Fred Schneider <i>FS 3-15-10</i>	3-9-10
FUNDS RECEIVED:		APPROVED BY:	
CONTRIBUTIONS RECEIVED	0	Joe Harris <i>JH 3/10/10</i>	3/10/10
REFUNDABLE ADVANCES RECEIVED	0	FOR SPECIAL BUDGET ITEM UNDER \$10,000 --	
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET CASH REQUIRED	\$ 24,425	FOR SPECIAL BUDGET ITEM EXCEEDING \$10,000 --	
		William M. Garfield <i>W.M.G. 3-10-2010</i>	3-10-2010
		AUTHORIZED BY:	
		R. H. Nicholson, Jr.	3/11/2010

COMMENTS:

Contingency Budget shall be used to fund this pump replacement

FILE COPY

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by **FRED SCHNEIDER**

Date 3/11/2010

AFH

CL #10

2/19/10

STATIC 175 - 199
DYNAMIC 240 @ 900 gpm ≈ 283 @ 1500

DESIGN FLOW 900 - 1500 gpm

$$HP_{EST.} = \frac{1500 \cdot 315}{2960 \cdot 85} = 140 HP.$$

TOT = LIFT + COLUMN + MISC (TANK IS UNDER VACUUM)

$$\approx 283 + 12 + 20$$

$$TDH \approx 315'$$

WELL IS PINCHED BACK TO 900 gpm $\approx 450'$ AND EXISTING PUMP CURVE.

DESIGN FOR 900 gpm @ 450' TDH. (w/ PINCHED WELLS)
1500 gpm @ ~~315'~~ TDH. (w/ PINCHED WELLS)

1700 gpm MAX TUBE TO SAND PRODUCE

* REUSE PUMP REMOVED FROM WELL #13 - VERY SIMILAR TO EXISTING PUMP.

10 X 2.5" X 1.5" COLUMN TUBE & FITTING.

MAX 9 TD. LATERAL 1.125"

$$\frac{HL}{29L} [K C_1 - C_2 + C_3 (1 - \frac{L}{2R})]$$

$$K = 12.5$$
$$H = 440/1000 = .44$$
$$L = 600/1000 = .6$$

S.L.C. PRINT OUT OF LATERAL CHECKS.

GANNAD

STATIC 179'
CLOUDY 179'-381'
PERFS START 357' MILLS IENIA
CLEAR 381'-490'
CLOUDY 490'-675'
CLEAR 675'-
REDUCTION TO 16" 682
DOWL RUD MARKS 597'

BRUSH & BAIL PERFS 757-92
FOCUS ON 682'-931'

WILL CLEAR 682'-931'?
(250')

IC = 12.5

STD CAT 1 1/2"

Pump Data Sheet - National Pump Company

Company: AZ Water
Name: James
Date: 2/21/2010

CL WELL #10



Pump:

Size: M14HC (4 stage)
Type: VERT. TURBINE
Synch speed: 1800 rpm
Curve: CVM14H4P6CY
Specific Speeds:
Dimensions:
Speed: 1770 rpm
Dia: 10.995 in
Impeller:
Ns: 2113
Nss: 8850
Suction: 10 in
Discharge: 12 in

Search Criteria:

Flow: 1500 US gpm
Head: 400 ft

Fluid:

Water
SG: 1
Viscosity: 0.8565 cP
NPSHa: ---
Temperature: 80 °F
Vapor pressure: 0.5072 psi a
Atm pressure: 14.7 psi a

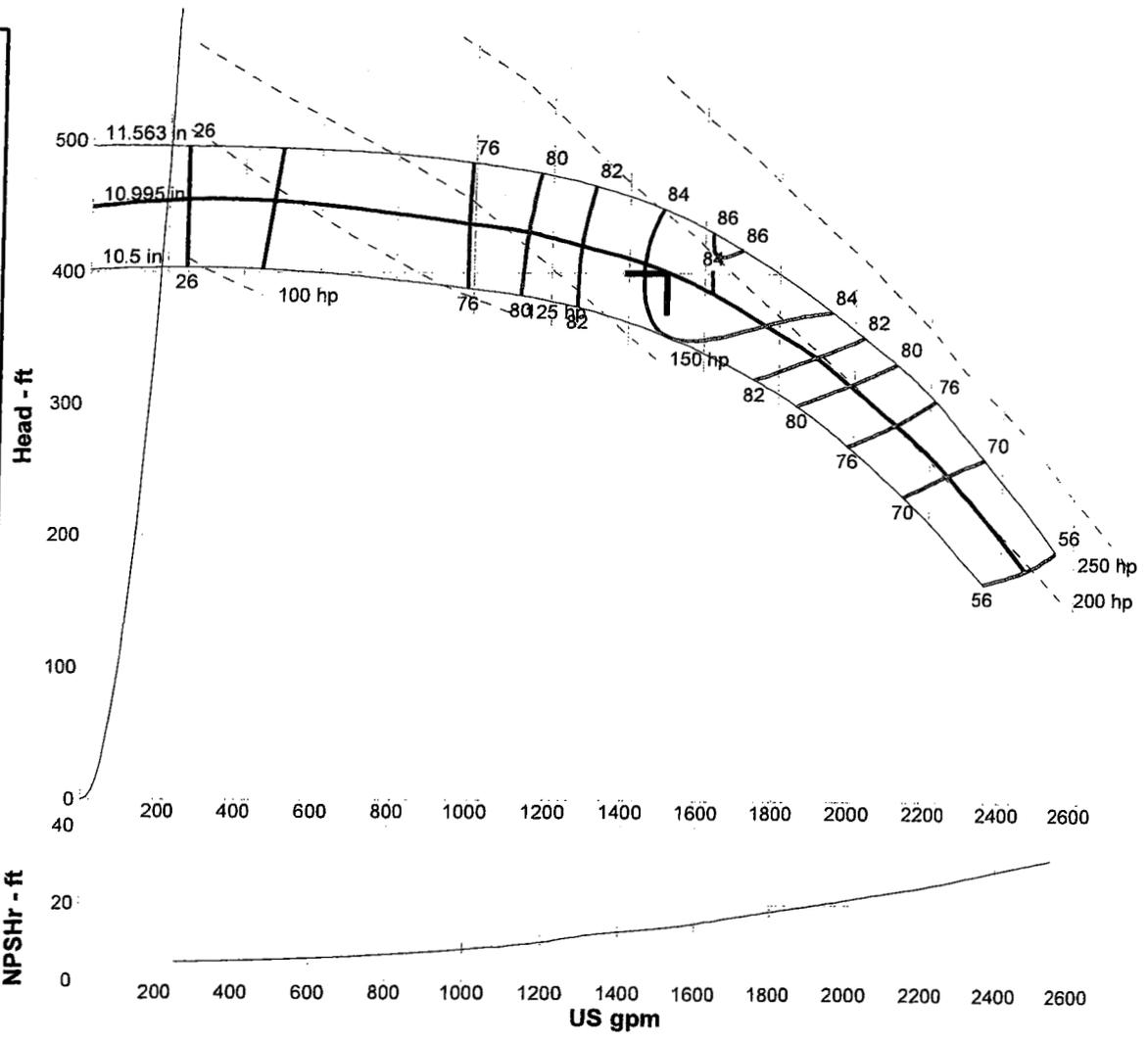
Pump Limits:

Temperature: 180 °F
Pressure: 321 psi g
Sphere size: 0.6 in
Power: ---
Eye area: 25.3 in²

Motor:

Standard: NEMA
Enclosure: WP-1
Sizing criteria: Max Power on Design Curve
Size: 250 hp
Speed: 1800
Frame: 447

Data Point	
Flow:	1500 US gpm
Head:	400 ft
Eff:	84%
Power:	180 hp
NPSHr:	14 ft
Design Curve	
Shutoff head:	450 ft
Shutoff dP:	195 psi
Min flow:	486 US gpm
BEP:	84% @ 1619 US gpm
NOL power:	201 hp @ 2249 US gpm
Max Curve	
Max power:	224 hp @ 2214 US gpm



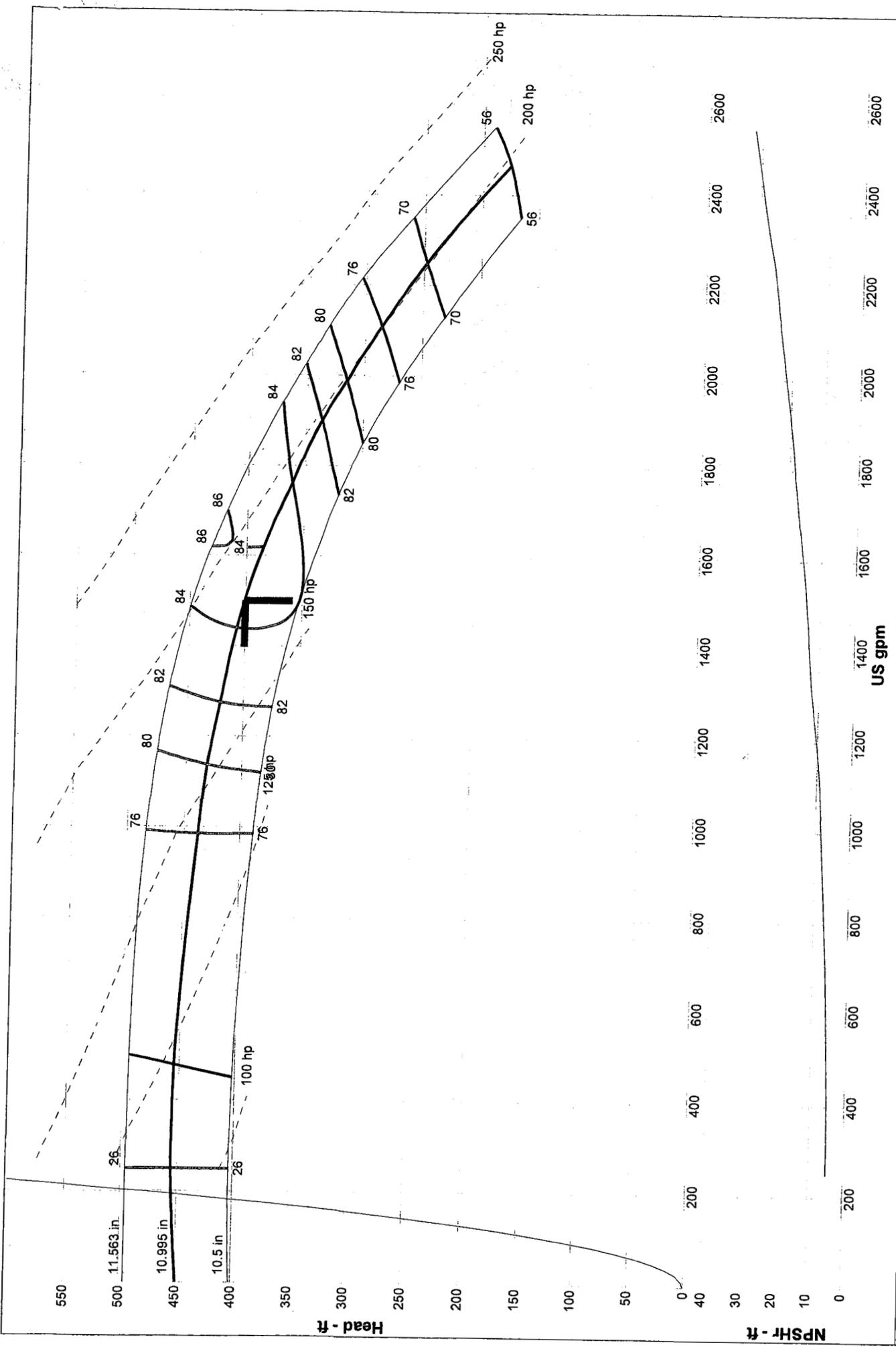
Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1800	1770	355	83	193	18.5
1500	1770	400	84	180	14
1200	1770	426	81	160	10.4
900	1770	440	70	140	7.89
600	1770	447	50	126	6.56

1300

417

82



Company: AZ Water
 Name: James
 2/21/2010

National Pump Company
 Catalog: National Pump Company.60, Vers 60cy0331
 VERT. TURBINE - 1800
 Design Point: 1500 US gpm, 400 ft

Size: M14HC 4 stage
 Speed: 1770 rpm
 Dia: 10.995 in
 Curve: CVM14H4P6CY



DEAD HEAD CALC.

MIN. CALC. TDH

TDH (ft)=	450
Column Length (ft)=	600
Thrust Factor, K (lb/ft)=	12.5
Column Diameter (in)=	10
Tubing Diameter (in)=	2.5
Shaft Diameter (in)=	1.5
C1=	7.84095
C2=	34.16001
C3=	21.19790
H=	0.45
L=	0.6

FROM CATALOG.

CURRENT DATA NOT AVAILABLE

Stretch (in)= 0.660269467
Impeller Clearance &
Assembly Loss (in)= 0.24
Required Lateral (in)= 0.900269467

CALC. AT 900 rpm

MIN. CALC. TDH

TDH (ft)=	440
Column Length (ft)=	600
Thrust Factor, K (lb/ft)=	12.5
Column Diameter (in)=	10
Tubing Diameter (in)=	2.5
Shaft Diameter (in)=	1.5
C1=	7.84095
C2=	34.16001
C3=	21.19790
H=	0.44
L=	0.6

Stretch (in)= 0.642672964
Impeller Clearance &
Assembly Loss (in)= 0.24
Required Lateral (in)= 0.882672964

ARIZONA WATER COMPANY

COOLIDGE WELL #10 EQUIPMENT SPECIFICATIONS

Existing Well Information

Location: ½ Mile North of Hwy 287 and ¼ Mile East of Arizona Blvd.
In the NW ¼ Sec. 10 – T.5S., R.8E.
Drilled by: Moss-Weber Inc. 1978
Casing: 20" .312 wall mild steel from 0'-692' and 16" 5/16" Mild Steel from 688'-1000'
machine cut perforations from 350'-675' and 700'-980'
Pump: National M14MC 4-stage turbine pump
Motor: 200 HP 480V 3 phase VHS motor

Special Conditions

- Arizona Water Company will provide the replacement National M14HC 4-Stage pump assembly.
- The pump provided by AWC will be disassembled and inspected prior to installation.
- All materials removed from the well including but not limited to bailed material, unused pumping equipment are to be removed and disposed of by the contractor.

Design Conditions

1500 GPM @ 400' TDH.
Pump setting 600 ft.

Equipment to be Furnished and Installed by Pump Company

- 600 ft. 2" I.D. SCH 40 solvent weld PVC sounding line.
- 600 ft. 1/4" Stainless Steel air line.
- Video Well
- Brush and Bail well using cable tool rig.
- All miscellaneous bandits, buckles, tape, etc.
- All material subject to Arizona Water Company Standard Specification OE-11-22 (enclosed) except as noted

ARIZONA WATER COMPANY COST ESTIMATE WORKSHEET

DATE PREPARED:

PRELIMINARY
ACTUAL

PREPARED BY: James Wilson

SYSTEM:

SHEET OF

PROJECT LOCATION:

DRAWING NO.

PROJECT DESCRIPTION:

Preliminary cost estimate to drill and equip a replacement well. Well drilling and equipment pricing taken directly from recently drilled wells in Coolidge (Wells 11 & 13)

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL	
C O N T R A C T W O R K	Purchase Property (1 acre)	314	1	\$ 70,000.00	\$ 70,000	
	Drill 2000' deep well and install 18" louverd casing	314	1	679,433.00	679,433	
	3-phase power to site	325	1	25,000.00	25,000	
	Install SES and MCC with SCADA controls and programing	325	1	126,680.00	126,680	
	Site grading, drainage, dry well and catch basin	314	1	55,000.00	55,000	
	Onsite underground piping and discharge header	343	1	45,000.00	45,000	
	Construct 8' block wall with rolling gate	314	1	45,000.00	45,000	
	Install pump, motor, colum pipe and discharge head	325	1	93,872.00	93,872	
	Contracting Tax (4.5%)			1	51,299.33	51,299
	Performance and Payment Bond (2%)			1	22,799.70	22,800
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				
TOTAL CONTRACT WORK					\$ 1,214,084	
M A T E R I A L S	Cla-Valve	325	2	\$ 4,500.00	\$ 9,000	
	8" Meter	325	1	5,057.00	5,057	
	Miscellaneous Materials	325	1	15,000.00	15,000	
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345				
	TAXABLE METERS	346				
	METERS	346				
TOTAL MATERIALS					\$ 29,057	
L A B O R						
	TESTING FEE	343	1	\$ 5,000.00	5,000	
	PERMIT FEE	343	1	15,000.00	15,000	
	SURVEY FEE	343	1	4,500.00	4,500	
	FIELD INSPECTION	343	1	5,500.00	5,500	
INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345					
INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345					
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345					
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345					
TOTAL LABOR					\$ 30,000	
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					\$ 1,273,141	
OVERHEAD					305,554	
TOTAL					\$ 1,578,695	
REFUNDABLE PORTION <input type="checkbox"/>		NON-REFUNDABLE PORTION <input type="checkbox"/>		COST ESTIMATE		



ARIZONA WATER COMPANY

CONTRACT

CONTRACTOR: Coolidge Engine & Pump		DATE OF CONTRACT:	March 8, 2010
Address:	P.O. Box 957	SYSTEM:	Coolidge
	Coolidge, AZ 85228	W.A. #:	1-4730

DESCRIPTION OF WORK:	Pull and replace the pump at Coolidge Well #10 per the attached proposal dated March 1, 2010	WORK SHALL BE COMPLETED ON OR BEFORE <u>30</u> CALENDAR DAYS AFTER COMMENCEMENT NOTICE IS ISSUED.
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(See Paragraph 4, below).

TOTAL COST (including taxes): \$9,156.99

THIS CONTRACT is made by and between ARIZONA WATER COMPANY, an Arizona corporation, (hereinafter referred to as the "Company"), and the CONTRACTOR named above.

1. The Contractor hereby certifies that it has read the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* ("AWC Specifications") and related construction drawings, and understands that all provisions of said AWC Specifications, and related construction drawings, apply to work covered under this Contract, and which, by this reference, are incorporated herein.
2. The Contractor agrees, as an independent contractor, to furnish all of the labor, tools and certain materials required to perform the work described above for the Company, in accordance with the General Conditions of Contract and related construction drawings.
3. The Company agrees to furnish to the Contractor, without any cost to Contractor, certain equipment and materials necessary to be used or expended in the performance of said work, as follows: NONE.
4. Work shall not commence upon this Contract until a written Commencement Notice has been given to the Contractor by the Company. In the event the Commencement Notice is not given to the Contractor by the Company within ninety (90) calendar days from the date of this Contract, the Contractor has the option to cancel the Contract by giving written notice of cancellation to the Company.

Upon the satisfactory completion of the work within the Contract time limit, the Company agrees to pay, in cash, to the Contractor the total cost of the work, including all taxes.

SPECIAL CONDITIONS:

This signed contract to serve as the commencement notice

ARIZONA WATER COMPANY

Company

By: _____
 Title: **James T. Wilson, PE**
Engineer
 afh

Coolidge Engine & Pump

Contractor

By: _____
 Title: _____

PROPOSAL

INCLUDING LABOR AND MATERIALS

In response to the Invitation To Bid from Arizona Water Company (the "Company"), and in accordance with the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* (the "AWC Specifications") thereto, and all applicable plans, the undersigned Contractor hereby proposes and agrees to furnish and to do everything required by the terms and conditions of the Company's standard construction contract (the "Contract") for the construction of Coolidge Well #10, at the following unit and/or total prices for the work described:

ITEM	WORK	QUANTITY & UNIT PRICE	TOTAL
1.	Labor to transport, disassemble, inspect and reassemble National M14HC 4-stage pump.	1 ea. \$ 375.00	\$ 375.00
2.	Labor to pull existing pump and motor, install new pump and reinstall motor.	1 ea. \$ 5,295.00	\$ 5,295.00
3.	Video Well	1 ea. \$ 650.00	\$ 650.00
4.	2" SCH 40 solvent weld PVC secured to column with stainless steel bands	600 lf. \$ 462.00	\$ 462.00
5.	1/4" Stainless Steel air line with pressure guage secured to column with stainless steel bands.	600 lf. \$ 1,800.00	\$ 1,800.00
6.	Brush and Bail with cable tool rig (To be charged per hour)	1 hr. \$ 165.00 / HR.	
7.	Provide and install Lakos PPS-825-I Pump Protection Separator Complete. B position collar.	1 ea. \$ 5,401.25	
8.	10"x20' Column.	1 ea. \$ 612.50	
9.	2-1/2"x1-1/2" Shaft assembly	1 ea. \$ 475.00	
	All mobilization charges, misc. buckles bandits and tape to be included in totals		Subtotal \$ 8,582.00
	All scrap materials including pump, column pipe and bailed materials to be disposed of by contractor.		Taxes 6.7%
			Subtotal
		100% Performance & Payment Bonds 3 %	
			Total \$ 8,582.00

The prices submitted in this Proposal are good for ninety (90) calendar days from the date of this Proposal. The work shall be completed within Forty Five (45) calendar days after the Commencement Notice is issued.

At the sole discretion of the Company, the 100% performance and payment bonds may not be required.

The Contractor represents that this Proposal, in all respects, is fair and honest, is submitted in good faith, and is not submitted in collusion with any other company, firm or individual. The Contractor represents that it is not in debt or default to the Company. The Contractor further represents that it has visited the site of the work and is knowledgeable of its environment. Within five (5) days of the Contractor receiving the Contract for the performance of this work, the Contractor will execute the Contract and return it to the appropriate Company office.

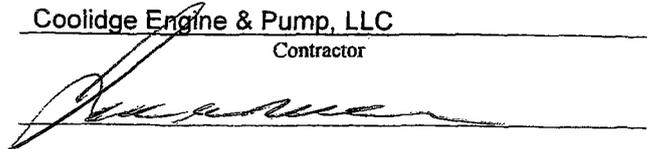
The Contractor agrees to provide the Company with a current Certificate of Insurance with coverage in the minimum amounts required by the General Conditions of Contract, before this Proposal will be accepted for consideration. It is understood and agreed that, if a claim is received by the Company in connection with the work performed under Contract with the Company, the claim will be referred to the insurance carriers of the Contractor and the Company in accordance with the General Conditions of Contract.

The Contractor is the holder of Arizona State Contractor's License No. ROC188885, Classification K-29.

Contractor's Complete Business Address

Coolidge Engine & Pump, LLC
Contractor

Coolidge Engine & Pump, LLC

By: 

P. O. Box 957 4057 E. Wilshire Ave.

Title: Owner/Managing Partner

Coolidge, AZ 85128

Date: March 1, 2010

JTW

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ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.



Mike Longmire
(602) 531-3660

Brian Rupert
(602) 531-3661

P.O. Box 759, Willcox, AZ 85644

Well Report Number 8849 P.O. Number _____ Date 4-19-10

Customer AZ Water Co Contractor / Pump Co. Coolidge Eng & Pump

Address _____

Well Number #10 Location _____

Casing Size 20" 00 Liner Size 16" w 682' 8"

Static Water Level 179 Breaks none visible

Perforations Mills Knife cuts start w 357' 4" Saw Cuts start w 694' 1"

Original Well Depth _____ Well Depth 931' 6" Pump Depth _____

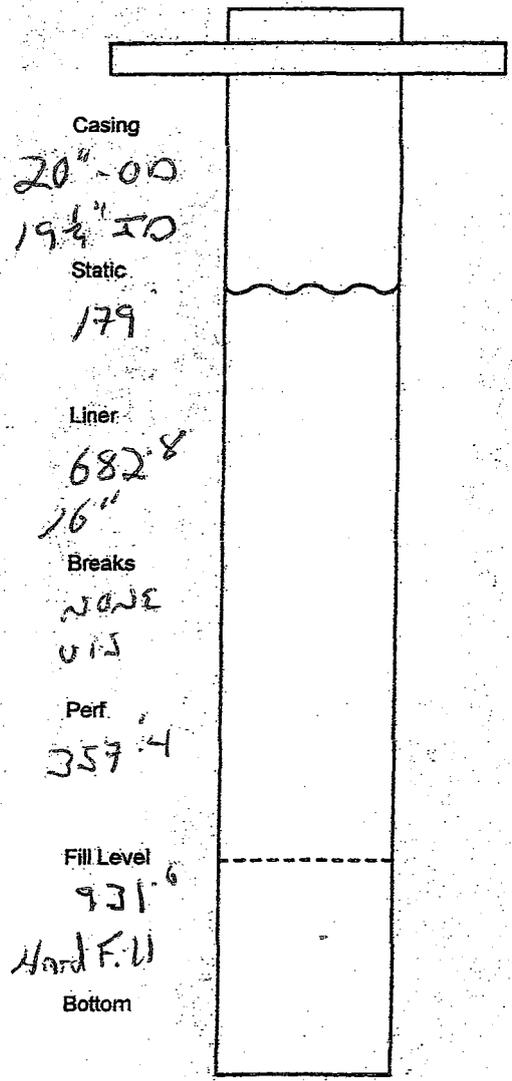
Results O w top of casing,

Double Cut Mills Knife
w 447' 2, 533' 2, 647' 7

682' 8 - 16" reduction
Saw Cuts are plugged!

Recommendations _____

Operator Brian Rupert





Mike Longmire
(602) 531-3660

Brian Rupert
(602) 531-3661

P.O. Box 759, Willcox, AZ 85644

Well Report Number 8849.3 P.O. Number _____ Date 5-10-10

Customer AZ Water Co Contractor / Pump Co. Coolidge Eng & Pump

Address _____

Well Number #10 Location _____

Casing Size 20" OD Liner Size Bell Reduction w 682-8, 16" w 683-3

Static Water Level 175.3 Breaks none visible

Perforations Mills Knife Cuts start w 357.4, Saw Cuts start w 694.4

Original Well Depth _____ Well Depth 922.7 Pump Depth _____

0 w top of casing, Bands set w 15"

Results

1 Poor Visibility static to 389'

± 489' to 680'
Mills Knife Dbl Cuts w 412',
447.2, 533.2, 647.7

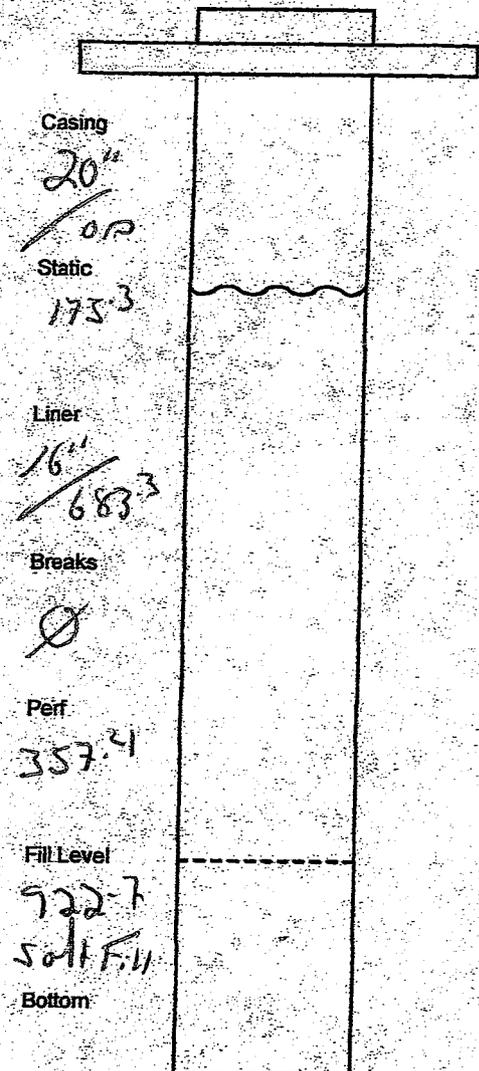
682-8 Bell Reduction
683-3, 16" Reduction

6 Perfs are open

Static up 3.7 since 4-19-10

Recommendations _____

Operator Brian R



Coolidge Engine & Pump, L.L.C.

RECEIVED
JUN 15 2010

ARIZONA WATER COMPANY
PHOENIX - ENGINEERING

ARIZONA WATER COMPANY WELL #10

Coolidge Engine & Pump, L.L.C.

ENGINEERING DATA

BOWL DESIGN

1500 GPM @ 400' TDH

BOWL SELECTION

NATIONAL PUMP MODEL M14HC-3STAGE USED BOWL

ONE STAGE ADDED TO MAKE 4 TOTAL STAGES

IMPELLER DIA. = 11.563"

BOWL DESIGN AND SELECTION ALL BY ARIZONA WATER

NO WARRANTIES ARE EXPRESSED OR IMPLIED

BY

COOLIDGE ENGINE & PUMP, LLC

ON ALL ABOVE DATA

Coolidge Engine & Pump, L.L.C.

ENGINEERING DATA

SHAFT ELONGATION

ASSUMED K-FACTOR = 14 X 400 = 5600#

1 15/16" = .79 X 1 = .079

1 1/2" = .131 X 5 = .655

SHAFT STRETCH = .734

COLUMN STRETCH =

10" = .019 X 6 = (.114)

TOTAL SHAFT ELONGATION = .620

COOLIDGE ENGINE & PUMP LLC

4057 WILSHIRE AVE. — P. O. BOX 957

COOLIDGE, AZ 85228

PHONE: (520) 723-4556 FAX: (520) 723-4556

Job # 2938 #10 Date May 27, 2010

Customer Name Arizona Water Company

Well Location North Of Coolidge

Make of Pump Peerless - Layne Bowls Head

Headshaft Length 102" Size _____

Oil Tube Special Length 22. Size _____

Size of Column 10"

Type of Pipe & Thread Butt

Oil Tube Size 3" - For First 100' At Top of Well / 2 1/2" For 500' At Bottom Of Well

Shaft Size 1 15/16" For First 100" At Top of Well / 1 1/2" For 500' At Bottom Of Well

Make of Bowles Pulled National Size _____

Stages 4 Take off Pipe Size 10" Thread _____

Oil Tube Size 3" Stick Up 10

Shaft Size 1 15/16 Stick Up 20

Suction Size 10" Length _____ Thread _____

Screen No

Make of Bowles Installed National M14HC Size _____

Stages 4 Take Off Pipe Size _____ Thread _____

Oil Tube Size 3" Stick Up 10

Shaft Size 1 15/16 Stick Up 20

Suction Size 10" Length _____ Thread _____

Screen No

Pump Setting To Bowles 600 Well Size 20" To 683' / 16" To 922'

Well Depth _____ Sand Level _____

Water Level _____ Pumping Level _____

Electric Power Make U, S, Serial No. _____

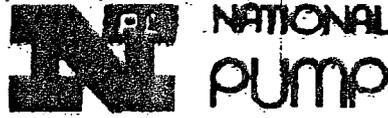
Horse Power 200 R. P. M. _____

Natural Gas Power Make _____ Model _____

Gearhead Make _____ Horse Power _____ Ratio _____

REMARKS:

PERFORMANCE BASED ON
PUMPING CLEAR, FRESH
NON-AERATED WATER AT
85 DEGREES F TEMPERATURE.



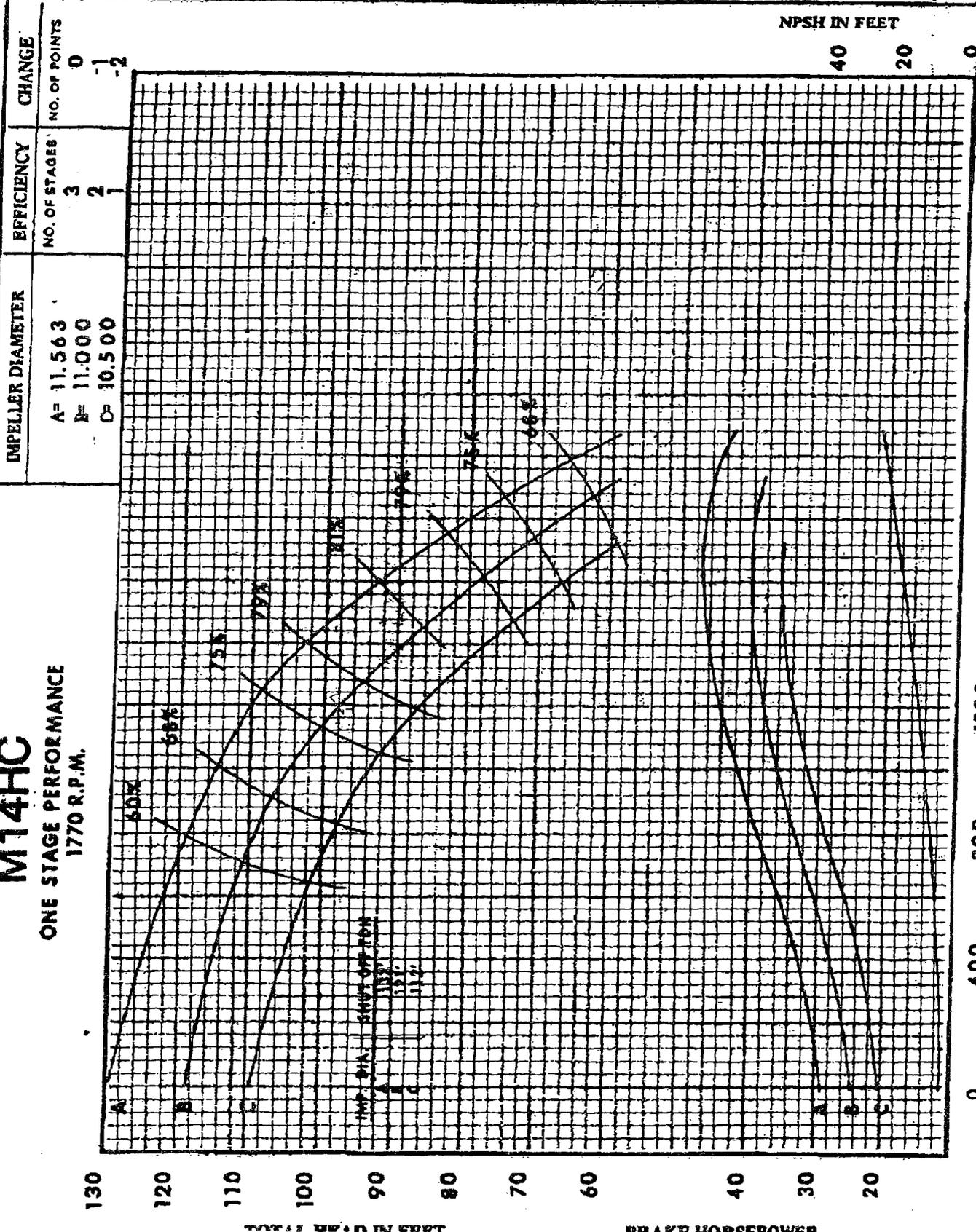
GLENDALE, ARIZONA

SECTION - C
PAGE - 18

M14HC

1770 R.P.M.
MAY 1981
Supercedes
Dec. 1977

M14HC
ONE STAGE PERFORMANCE
1770 R.P.M.



U.S. GALLONS PER MINUTE

IMPELLER DIAMETER	EFFICIENCY	CHANGE
A= 11.563	NO. OF STAGES	NO. OF POINTS
B= 11.000	3	0
C= 10.500	2	-1
	1	-2

M14HC



GLENDALE, ARIZONA

SINGLE STAGE WEIGHT:

416 lbs.

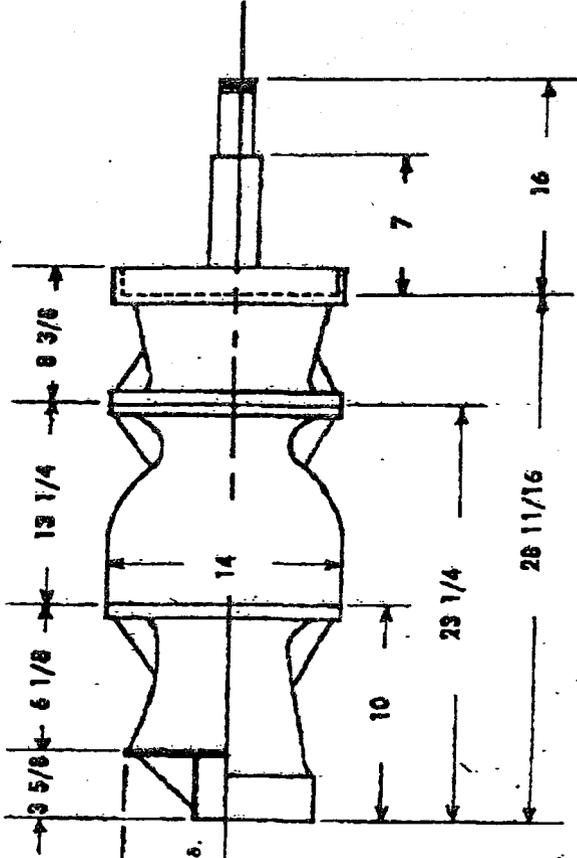
THREADED

14 lbs. 14 1/4 Dia.

FLANGED

170 lbs.

ADD'L STAGE WEIGHT:



IMPELLER DATA

IMPELLER NO. 10363 TYPE ENCLOSED. STANDARD MATERIAL BRONZE FULL DIAMETER 11.563
EYE AREA 25.32 sq. in NO. VANES 7 THRUST CONSTANT 12.5 WEIGHT 30 lbs.

BOWL DATA

BOWL NO. WITH BRZ. BRG. 0603 BOWL NO. WITH RUBBER BRG. 0605 TYPE BOLTED
LATERAL 1 1/8 SHAFT DIA. 1 15/16 MAX. NO. OF STAGES 12 SUCTION INLET 10" THRD.
COLUMN PIPE: 10" - 12" THREADED
FLANGED COLUMN - CONSULT FACTORY.

WA1-4754

ARIZONA WATER COMPANY
WORK AUTHORIZATION

SCANNED

W.A. NUMBER:
P.E. NUMBER:
BUDGET ITEM NO.:
SHEET NO.:

1-4754
CL
Special #14
1 of 2

SYSTEM: COOLIDGE	WORK TO START BY: UPON AUTHORIZATION
DIVISION: COOLIDGE	WORK TO BE FINISHED BY: WITHIN 60 DAYS
TAX CODE: 2100	

DESCRIPTION OF WORK:

Pull and replace Coolidge Airport Well #2. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

Motor/wire MEGS bad down in the well. This is one of two wells that supplies the Coolidge Airport System, this well needs to be replaced for redundancy.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	<i>Mike Loggins</i>	8/16/10
LABOR	1,420	REVIEWED FOR ESMT/ROW VERIFICATION:	
CONTRACT PORTION	15,791	<i>Charles Briggs</i> CB 08-25-2010	08-20-2010
OVERHEAD	4,131	REVIEWED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 21,342	<i>James Wilson</i> JW 9/25/10	8/20/10
FUNDS RECEIVED:		APPROVED BY ENGINEERING:	
CONTRIBUTIONS RECEIVED	0	<i>Fredrick Schneider</i> FS 8-25-10	8-16-10
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE:	
TOTAL CONTRIBUTIONS/ADVANCES	0	<i>Joseph Harris</i>	8/19/10
NET CASH REQUIRED	\$ 21,342	SPECIAL ITEM EXCEEDING \$10,000; AUTHORIZED BY PRESIDENT:	
		<i>William M Garfield</i>	8-23-2010
		SPECIAL ITEM EXCEEDING \$10,000; AUTHORIZED BY CHAIRMAN:	
		APPROVED VIA FAX	8-24-2010
		<i>M. L. Whitehead</i>	

COMMENTS:

FILE COPY

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by **FRED SCHNEIDER**
Date 8/25/10

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-4754
 P.E. NUMBER: CL
 BUDGET ITEM NO.: Special #14
 SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:
 Pull and replace Coolidge Airport Well #2.

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Pull and install submersible pump and motor	325	1	\$ 4,276.00	\$ 4,276
	Grundfos 300S500 13 stage pump w/50Hp	325	1	6,383.00	6,383
	Buckles, Bandits and Tape	325	1	80.00	80
	MEG existing #4 wire and pressure test 1/4" stainless steel	325	1	225.00	225
	1" couplings	325	20	0.33	7
	#4 submersible cable	325	450	4.41	1,985
	5" wheel check valve	325	3	670.00	2,010
	Contracting Tax	325	1	763.00	763
	Bonds	325	1	62.35	62
SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345				
SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345				
SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				

TOTAL CONTRACT WORK \$ 15,791

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			

TOTAL MATERIALS \$ -

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE	325	1	\$ 100.00	100
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	24	55.00	1,320
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345				

TOTAL LABOR \$ 1,420

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 17,211

OVERHEAD 4,131

TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 21,342

afh

ARIZONA WATER COMPANY

COOLIDGE AIRPORT WELL # 2 EQUIPMENT SPECIFICATIONS

Existing Well Information

Location: South Well at Coolidge Airport
Contact: (520) 723-5346
Casing: 16" I.D. cased 0 ft. to 526 ft.
Drilled by: 1942

Design Conditions

300 GPM @ 506 TDH
Pump setting 400 ft.
Static Water Level 291 ft.
Dynamic Water Level 310 ft.
Column Pipe 5"
System Pressure 70 psi

Equipment to be Furnished and Installed by Pump Company

- One Grundfos Pump 300S500-13 stage with 50 HP 460V 3 Phase 6" motor assembly or alternate with Arizona Water Company Engineering approval
- Twenty 1" couplings
- All miscellaneous bandits, buckles, tape, etc.
- All material subject to Arizona Water Company Standard Specification OE-11-22 (enclosed) except as noted

Bowl Assembly Construction Materials

Notes:

1. No invoice will be accepted for payment unless accompanied by a "complete" installed pump equipment data sheet
2. Alternate bowl assemblies will be considered subject to final approval by Arizona Water Company's Engineering department
3. Alternate motor assemblies will be considered subject to final approval by Arizona Water Company's Engineering department

ARIZONA WATER COMPANY COST ESTIMATE WORKSHEET

DATE PREPARED:

PRELIMINARY
ACTUAL

PREPARED BY: James Wilson

SYSTEM:

SHEET OF

PROJECT LOCATION:

DRAWING NO.

PROJECT DESCRIPTION:

Preliminary cost estimate to drill and equip a replacment well. Well drilling and equipment pricing taken directly from recently drilled wells in Coolidge (Wells 11 & 13)

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL	
C O N T R A C T W O R K	Purchase Property (1 acre)	314	1	\$ 70,000.00	\$ 70,000	
	Drill 2000' deep well and install 18" louverd casing	314	1	679,433.00	679,433	
	3-phase power to site	325	1	25,000.00	25,000	
	Install SES and MCC with SCADA controls and programing	325	1	126,680.00	126,680	
	Site grading, drainage, dry well and catch basin	314	1	55,000.00	55,000	
	Onsite underground piping and discharge header	343	1	45,000.00	45,000	
	Construct 8' block wall with rolling gate	314	1	45,000.00	45,000	
	Install pump, motor, colum pipe and discharge head	325	1	93,872.00	93,872	
	Contracting Tax (4.5%)			1	51,299.33	51,299
	Performance and Payment Bond (2%)			1	22,799.70	22,800
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				
TOTAL CONTRACT WORK					\$ 1,214,084	
M A T E R I A L S	Cla-Valve	325	2	\$ 4,500.00	\$ 9,000	
	8" Meter	325	1	5,057.00	5,057	
	Miscelaneous Materials	325	1	15,000.00	15,000	
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345				
	TAXABLE METERS	346				
	METERS	346				
TOTAL MATERIALS					\$ 29,057	
L A B O R						
	TESTING FEE	343	1	\$ 5,000.00	5,000	
	PERMIT FEE	343	1	15,000.00	15,000	
	SURVEY FEE	343	1	4,500.00	4,500	
	FIELD INSPECTION	343	1	5,500.00	5,500	
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345				
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345				
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345					
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345					
TOTAL LABOR					\$ 30,000	
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					\$ 1,273,141	
OVERHEAD					305,554	
TOTAL					\$ 1,578,695	
REFUNDABLE PORTION <input type="checkbox"/>		NON-REFUNDABLE PORTION <input type="checkbox"/>		COST ESTIMATE		



ARIZONA WATER COMPANY

COOLIDGE DIVISION
448 W. CENTRAL AVENUE
COOLIDGE, AZ 85122 - 520-723-5346

PROPOSAL/CONTRACT

CONTRACTOR: LAYNE CHRISTENSEN COMPANY	SYSTEM: COOLIDGE
ADDRESS: 12030 E. RIGGS ROAD	W.A. No(s): 1-4754
CHANDLER, AZ 85249	BID DUE DATE: August 13, 2010

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

- Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
- Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
- Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
- Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
- Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
- Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statutes ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
- Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
- The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
- Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
- Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 10 calendar days after the Commencement Notice is issued.
- Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
- The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

CONTRACTOR HAS TO BE READY TO START AUGUST 16, 2010.

CONTRACTOR	PROPOSAL/CONTRACT ACCEPTED:
LAYNE CHRISTENSEN COMPANY	ARIZONA WATER COMPANY
By: <i>David A Paszli</i>	By: <i>Fredrick K Schneider</i>
Print Name: DAVID A. PASZLI	Print Name: MIKE LOGGINS <i>Fredrick K Schneider</i>
Title: ACCOUNT MANAGER	Title: VP-ENGINEERING
Date: 8-25-10	Date: 8-25-10



ARIZONA WATER COMPANY

COOLIDGE DIVISION
448 W. CENTRAL AVENUE
COOLIDGE, AZ 85122 - 520-723-5346

PROPOSAL/CONTRACT

CONTRACTOR: <u>LAYNE CHRISTENSEN COMPANY</u>	SYSTEM: COOLIDGE
AZ CONTRACTOR LICENSE NO: _____ CLASSIFICATION: _____	W.A. No(s): 1-4754
ADDRESS: 12030 E. RIGGS ROAD	BID DUE DATE: August 13, 2010
CHANDLER, AZ 85249	BID BOND REQUIRED <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

DESCRIPTION OF PROJECT: **PULL AND REPLACE PUMP AND MOTOR AT COOLIDGE AIRPORT WELL #2**

	UNIT PRICE			TOTAL COST	
	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (per Paragraph 6)					
3. Total Labor to Install Exempt Materials (add the amounts in column 1)				3	
4. Total Exempt Materials (add the amounts in column 2)					4
5-6. NON-EXEMPT MATERIALS					
Labor to pull and install pump and motor	1 ea	\$ 4,276		\$ 4,276	
Grundfos 300 5500-13 pump assembly w/50HP submersible motor	1 ea		6,383		6,383
Stainless Steel, Buckles, Bandits and Tape	Lot		80		80
MEG Wire and pressure test 1/4" SS Airline	Lot	\$225		\$ 225	
1" couplings	20 ea				6.60
#4 Submersible pump cable	450 LF		4.41	5	6
1" Schedule 40 PVC	1 LF		0.50	PRICE	ONLY
1/4" Stainless Steel airline	1 LF		1.33	PRICE	ONLY
Video Well	1 ea	\$593		PRICE	ONLY
Brush and Bail	1 hr	\$208		PRICE	ONLY
5" wafer check valve	1 ea		670	PRICE	ONLY
7. Total Labor to Install Non-Exempt Materials (add the amounts in column 5).....				7	4,501.00
8. Total Non-Exempt Materials (add the amounts in column 6)					8 \$ 6,469.60
9. Subtotal A (add lines 3, 7 and 8)					9 \$ 10,970.60
10. Contracting Tax Base (multiply the amount on line 9 by 0.65)				10	\$ 7,130.89
11. Applicable Contracting Tax Rate				11	10.70%
12. Contracting Tax (multiply the amount on line 10 by line 11)					12 \$763.00
13. Subtotal B (add lines 4, 9 and 12)					13 \$11,733.60
14. 100% Performance and Payment Bonds Cost					14 \$62.35
15. Estimated Total Cost (add lines 13 and 14)					15 \$11,795.95

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, chip seal, and traffic control necessary for the Project.

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.

GRUNDFOS®



Bowl Assembly

Pump shroud size 8"

Length 11.7"

Mfg. Grundfos

Size: SP

No. stages 13

Serial No. L10327H167

Model No. 3005500-13

South well #2 AIRPORT

Impellers @ Bottom 8 9/16"

Impellers @ Top 9 13/16"

Motor stick up 8 7/8"

MOTORE SOMMERSO

INSTALLED BY

8-31-10

LAYNE CHRISTENSEN

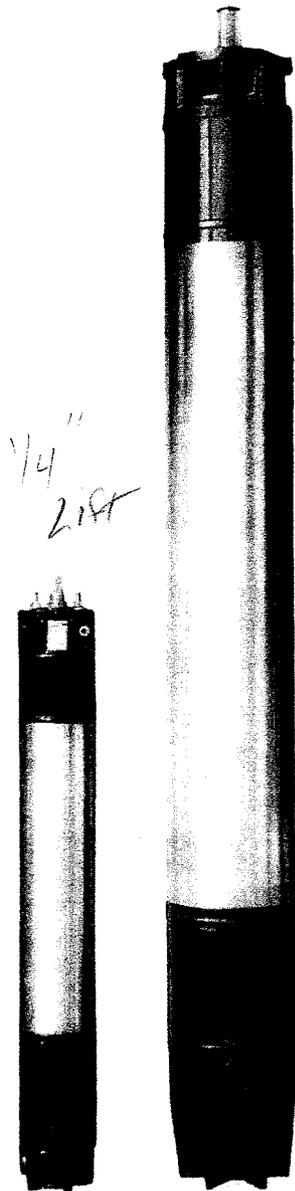
SERIE MMS 6000

MMS 8000

MMS 10000

MMS 12000

ISTRUZIONE PER L'USO



GRUNDFOS

Submersible Motors S.r.l.

Via Bergamo, 2

20060 Gessate (MI) - Italy

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0. FOREWORD, WARRANTIES AND LIMITATIONS

Foreword

The purpose of this instructions manual is to ease as much as possible the installation

We strongly recommend to read it attentively and to consult it whenever work is done on the motor. Unobservance of the instructions here reported or improper use of the motor by unskilled personnel may compromise motor life and proper operation.

GRUNDFOS technical assistance is readily available: for any doubt or possible problem, please contact us also by phone.

The motors are carefully inspected and tested before dispatchment. Check however the equipment at delivery against the accompanying documents. Check box integrity before removing the motor. Parts and accessories can be packed alone or fastened to the box. If something is missing or damaged, please contact immediately Your local forwarding agent.

Warranty and Limitations

The warranty does not include possible damages or failure caused by mishandling, wrong electrical connections and uncorrect assembling.

The warranty also excludes in all cases the issuing of pass certificates and remboursements for the equipment or for consequential damage.

Aturia declines any responsibility for damages to persons and things due to improper use of the machinery here described.

Normal wear parts are not subjected to warranty.

Safety warning

The following symbols will be used on this instruction manual to highlight instructions whose unobservance may imply a potential danger to people and things:



A) DANGER

Warns against the risk of electric shock implied. Risk of electric shock in the unobservance of the relevant instruction.



B) DANGER

Warns against the risk of personal injury or extensive damage implied in the unobservance of the relevant instruction.



C) WARNING

Warns against the risk of damage to the motor and/or the installation implied in the unobservance of the relevant instruction.

Beware: Read thoroughly this instruction manual before installing the motor. The warranty will not apply to any damage caused by unobservance of the instructions here reported. Motor installation. operation and

1. PRODUCT DESCRIPTION

1.1 Motor

Winding: Wire of pure electrolytic copper sheathed with special non-Hydroscopic thermoplastic material of high dielectric strenght characteristics.

Stator: casing in stainless steel

Rotor: Squirrel cage. Rotor is dynamically balanced for smooth and vibration-free operation.

Thrust bearing: Self equalizing and sel-aligning Michell or Kingsbury type assembly, water lubricated.

Shaft bearing: Anti-wear bush bearing in metallized graphite. Water lubrication provides minimum friction and complete compatibility with well water.

Shaft: Stainless steel shaft of oversized design minimized deflection, lengthening service life.

Seal: rubber lip-type shaft seal or mechanical seal.

Diaphragm: equilizing diaphragm compensates for submergence pressure.

Motor: is filled with water.

Cable: rubber single-core or triple-core, depending on the of motor.

1.2 Construction features

Our submersible motors are designed and tested according to IEC 34 Standards. Motor nameplate shows the following operating data:

- Manufacturer
- Motor type
- Part Number
- Production date
- Voltage (V)
- Ampere (A)
- Power (kW)
- Reference standard IEC 34
- Frequency (Hz)
- Rotational velocity (rpm)
- Power factor (cos φ)
- CE marking
- Weight
- Operating condition

1.3 Applications

Submersible motors are coupled to submersible pumps and installed in a vertical position for use in the following applications:

- Industrial and civil applications
- Irrigation systems
- Water supply systems
- Mining
- Offshore
- Nuclear and steam power stations
- Fire-fighting equipments

GRUNDFOS 

MMS8000 PROD. No. 96430676 0307

110 KW SF. 1,0 50 HZ			
3 ~ VOLT	380	400	415
MAX.AMPS	230	224	222
COS Ø /PF	0,890	0,870	0,840
RPM	2870	2890	2900

110 KW SF. 1,15 60HZ			
3 ~ VOLT	440	460	480
MAX.SF.AMPS	226	220	216
COS Ø /PF	0,900	0,880	0,860
RPM	3470	3480	3490

S1/25 °C 0.6 m/s - 1.6 ft/s IEC 34 N. 2/1
WEIGHT 333 Kg / 734 LB

CE

Made in EU, I



96430676

2. TRANSPORT AND STORAGE

2.1 Transport



Before transportation, please check:

- Motor weight
- Motor overall dimensions
- Suitability of lifting points.

Aturia submersible motors and their accessories (if included) are packed in boxes suited for transportation to avoid any damage on the way. However, we recommend to inspect carefully the motor at delivery.

The motor should be handled with equipment suited to its weight and to the shape of its crate (see Figure 1) to avoid possible damages due to mishandling. Lifting by hand is allowed only for weights lower than 20 kilograms. For higher weights, we suggest to lift the motor as shown in Figures 2 and 3.

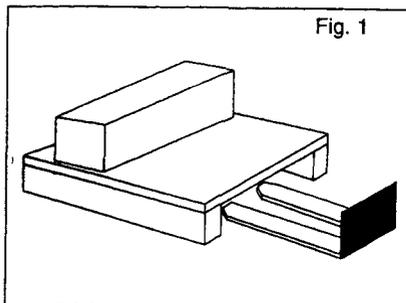


Fig. 1

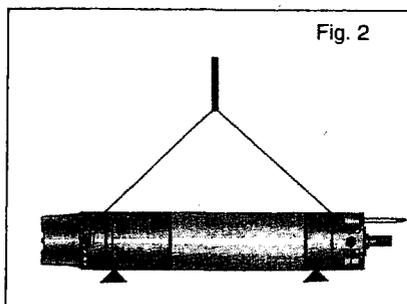


Fig. 2

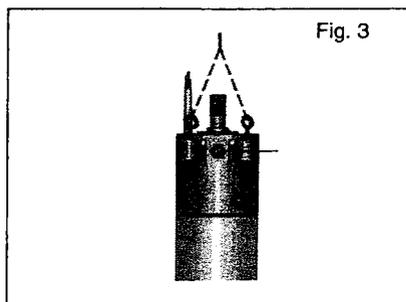


Fig. 3

2.2 Storage



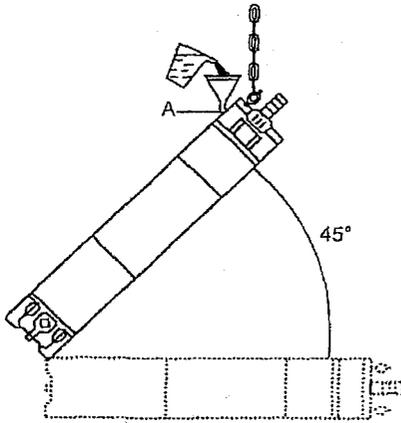
During storage, please observe the following precautions:

- Store the motor in a closed, dry and airy environment.
- All motors are filled with a water-antifreeze mixture to prevent internal freezing below -10°C .
- Motors should not be stored or installed with lower temperatures or for periods longer than 12 months; however, if this is unavoidable turn the shaft by hand once a month.
- Motors stored for more than 12 months must be checked by an authorized shop before installation.
- Protect cable ends against humidity.
- To avoid any damage to the electric cables, never bend them with a curving radius lower than 6 times their diameter.
- Protect against direct sunlight the electric cables and, in case the motor will be stored partially dismantled, the rubber parts and the thrust bearings.

3. GENERAL SAFETY INSTRUCTIONS

3.1 General Instructions

- Make sure that voltage and frequency reported on motor nameplate correspond to mains voltage and frequency.
- Electrical connections should be made only by specialized personnel strictly following accident prevention rules, the electric patterns shown on this manual and the control panel electric patterns. Grounding cables (green and yellow cables) must be connected to the plant grounding circuit. Make sure the control panel conforms to current standards and has a protection degree suited to the installation site.
- The motor should be used only for the applications and within the limits specified in point 1.3. In case of applications not specified in this instruction manual, please contact Grundfos to check for motor suitability.
- Before working on the motor, make sure the electric components of the concerned installation are disconnected from the electric mains.



4. INSTALLATION

4.1 Motor filling

Before proceeding with motor installation, it is necessary to fill up the motor as prescribed on the sticker applied to the stator.

The motor is delivered filled up with a special mixture assuring bearings lubrication and cooling.

How to fill the motor with liquid:

Before you install the motor, fill the motor with liquid. Follow this procedure:

- Place the motor at a 45° angle with the top of the motor upwards.
- Unscrew the plug A and place a funnel in the hole.
- Pour tap water into the motor until the motor liquid inside the motor begins to flow out the motor at A.
- Remove the funnel and refit the plug A.

Attention:

Before you fit the motor to a pump after a long period of storage, lubricate the shaft seal by adding a few drops of water and turning the shaft.

Note: Motor liquid contains glycerol.

For proper motor operation, never neglect to perform motor filling.

4.2 Insulation checking

Check motor insulation before coupling the motor to the pump. Join one megohmmeter end to motor case and the other end to the cables coming out of the motor. The megohmmeter reading should not be lower than 30 megahoms.

4.3 Electrical connection

Electrical connection must be performed by specialized personnel only, strictly following the instructions of motor and electrical equipment manufacturers.

If the motor is supplied without cable, the cable must be selected following the prescriptions of Grundfos Technical Service.

For supply cable selection it is necessary to consider the following factors:

- Mains voltage
- Allowable voltage drop along the line
- Motor BHP
- Cable max. output (Ampere)
- Ambient temperature

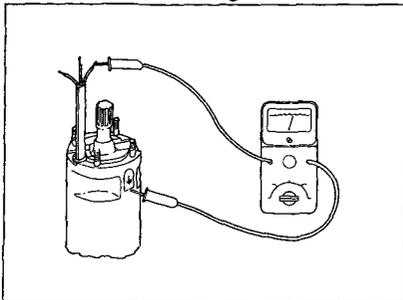
Motor cable connection should be performed with extreme care. If two cables have to be connected in parallel, pay extreme attention to join together cables of the same colours or showing the same symbols.

We suggest to leave 2 or 3 meters of cable more in case terminal connections should be changed.

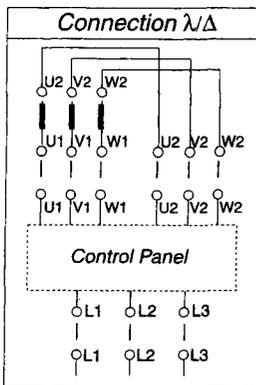
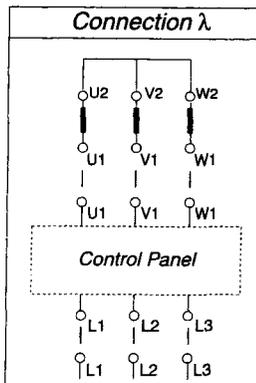
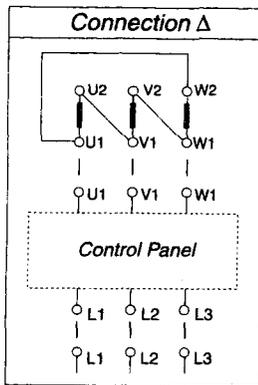
4.4 Electrical equipment

The motor is connected by the supply cable to the control panel, which contains the necessary control and protection devices.

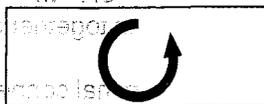
4.2 Insulation checking



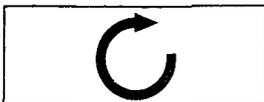
4.3 Electrical connection



4.6 Rotation direction



Direction of rotation facing delivery side: CW



Direction of rotation facing delivery side: CCW

4.5 Electrical protections



The following protections are always necessary:

- Overload protection
- Short-circuit protection
- Phase drop
- Voltage drop

These protections must trip on all three-phases. We suggest besides to install protections against

- Overload protection
- Start the motor and keep it working for half an hour in normal operating conditions.
- Slowly lower thermal setting until tripping the protection.
- Raise tripping value by 5%

For Star/Delta starters with stator impedences and with autotransformers, we suggest a protection operating period lower than 5 - 7 sec.

4.6 Rotation direction

Check motor rotation direction before coupling the motor to the pump, so to avoid any damage to motor thrust bearing. Find and mark by means of a cyclic phase indicator, whose pointer is turning counterclockwise mains terminals L1, L2 and L3 and connect them to control panel terminals L1, L2 and L3.

Star/delta starting

Motor cables are marked with letters U1-V1-W1 e U2-V2-W2. They have to be connected to control panel terminals, respectively: U1-V1-W1 and U2-V2-W2 for counterclockwise rotation (seen from motor/pump coupling).

In case of clockwise rotation, reverse terminals U1-V1 and U2- W2.

DOL, stator and autotransformer starting

Motor cables are marked with letters U1, V1, W1 and have to be connected to control panel terminals, respectively: U1, V1, W1 for clockwise rotation (seen from motor/pump coupling). For clockwise rotation, reverse two of the cables.

4.7 Further instructions for six-cables motors terminals connection

Six cables motors can be started with a Star/Delta starter only if main voltage is at least equivalent to the motor minimum rated voltage.

To obtain the correct rotation direction, find main terminals L1, L2 and L3 as previously described.

4.8 Operation



The max. number of startups/hour depends from starter type and motor power.

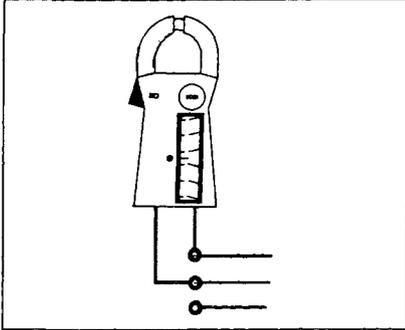
Up to 75 kW:	10 startups/h
From 75kW to 150kW:	8 startups/h
Over 150 kW:	5 startups/h

All motors can bear a supply voltage deviation of +/- 5% and a frequency

5. MOTOR CHECKING AND FAULT FINDING

In case of motor checking or malfunctioning during motor operation, operate as follows:

5.1 Supply voltage



5.1 Supply voltage

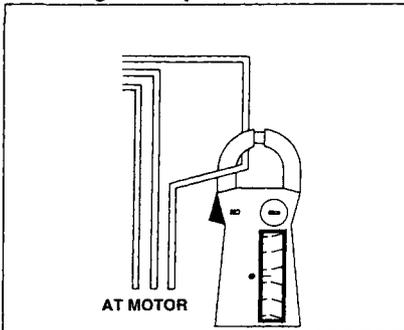
Operation:
Check voltage between the phases with a voltmeter

Checking

Running motor voltage has to be reported at point 4.8.

Higher variations might damage motor windings: in this case, stop the motor and check supply voltage.

5.2 Voltage absorption



5.2 Voltage absorption

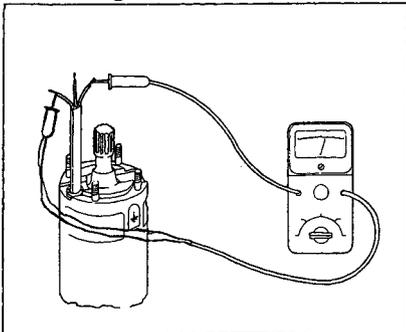
Operation
Measure voltage on each phase.
Max. voltage value is reported on motor nameplate

Checking

Voltage difference between the phases should not exceed 5%. Excessive BHP can take place in the following cases:

- Weakening connections in the joinings (see 5.3)
- Supply voltage too low or too high (see 5.1)
- Short-circuiting motor windings (see 5.3 and 5.4)
- Damaged pump overloading the motor
- Resistance value between the phases are too different (see 5.3 and 5.4)
- Asymmetrical supply voltage

5.3 Windings resistance



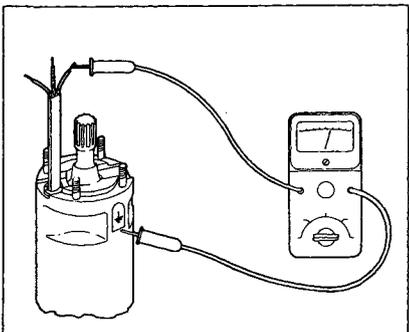
5.3 Windings resistance

Operation
Disconnect output cable from control panel
Measure resistance to leads.

Checking

The difference between resistance values should not exceed 5%. For higher differences, check separately motor and cable and replace defective parts.

5.4 Insulation resistance



5.4 Insulation resistance

Operation
Disconnect output cable correct from control panel.
Measure insulation between each phase and ground

Checking

Make sure grounding connection is and in good conditions. Insulation with cold motor should be at least 30 megahoms or higher. If this is not the case, check separately motor and cable and replace defective parts.

6. MAINTENANCE AND REPAIRATION

6.1 Disassembling the motor

Thanks to its construction features, the motor can be disassembled and reassembled quite easily by using standard shop metric tools. Motor disassembling, reassembling and repairation must be carried out by qualified personnel only or by an authorized shop.

6.2 Reassembling the motor

Once reassembled, the motor cannot operate without being completely filled up as explained in point 4.1.
Before starting, test the motor as explained in 5.3 and 5.4.

6.3 Testing

In case of motor windings replacement, perform the following operation before coupling the motor to the pump.

- Check motor ground insulation by joining one megahometer end to motor case and the other end to the cables coming out of the motor. The megahometer reading should not be lower than 30 megahoms.
- Connect motor to the mains through motor control panel and give a voltage pulse at voltage rated value. Check phase absorption for each phase: the values should be even, with a max. allowable difference of +/- 5%. Detected voltage value should be between 30% and 40% of In.
- Dielectric strenght test
Place the motor on an insulating support and apply with a suited equipment a $1000V + 2Vn$ voltage for 30 seconds. Once performed the voltage test, check insulation to the ground as explained in 5.4.

7. SPARE PARTS

7.1 Spare parts ordering

For a faster processing of Your order, when ordering spare parts please specify:

- Motor type.
- Motor serial number
- Part name and number as listed on sectional drawings.

The first two informations are easily found on motor nameplate.

8. DECOMMISSIONING AND DISMANTLEMENT

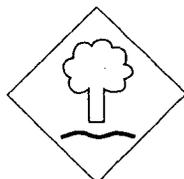
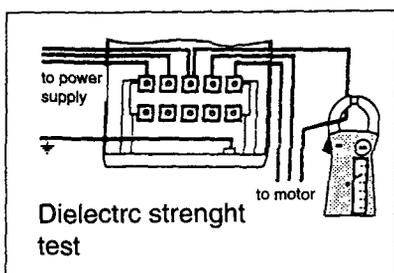
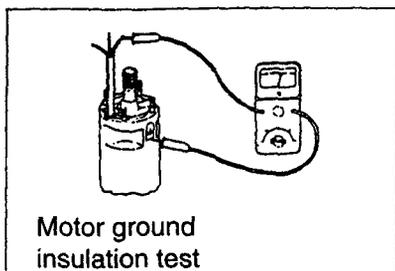
8.1 Dismantlement

When the motor will be permanently stopped and dismantled, the various construction materials should be properly disposed of. It is important to make sure that no residual polluting liquids are trapped within the motor..

The materials used for motor construction are:

- Steel and cast iron
- Aluminium.
- Rubber and plastic.
- Copper

The disposal of polluting liquids and materials should follow current environmental



DIMENSIONS AND WEIGHTS

MODEL NO.	FIG.	HP	MOTOR SIZE	DISCH. SIZE	DIMENSIONS IN INCHES					APPROX. SHIP WT.
					A	B	C	D	E	
300S30-1B	A	3	4"	3" NPT	38.1	23.6	14.5	3.8	5.7	65
300S50-1	A	5	4"	3" NPT	44.1	29.6	14.5	3.8	5.7	82
300S50-2BB	A	5	4"	3" NPT	49.1	29.6	19.5	3.8	5.7	87
300S75-2	A	7 1/2	4"	3" NPT	43.5	24.0	19.5	3.8	5.7	113
300S75-2*	A	7 1/2	6"	3" NPT	49.1	29.6	19.5	5.4	5.7	104
300S100-3A	A	10	4"	3" NPT	67.8	43.9	23.9	3.8	5.7	154
300S100-3A	A	10	6"	3" NPT	49.3	25.4	23.9	5.4	5.7	130
300S150-3	A	15	6"	3" NPT	51.9	28.0	23.9	5.4	5.7	146
300S150-4AA	A	15	6"	3" NPT	56.4	28.0	28.4	5.4	5.7	161
300S150-4	A	15	6"	3" NPT	56.4	28.0	28.4	5.4	5.7	161
300S200-5AA	A	20	6"	3" NPT	63.4	30.6	32.8	5.4	5.7	172
300S200-5	A	20	6"	3" NPT	63.4	30.6	32.8	5.4	5.7	172
300S200-6B	A	20	6"	3" NPT	67.9	30.6	37.3	5.4	5.7	177
300S250-6	A	25	6"	3" NPT	70.4	33.1	37.3	5.4	5.7	192
300S250-7AA	A	25	6"	3" NPT	74.8	33.1	41.7	5.4	5.7	201
300S300-7	A	30	6"	4" NPT	74.8	33.1	41.7	5.4	5.7	220
300S300-8	A	30	6"	4" NPT	81.9	35.7	46.2	5.4	5.7	241
300S300-9B	A	30	6"	4" NPT	81.9	35.7	46.2	5.4	5.7	246
300S400-9*	A	40	6"	4" NPT	91.4	40.8	50.6	5.4	5.7	281
300S400-10*	A	40	6"	4" NPT	95.9	40.8	55.1	5.4	5.7	286
300S500-11*	A	50	6"	4" NPT	117.3	57.8	59.5	5.4	5.7	292
300S500-12*	A	50	6"	4" NPT	116.8	57.8	63.9	5.4	5.7	396
300S500-13*	A	50	6"	4" NPT	126.2	57.8	68.4	5.4	5.7	402
300S600-14*	A	60	6"	4" NPT	135.3	61.3	74.0	5.4	7.1	447
300S600-15*	A	60	8"	4" NPT	120.3	41.8	78.5	7.5	7.1	484
300S750-16	A	75	8"	4" NPT	130.3	47.4	82.9	7.5	7.1	540
300S750-17	A	75	8"	4" NPT	134.8	47.4	87.4	7.5	7.1	544
300S750-18	A	75	8"	4" NPT	139.2	47.4	91.8	7.5	7.1	626

NOTES: Models 2-15 Stgs. are suitable for use in 6" wells, 16-18 Stgs. are suitable for use in 8" wells.
 Weights include pump end with motor in lbs.
 * Alternate motor sizes available.

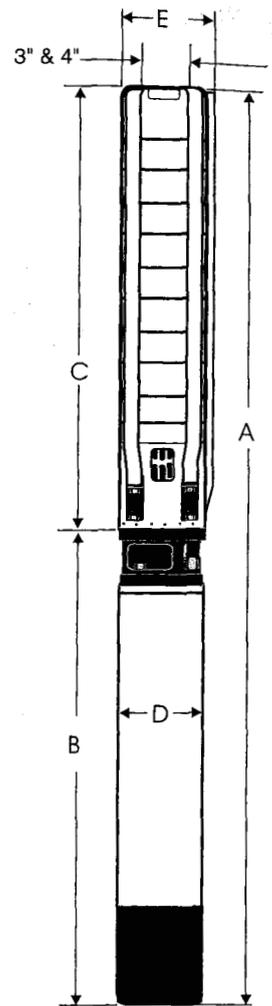
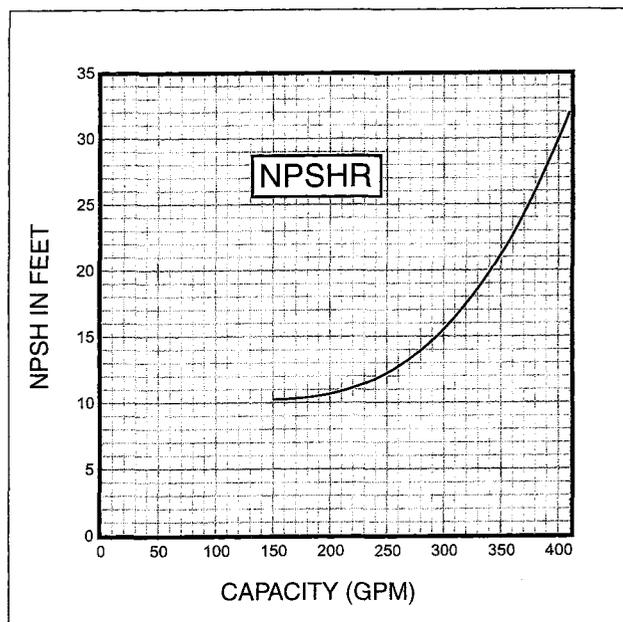


Fig. A

MATERIALS OF CONSTRUCTION

COMPONENT	CYLINDRICAL SHAFT (2-18 Stgs.)
Check Valve Housing	304 Stainless Steel
Check Valve	304 Stainless Steel
Diffuser Chamber	304 Stainless Steel
Split Cone Nut	304 Stainless Steel
Split Cone	304 Stainless Steel
Impeller	304 Stainless Steel
Suction Interconnector	304 Stainless Steel
Inlet Screen	304 Stainless Steel
Straps	304 Stainless Steel
Cable Guard	304 Stainless Steel
Coupling	316/329 Stainless Steel**
Pump Shaft	431 Stainless Steel
Intermediate Bearings	NBR
Impeller Seal Ring	NBR/304 Stainless Steel
Check Valve Seat	NBR/316 Stainless Steel
Top/Lower Bearing	NBR/316 Stainless Steel
8" Motor Adaptor Plate	304 Stainless Steel
Upthrust Washer	Carbon/Graphite HY22
Upthrust stop ring	304 S.S./Tungsten Carbide

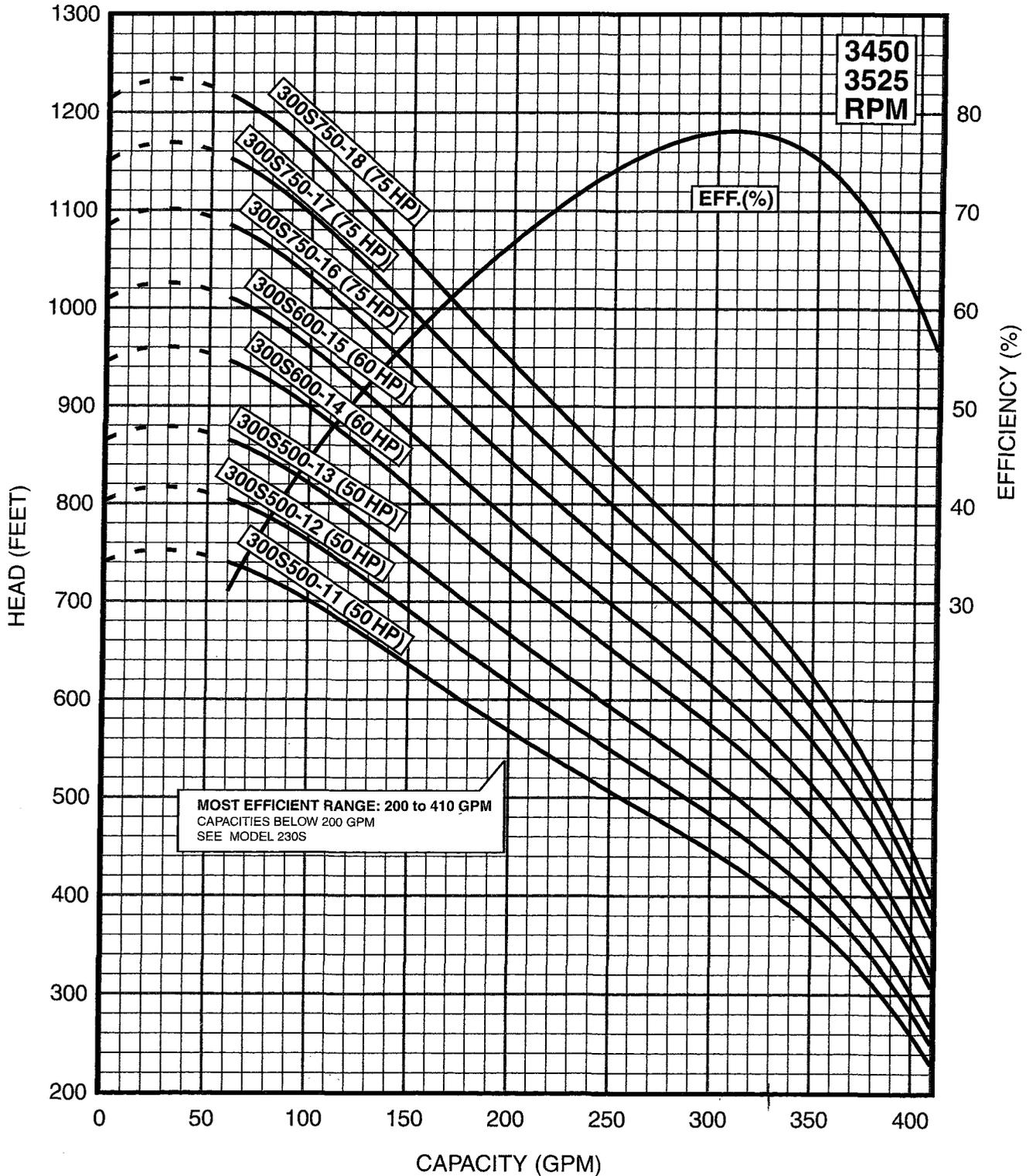
NOTES: Specifications are subject to change without notice.
***Stainless Steel options available.**
**** 4" Coupling made of 316 Stainless Steel.**



FLOW RANGE: 60 -410 GPM

OUTLET SIZE: 3" & 4" NPT*

NOMINAL DIA. 6"



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
 4" MOTOR STANDARD, 7.5 HP/3450 RPM.
 6" MOTOR STANDARD, 15-60 HP/3450 RPM.
 8" MOTOR STANDARD, 75 HP/3525 RPM.
 * 3" NPT 2-6 STAGES, 4" NPT 7-18 STAGES.

Performance conforms to ISO 9906 Annex A
 @ 8 ft. min. submergence.



CONSTRUCTION COMPLETION DATE:

8/31/10

WORK AUTHORIZATION NUMBER:

1-4754

THE FOLLOWING RECORD REQUIREMENTS ARE ATTACHED:

PREPARED BY

N/A

- 1. CONSTRUCTION DRAWINGS WITH "AS BUILT" LOCATION OF PIPE, FITTINGS, ETC. MARKED IN RED
2. VALVE CARDS
3. HYDRANT CARDS WITH COPY OF COVER LETTER
4. MATERIALS INSTALLED OR RETIRED LISTED ON THE REVERSE SIDE OF THE W.A. WITH R.O.S. AND P.D.R. NUMBERS
5. PRESSURE AND LEAKAGE TEST RESULTS:

DATE TESTED
TIME STARTED
TIME FINISHED
PIPE DIAMETER
FOOTAGE TESTED
ALLOWABLE LEAKAGE
LEAKAGE OBSERVED
PRESSURE AT TEST POINT
COMPANY EMPLOYEE OBSERVING TEST (print)
INITIALS OF EMPLOYEE

N/A

6. DISINFECTION SAMPLING:

INITIAL SAMPLING (minimum 50 ppm available chlorine)

DATE
TIME
PPM Cl2

AFTER 24 HOURS DETENTION TIME (minimum 10 ppm free chlorine)

DATE
TIME
PPM Cl2

AFTER SUFFICIENT FLUSHING (water is clear and system Cl2 residual is measured)

DATE
TIME
PPM Cl2

BACTERIOLOGICAL SAMPLE(S)

DATE
TIME

ATTACHED Yes No Yes No Yes No Yes No

7. ACCOUNT NUMBERS FOR 2" AND LARGER METERS AND PRIVATE FIRE SERVICE TAPS:

Table with columns: SIZE, ACCOUNT NUMBER, ASSIGNED BY

Table with columns: SIZE, ACCOUNT NUMBER, ASSIGNED BY

8. CROSS-CONNECTION SURVEY FORM FOR ANY REQUIRED BACKFLOW PREVENTION ASSEMBLY.

I certify that construction on the above Work Authorization was completed as of the date shown above and for which all materials have been accounted. I further certify that I have inspected the work done and have found it to be satisfactory and in accordance with Company specifications.

Handwritten signature of Division Manager of Operations Superintendent

Division Manager of Operations Superintendent (signature)

9/2/10

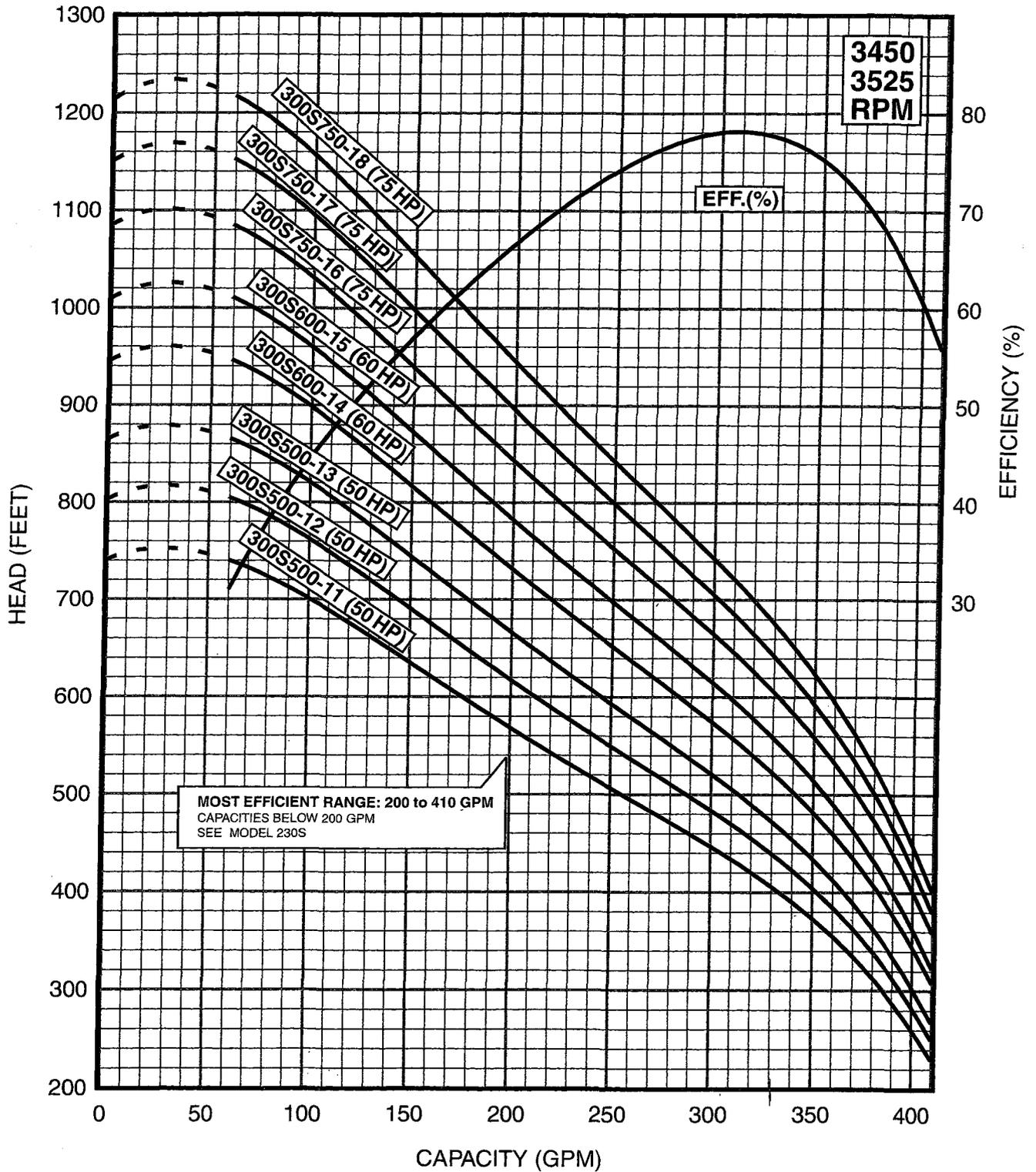
Date of Notice

ATTACH TO CONSTRUCTION & ENGINEERING FILE COPY OF WORK AUTHORIZATION

FLOW RANGE: 60 -410 GPM

OUTLET SIZE: 3" & 4" NPT*

NOMINAL DIA. 6"



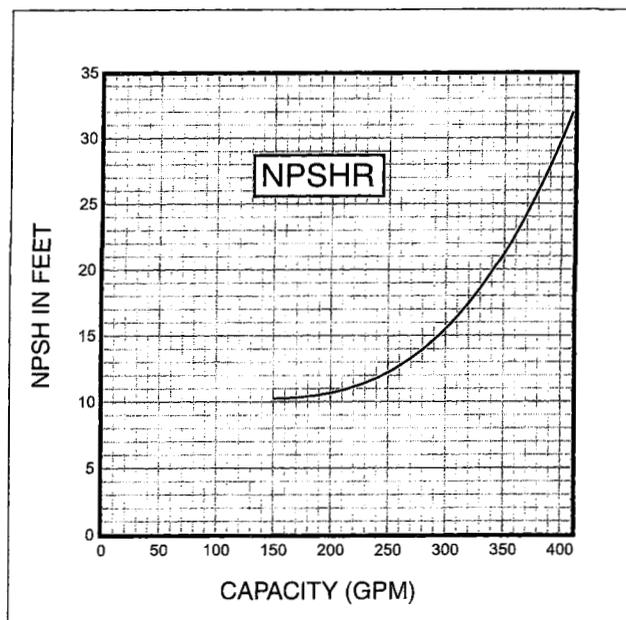
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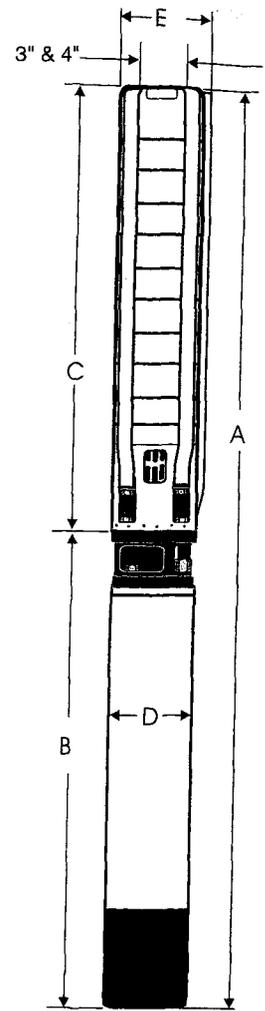


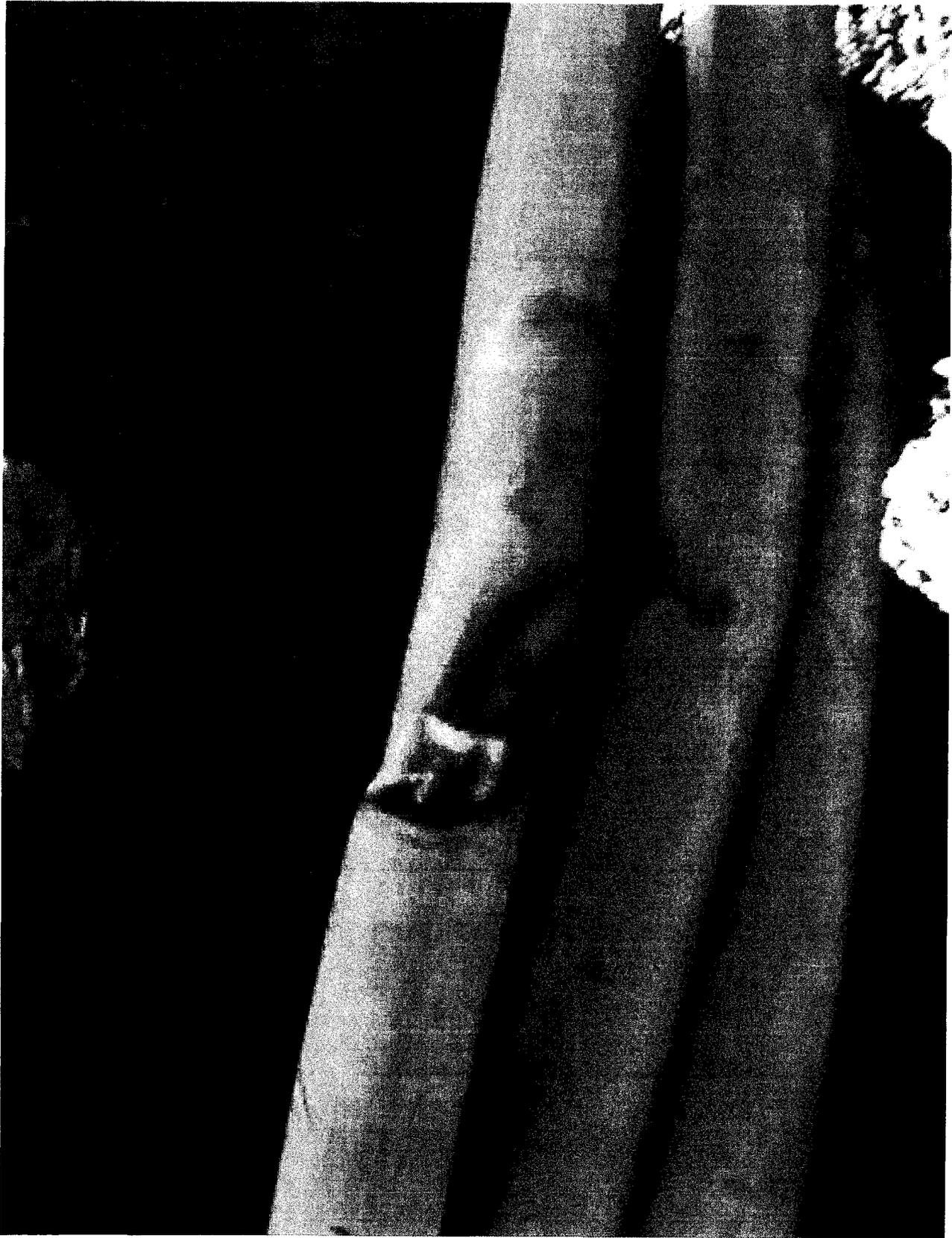
Fig. A















ARIZONA WATER COMPANY

CONSTRUCTION COMPLETION NOTICE

CONSTRUCTION COMPLETION DATE:

8/31/10

WORK AUTHORIZATION NUMBER:

1-4754

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2. VALVE CARDS.....
3. HYDRANT CARDS WITH COPY OF COVER LETTER.....
4. MATERIALS INSTALLED OR RETIRED LISTED ON THE REVERSE SIDE OF THE W.A. WITH R.O.S. AND P.D.R. NUMBERS.....
5. PRESSURE AND LEAKAGE TEST RESULTS:

PREPARED BY

N/A

DATE TESTED

N/A

TIME STARTED

TIME FINISHED

PIPE DIAMETER

FOOTAGE TESTED

ALLOWABLE LEAKAGE

LEAKAGE OBSERVED

PRESSURE AT TEST POINT

COMPANY EMPLOYEE OBSERVING TEST (print)

INITIALS OF EMPLOYEE

6. DISINFECTION SAMPLING:

INITIAL SAMPLING

(minimum 50 ppm available chlorine)

DATE

TIME

PPM Cl₂

AFTER 24 HOURS DETENTION TIME

(minimum 10 ppm free chlorine)

DATE

TIME

PPM Cl₂

AFTER SUFFICIENT FLUSHING

(water is clear and system Cl₂ residual is measured)

DATE

TIME

PPM Cl₂

BACTERIOLOGICAL SAMPLE(S)

DATE

TIME

ATTACHED Yes No Yes No Yes No Yes No

7. ACCOUNT NUMBERS FOR 2" AND LARGER METERS AND PRIVATE FIRE SERVICE TAPS:

SIZE	ACCOUNT NUMBER	ASSIGNED BY

SIZE	ACCOUNT NUMBER	ASSIGNED BY

8. CROSS-CONNECTION SURVEY FORM FOR ANY REQUIRED BACKFLOW PREVENTION ASSEMBLY.

I certify that construction on the above Work Authorization was completed as of the date shown above and for which all materials have been accounted. I further certify that I have inspected the work done and have found it to be satisfactory and in accordance with Company specifications.

[Signature]

Division Manager of Operations Superintendent (signature)

9/2/10

Date of Notice

ATTACH TO CONSTRUCTION & ENGINEERING FILE COPY OF WORK AUTHORIZATION

WA1-4763

ARIZONA WATER COMPANY

WORK AUTHORIZATION

W.A. NUMBER: 1-4763
 P.E. NUMBER:
 BUDGET ITEM NO.: Special 16
 SHEET NO.: 1 of 2

SYSTEM: PINAL VALLEY	WORK TO START BY: UPON AUTHORIZATION
DIVISION: PINAL VALLEY	WORK TO BE FINISHED BY: WITHIN 30 DAYS
TAX CODE: 2100	

DESCRIPTION OF WORK:

Pull and Replace the pump at Well #27. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

Distribution system high pressure and pressure surge spikes have resulted in historic well pump failures. As part of WA 1-4620 a new ground storage tank and booster station have been installed to relieve the well head pressure. The plan was to replace the well pump to match the pressure and flow requirements of the new system configuration at such time as the pump fails. The well production has dropped indicating possible worn impellers. Therefore, the pump is being replaced.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	James Wilson <i>920 10/29/10</i>	9/29/10
LABOR	1,500	REVIEWED FOR ESMT/ROW VERIFICATION:	
CONTRACT PORTION	45,930	Charles Briggs <i>CB 10-05-2010</i>	09-30-2010
OVERHEAD	11,383	REVIEWED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 58,813	Andrew J Haas Andy Haas <i>AJH 10-7-10</i>	9-30-10
FUNDS RECEIVED:		APPROVED BY ENGINEERING:	
CONTRIBUTIONS RECEIVED	0	Fred Schneider <i>10-8-10</i>	9-30-10
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE:	
TOTAL CONTRIBUTIONS/ADVANCES	0	Joseph Harris	9/30/10
NET CASH REQUIRED	\$ 58,813	SPECIAL ITEM EXCEEDING \$10,000; AUTHORIZED BY PRESIDENT:	
		William M Garfield	10-4-2010
		SPECIAL ITEM EXCEEDING \$10,000; AUTHORIZED BY CHAIRMAN:	
		APPROVED VIA FAX	10/05/2010
		M. L. Whitehead	

COMMENTS:

*Final estimate
 Special to be funded from the 2010
 Contingency Budget.
 #6*

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by **FRED SCHNEIDER**
 Date 10/05/10

WORK AUTHORIZATION - DETAIL SHEET

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	325	Goulds 12RAMC 11-stage pump	1	2008 1-4528

PROJECT DESCRIPTION:

Pull and replace the pump at Well #27

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Labor to pull and replace pump	325	1	\$ 7,480.00	\$ 7,480
	Install Simflo SC12C 8-stage pump	325	1	6,450.00	6,450
	Video well	325	2	500.00	1,000
	Misc. buckles, bandits, and straps	325	1	125.00	125
	Brush and bail well	325	24	135.00	3,240
	Install 8" column pipe	325	26	500.00	13,000
	Install 3"x1-11/16 oil tube and shaft	325	20	656.00	13,120
	Install 1/4" SS air line	325	1	863.00	863
	Taxes	325	1	572.00	572
	Performance and payment bond	325	1	80.00	80
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				

TOTAL CONTRACT WORK \$ 45,930

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
SERVICE CONNECTIONS: SINGLE-SHORT	345				
METERS	346				

TOTAL MATERIALS \$ -

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	1	1,500.00	1,500
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345				
INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345				
INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345				

TOTAL LABOR \$ 1,500

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 47,430

OVERHEAD 11,383

TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 58,813

Existing Pump Design

Design Condition: 500 gpm @ 888 ft TDH?
 Existing Pump: Goulds 12 WAMC 11-stages
 Existing Motor: 200 HP 1800 RPM VHS 480V 3-Phase
 8" Column x 3" Oil Tube x 1- $\frac{1}{16}$ " shaft 682 LF

Problems with Existing Pump Design

Pump designed for 150 psi system pressure
 15 minute flush to atmosphere draws water level down to bowls Off pump curve to right at ~~1200-1300 gpm~~
 When pump is turned into system, hammer from increased pressure causes bowls to drag
 Lineshaft is undersized original pump $K=2.4$ lbs/ft, existing pump $K=7.0$ lbs/ft
 Excessive stretch, extra lateral required
 Ductile iron bowl requirement

New Pump Design

Pump through ATP into 15 Kgal storage tank + use booster pump into 150 psi system pressure
 Find pump curve with lower flow on pump to waste
 Find pump curve with lower K value, lower maximum TDH, and more ^{available} lateral

Static Water Level = 200-300 ft Volatile
 Dynamic Water Level = 500-657 ft for 450-500 gpm Volatile
 Assume 575 ft @ 450 gpm

Column Pipe Friction Loss for 682 LF of 8" Column x 3" Oil Tube x 1- $\frac{1}{16}$ " shaft
 @ 450 gpm Headloss = 1.0 ft / 100 ft of column pipe

$$\frac{1.0 \text{ ft}}{100 \text{ ft pipe}} (682 \text{ ft pipe}) = 6.82 \text{ ft say } 7 \text{ ft}$$

Losses through ATP assume 10 psi = 23.1 ft say 25 ft
 Assume 17-18 ft tank is 8 ft full about half full
 TDH = 575 ft + 7 ft + 25 ft + 8 ft = 615 ft TDH

Design Condition: 450 gpm @ 615 ft TDH

Bowl Assembly

Choose Simflo SC12C 8-stage 9.325" Full trim impeller

Design point on curve 450gpm @ 603ft

Cast Iron Maximum Bowl Working Pressure for Simflo SC12C = 254 psi

$$254 \text{ psi} \frac{2.31 \text{ ft}}{1 \text{ psi}} = 586.74 \text{ ft}$$

Design TDH = 603ft

Design Curve w/ 9.325" impeller: Shutoff head = 740ft

$$\frac{740 \text{ ft}}{8 \text{ stages}} = 92.5 \text{ ft/stage}$$

8-stages

$$\frac{740 \text{ ft} - 586.74 \text{ ft}}{92.5 \text{ ft/stage}} = 1.66 \text{ stages}$$

Bowl Lateral Requirement

Impeller Thrust = $T_{imp} = K \times H_L \times SG$ 8" Column x 3" Tube x 1-1/16" Shaft
 $T_{imp} = (6.5 \text{ lb/ft}) (740 \text{ ft}) (1.0) = 4810 \text{ lbs} = P$

Lineshaft Elongation

$$e = \frac{PL}{EA} = \frac{(4810 \text{ lbs}) (682 \text{ ft}) (12 \text{ in/ft})}{(28.5 \times 10^6 \text{ psi}) \frac{\pi (1 \frac{1}{16} \text{ in})^4}{4}} = 0.6176 \text{ in}$$

Column and Tube Elongation

Column Load = $TDH \times SG \times (KW - K)$

Specific Gravity $SG = 1.0$

for 8" column pipe $KW = 16.71$

Column Load = $(740 \text{ ft}) (1.0) (16.71 - 6.5 \text{ lb/ft}) = 7555.4 \text{ lbs}$

from Goulds table 200.B.05

linear interpolation

$$e = 0.033 \text{ in} + \frac{(7555.4 \text{ lbs} - 7500 \text{ lbs}) (0.035 \text{ in} - 0.033 \text{ in}) (682 \text{ ft})}{(8000 \text{ lbs} - 7500 \text{ lbs}) (100 \text{ ft})} = 0.2266 \text{ in}$$

Stretch = $0.6176 \text{ in} - 0.2266 \text{ in} = 0.3910 \text{ in}$

$$\text{Stretch} = \frac{HL}{29} \left[KC_1 - C_2 + C_3 \left(1 - \frac{1}{2} \frac{L}{H} \right) \right]$$

$H = TDH \text{ in ft}/1000 = 740/1000 = 0.74$

$L = \text{Column Length in ft}/1000 = 682/1000 = 0.682$

$K = \text{Thrust Factor} = 6.5 \text{ lbs/ft}$

For 8" Column x 3" Tube x 1-1/16" Shaft

$C_1 = 6.62510$

$C_2 = 24.40462$

$C_3 = 16.07294$

$$\text{Stretch} = \frac{(0.74)(0.682)}{29} \left[6.5(6.62510) - 24.40462 + (16.07294) \left(1 - \frac{1}{2} \frac{0.682}{0.74} \right) \right] = 0.4755 \text{ in}$$

Required Lateral = Stretch + Impeller Clearance + Assembly Loss

$$\text{Required Lateral} = 0.4755 \text{ in} + 0.125 \text{ in} + 0.125 \text{ in} = 0.7255 \text{ in}$$

Use 0.75 in Minimum Required La

Max. Available Lateral = 0.812 in OK

Motor Bearing Load

Motor Bearing Load = Impeller Thrust + Dead Weight

$$\text{Motor Bearing Load} = (K)(H_L)(SG) + (\text{Shaft Weight per ft.})(\text{Setting}) + (\text{Impeller Weight})(\# \text{ of Impellers})$$

$$\text{Motor Bearing Load} = (6.5 \text{ lbs/ft})(740 \text{ ft})(1.0) + (7.6 \text{ lbs/ft})(682 \text{ ft}) + (13.8 \text{ lbs})(8 \text{ stages}) = 10,103.6 \text{ lbs @ Shut Off}$$

$$\text{Motor Bearing Load} = (6.5 \text{ lbs/ft})(603 \text{ ft})(1.0) + (7.6 \text{ lbs/ft})(682 \text{ ft}) + (13.8 \text{ lbs})(8 \text{ stages}) = 9,213.1 \text{ lbs @ Design Condition}$$

Motor Sizing

Maximum HP on design pump curve = 92.8 HP

$$\text{HP at operating point} \Rightarrow \text{HP} = \frac{(\text{GPM})(\text{TQH})}{(3960)(\text{Pump Eff.})} = \frac{(450 \text{ gpm})(603 \text{ ft})}{(3960)(0.843)} = 81.3 \text{ HP}$$

1-1/16" Lineshaft Mechanical Friction Loss HP/100ft = 1.40

$$\text{HP} = 1.40 \text{ HP} \frac{682 \text{ ft}}{100 \text{ ft}} = 9.548 \text{ HP}$$

Thrust Bearing Friction Loss in HP

$$\text{HP} = \frac{\text{Total Thrust} \times \text{RPM} \times 0.0075}{100,000} = \frac{(10,103.6 \text{ lbs})(1800 \text{ rpm})(0.0075)}{100,000} = 1.36 \text{ HP}$$

$$\text{Maximum Required HP} = 92.8 + 9.548 + 1.36 = 103.7 \text{ HP}$$

Select 100HP VHS motor
Premium Efficiency

Motor Bearing Sizing

US Motor 100HP VHS WP1 Premium Efficiency motor normal bearing down thrust capacity = 6700 lbs

$$\text{Extra High Thrust (175\%)} \text{ bearing capacity} = (175\%)(6700 \text{ lbs}) = 11,725 \text{ lbs}$$

$$\text{Maximum bearing load} = 10,103.6 \text{ lbs} < 11,725 \text{ lbs}$$

Use Extra High Thrust (175%) Bearings



ITT

EXISTING PUMP

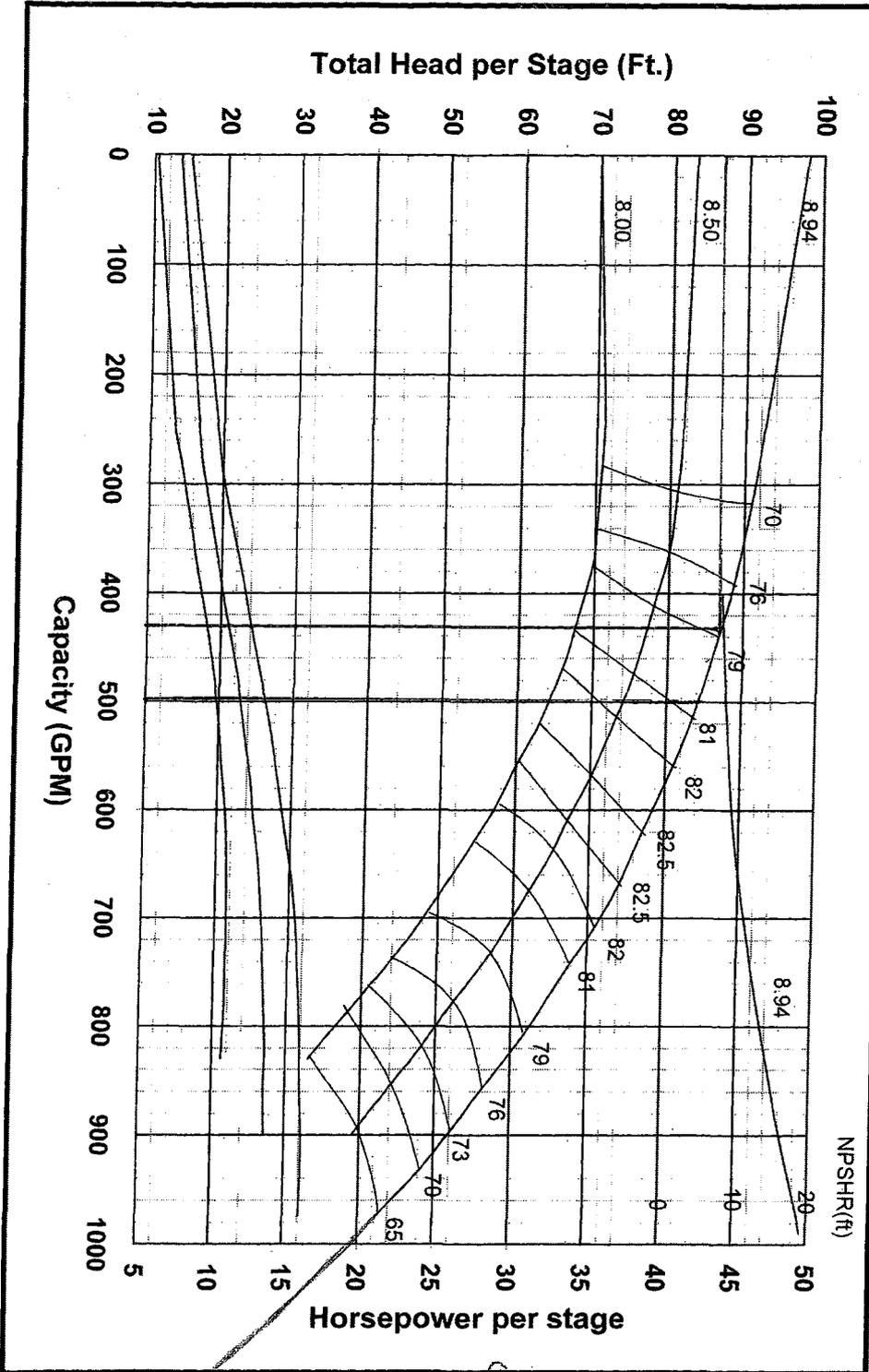
Turbine

Goolds Pumps

Model 12WAMC

(Effective June 1, 2006)

GOULD'S PROPOSAL NO.	GOULD'S S.O. NO.	INQUIRY NO.	CUSTOMER P.O. NO.	P.O. DATE	ITEM NO.	CUSTOMER
PROJECT	C6427	SERVICE	GPM CAPACITY	FT. TDH	% EFFICIENCY	RPM
			500	588		1800



Curve No.	E6412WCPC2
Model	12WAMC
RPM	1770
EFFICIENCY CORRECTION	
1-STAGE	-3.0
2-STAGE	-2.0
3-STAGE	-1.0
4-STAGE	0.0
Impeller ENCLOSED	
Ns =	1615
K =	7.0 LBS/FT
K(Bal) =	N/A
Bowl O.D.	11.60"
Bowl Lateral	0.75"
Max. PSI	390
Disch. size	6" 8" 10"

* REQUIRES DUCTILE IRON BOWL CONSTRUCTION

TURBINE OPERATIONS
 Lubbock, Texas
 BOWL PERFORMANCE CURVE BASED ON PUMPING CLEAR, NON-AERATED WATER. RATED POINT ONLY IS GUARANTEED. CURVES REPRESENT SINGLE STAGE PERFORMANCE BASED ON TEST OF MULTI-STAGE BOWL ASSEMBLY. EFFICIENCY CORRECTION IS REQUIRED FOR LESSER STAGES.



Goolds Pumps and the ITT Engineered Blocks Symbol are registered trademarks and Tradenames of ITT Corporation. SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.
 C12WALC2 January, 2009

Engineered for life

Copyright (c) 2009 ITT Corporation

ATTN: Kevin Pakka



ARIZONA WATER COMPANY

EXISTING PUMP

WELL RECORD

System: CG	Map Reference (e.g. Site Name): Well # 27	Well No. 27
---------------	--	----------------

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

BOWL DATA

Configuration:		
<input checked="" type="checkbox"/> Lineshaft Turbine	<input type="checkbox"/> Submersible Turbine	
Manufacturer: Gould Pump Inc.	Model No.: 12 WAMC	
Serial No.:	Stages: 11	Bowl O.D. (Inch): 12"
Impeller O.D. (Inch): 8.94	Thrust K Factor: 7	
Shaft Thread O.D. (Inch): 1 1/16"	Threads Per Inch: 10 THD	Thread Direction: L.H.
Oil Tube Thread I.D. (Inch): 3"	Threads Per Inch: 10 THD	Thread Direction: R.H.
Column Thread I.D. (Inch): 8"	Thread Type: TAPER	Threads Per Inch: 10 THD
Suction Thread I.D. (Inch): 8"	Thread Type: TAPER	Threads Per Inch: 10 THD
Supplier: Tri-Valley Pump	Date Installed: 1/14/08	
Remarks:		



ARIZONA WATER COMPANY

WELL RECORD

System: CG	Map Reference (e.g. Site Name): Well # 27	Well No. 27
---------------	--	----------------

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

AIR LINE DATA

Air Line O.D. (Inch): 3/8"	Length (feet): 690'	Material: Stainless
Supplier: Tri-Valley Pump		Date Installed: 1/14/08
Remarks:		



ARIZONA WATER COMPANY

WELL RECORD

System: CG	Map Reference (e.g. Site Name): Well # 27	Well No. 27
---------------	--	----------------

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

COLUMN PIPE DATA

Column Tread O.D. (Inch): 8.3"	Length (feet): 682'	Thread Type: TAPER
Threads Per Inch: 10	Thread Direction: R.H.	
Supplier: Tri-Valley Pump	Date Installed: 1/14/08	
Remarks: Column Pipe in 20' lengths		

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

OIL TUBE DATA

Oil Tube Thread I.D. (Inch): 3"	Threads Per Inch: 10	Thread Direction: R.H.
Supplier: Tri-Valley Pump	Date Installed: 1/14/08	
Remarks: Oil tube is 3" x 20' Peerless style		

THIS SECTION TO BE COMPLETED BY AWC OR CONTRACTOR

SHAFT DATA

Shaft Thread O.D. (Inch): 1 1/16"	Threads Per Inch: 10	Thread Direction: L.H.
Supplier: Tri-Valley Pump	Date Installed: 1/14/08	
Remarks:		

Company:
Name:
Date: 10/6/2009

PROPOSED PUMP



Pump:

Size: SC12C (8 stage)
Type: VERTTURBINE
Synch speed: 1800 rpm
Curve:
Specific Speeds:
Dimensions:
Vertical Turbine:
Speed: 1770 rpm
Dia: 9.325 in
Impeller:
Ns: 1591
Nss: ---
Suction: 6 in
Discharge: 6 in
Bowl size: 12 in
Max lateral: 0.812 in
Thrust K factor: 6.5 lb/ft

Search Criteria:

Flow: 450 US gpm Head: 585 ft

Fluid:

Water
SG: 1
Viscosity: 1.105 cP
NPSHa: ---
Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 11.25 psi a

Motor:

Standard: US
Enclosure: TYPE_1
Sizing criteria: Max Power on Design Curve
Size: 100 hp
Speed: 1800
Frame: ----

Pump Limits:

Temperature: ---
Pressure: 254 psi g
Sphere size: 0.656 in
Power: ---
Eye area: ---

Pump Selection Warnings:

Pump shutoff dP exceeds limit for the pump.

--- Data Point ---

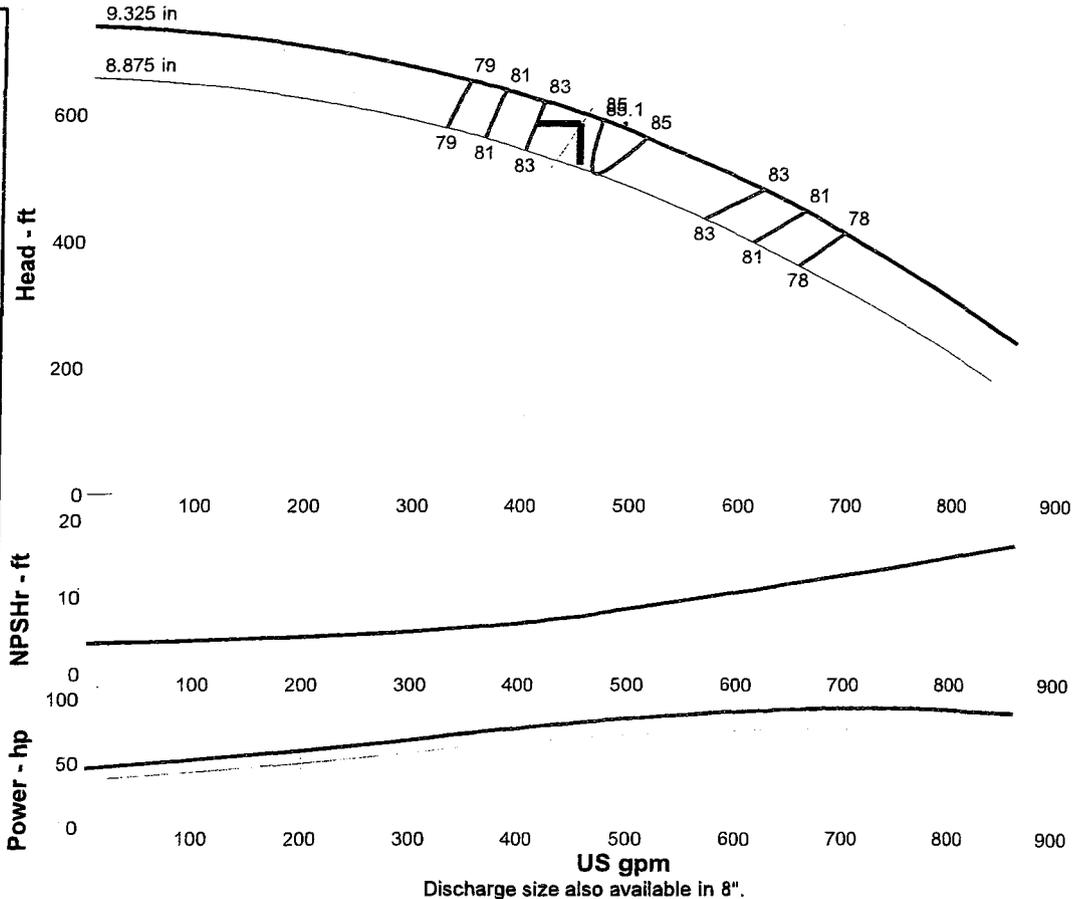
Flow: 450 US gpm
Head: 603 ft
Eff: 84.3%
Power: 81.1 hp
NPSHr: 7.42 ft

--- Design Curve ---

Shutoff head: 740 ft
Shutoff dP: 320 psi
Min flow: ---
BEP: 85.1% @ 491 US gpm
NOL power:
92.8 hp @ 695 US gpm

--- Max Curve ---

Max power:
92.8 hp @ 695 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
540	1770	541	84.5	86.9	9.32
450	1770	603	84.3	81.1	7.42
360	1770	648	79.8	73.7	6.1
270	1770	673	61.5	66.7	5.53
180	1770	695	41	60.1	5.02

ARIZONA WATER COMPANY

CASA GRANDE #27 – CASA GRANDE, AZ EQUIPMENT SPECIFICATIONS

Existing Well Information

Location: Southwest of McCartney Rd. & Evans Rd.
Drilled by: Zim Industries – 1998
Casing: 18" x .312 Roscoe Moss Copper Bearing Casing from 0'-1110' (bottom) with .070 Slot Ful-Flo perforations from 550'-670', 710'-790', and 830'-1090'
Pump: Goulds 12RAMC 11-stage 1800 RPM bowl assembly
Motor: U.S. Electrical Motor 200 HP VHS 480V 3-phase motor 445TPA Frame
Column, Tubing, and Shaft: 8"x3"x1-11/16" Column, Tubing, and Shaft

Special Conditions

- Existing 200 HP VHS motor to be kept by Arizona Water Company and placed into inventory.
- All scrap materials, including those removed from the well, are to be removed from the well site and disposed of by the contractor.
- Re-use existing 1/4" SS air line.

Design Conditions

450 GPM @ 615' TDH.
Pump setting 680 ft.

Equipment to be Furnished and Installed by Pump Company

- One Simflo SC12C 8-stage 1800 RPM bowl assembly (9.325" full trim impeller, 0.75" minimum lateral required, pump curve attached) or alternate with Arizona Water Company Engineering approval. Please provide alternative bowl assembly as a separate alternative in addition to the specified bowl assembly. Please include pump curve and required supporting information listed below for all alternative bowl assemblies.
- Video Well with downward and side scan video. Provide well video log and DVD copy.
- Brush and Bail well using cable tool rig if required.
- All miscellaneous bandits, buckles, straps, etc.
- All material subject to Arizona Water Company Standard Specifications (enclosed) except as noted.

Approved 125-HP VHS Motor Assemblies

U.S. Motors
Emerson
GE

- Motor shall be vertical hollow-shaft, squirrel cage, induction type, wired for three phase, 460 volts, 60 hertz current and shall comply with applicable NEMA Standards, premium efficiency.
- Motor shall be Class B design with Class F insulation. Motor shall have all copper windings.
- Motor shall be designed for continuous duty under rated full-load condition with a service factor of 1.15. Motor shall be capable of driving the pump continuously over the complete head-capacity range without the load exceeding the nameplate horsepower of the motor.
- Motor shall have weather protected NEMA WP-1 enclosures with stainless steel bird and rodent screens.

- Thrust bearings on the motor shall contain heavy-duty oil-lubricated type. Means shall be provided for visual inspection of the oil level while the motor is operating. Motors shall be filled with manufactures recommended oil.
- Thrust bearings shall be of ample capacity to carry the maximum hydraulic and mechanical thrust conditions encountered during pumping with an ample safety factory. The bearings shall be sized for a minimum 50,000 hour life when the pump is operating at +/- 25% of the max speed of rotation.
- The pump manufacture shall coordinate his design to properly mount the electric motor, make the shaft connection, and provide thrust values and other related information to the motor manufacturer.

Bowl Assembly Construction Materials

1. No left hand to right hand adaptations will be allowed for the oil tube assembly
2. No invoice will be accepted for payment unless accompanied by a "complete" installed pump equipment data sheet
3. Alternate bowl assemblies will be considered subject to final approval by Arizona Water Company's Engineering department

Included with Each Bid Should be a List Including:

- Maximum Bhp
- Operating Bhp
- Overall efficiency at design conditions
- Total down thrust at design conditions
- Maximum down thrust throughout total pump range
- Differential stretch at design condition
- Maximum differential stretch
- Allowable lateral for bowl assembly
- Provide thrust rating for 125-HP VHS bearing assembly (lbs.)



ARIZONA WATER COMPANY

CONTRACT

CONTRACTOR: Layne Christensen Company

DATE OF CONTRACT: December 29, 2009

Address: 12030 E. Riggs Road
Chandler, AZ 85249-3701

SYSTEM: Casa Grande
W.A. #: 1-4620

DESCRIPTION OF WORK:

Pull and replace pump and motor, install pump assembly, video well, provide misc buckles, bandits and straps, brus and bail with cable tool rig as per attached proposal dated November 5, 2009

WORK SHALL BE COMPLETED ON OR BEFORE 30 CALENDAR DAYS AFTER COMMENCEMENT NOTICE IS ISSUED.

(See Paragraph 4, below).

TOTAL COST
(including taxes): \$15,135.00

THIS CONTRACT is made by and between ARIZONA WATER COMPANY, an Arizona corporation, (hereinafter referred to as the "Company"), and the CONTRACTOR named above.

1. The Contractor hereby certifies that it has read the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* ("AWC Specifications") and related construction drawings, and understands that all provisions of said AWC Specifications, and related construction drawings, apply to work covered under this Contract, and which, by this reference, are incorporated herein.
2. The Contractor agrees, as an independent contractor, to furnish all of the labor, tools and certain materials required to perform the work described above for the Company, in accordance with the General Conditions of Contract and related construction drawings.
3. The Company agrees to furnish to the Contractor, without any cost to Contractor, certain equipment and materials necessary to be used or expended in the performance of said work, as follows: NONE.
4. Work shall not commence upon this Contract until a written Commencement Notice has been given to the Contractor by the Company. In the event the Commencement Notice is not given to the Contractor by the Company within ninety (90) calendar days from the date of this Contract, the Contractor has the option to cancel the Contract by giving written notice of cancellation to the Company.

Upon the satisfactory completion of the work within the Contract time limit, the Company agrees to pay, in cash, to the Contractor the total cost of the work, including all taxes.

SPECIAL CONDITIONS:

ARIZONA WATER COMPANY

Company

By: Andrew J. Haas
Andrew J. Haas, EIT

Title: Engineer

afh

LAYNE CHRISTENSEN COMPANY

Contractor

By: David A. Posye

Title: ACCOUNT MANAGER

PROPOSAL

INCLUDING LABOR AND MATERIALS

In response to the Invitation To Bid from Arizona Water Company (the "Company"), and in accordance with the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* (the "AWC Specifications") thereto, and all applicable plans, the undersigned Contractor hereby proposes and agrees to furnish and to do everything required by the terms and conditions of the Company's standard construction contract (the "Contract") for the construction of CG #27 at Casa Grande, Arizona, at the following unit and/or total prices for the work described:

ITEM	WORK	QUANTITY & UNIT PRICE	TOTAL
1.	Labor to pull and replace pump and motor	Lot.	7408.00
2.	Simflo SC12C 8-stage 1800rpm pump assembly	1 ea.	6450.00
3.	Video Well w/ side scan, video log, and DVD copy	1 ea.	500.00
4.	Misc. buckles, bandits, and straps	Lot.	125.00
5.	Brush and Bail with cable tool rig (Price Only)	per hr 135.00	XXXXXXXXXX
6.	8" Column Pipe (Price Only)	per lf 500.00	XXXXXXXXXX
7.	3" x 1-11/16" Oil Tube and Lineshaft (Price Only)	per lf 656.00	XXXXXXXXXX
8.	1/4"SS Air Line (Price Only)	690 lf 863.00	XXXXXXXXXX
9.	US Motor 125HP VHS 480V 3-phase, premium efficiency, 175% capacity thrust bearings (Price Only)	1 ea. 8,176.25	XXXXXXXXXX
All mobilization charges to be included in totals. 100% Performance & Payment Bonds are required. All scrap materials to be disposed of by contractor.			Subtotal 14483.00
			Taxes 572.00
			Subtotal 15055.00
100% Performance & Payment Bonds _____ %			80.00
			Total 15,135.00

The prices submitted in this Proposal are good for ninety (90) calendar days from the date of this Proposal. The work shall be completed within Thirty (30) calendar days after the Commencement Notice is issued.

At the sole discretion of the Company, the 100% performance and payment bonds may not be required.

The Contractor represents that this Proposal, in all respects, is fair and honest, is submitted in good faith, and is not submitted in collusion with any other company, firm or individual. The Contractor represents that it is not in debt or default to the Company. The Contractor further represents that it has visited the site of the work and is knowledgeable of its environment. Within five (5) days of the Contractor receiving the Contract for the performance of this work, the Contractor will execute the Contract and return it to the appropriate Company office.

The Contractor agrees to provide the Company with a current Certificate of Insurance with coverage in the minimum amounts required by the General Conditions of Contract, before this Proposal will be accepted for consideration. It is understood and agreed that, if a claim is received by the Company in connection with the work performed under Contract with the Company, the claim will be referred to the insurance carriers of the Contractor and the Company in accordance with the General Conditions of Contract.

The Contractor is the holder of Arizona State Contractor's License No. 071734, Classification A04.

Contractor's Complete Business Address

Layne Christensen Co.
12030 E. Riggs Rd.
Chandler, AZ 85249

Layne Christensen Co.
Contractor

By: Dario A. Pasyle
Title: ACCOUNT MANAGER
Date: 11-5-09

AJH

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

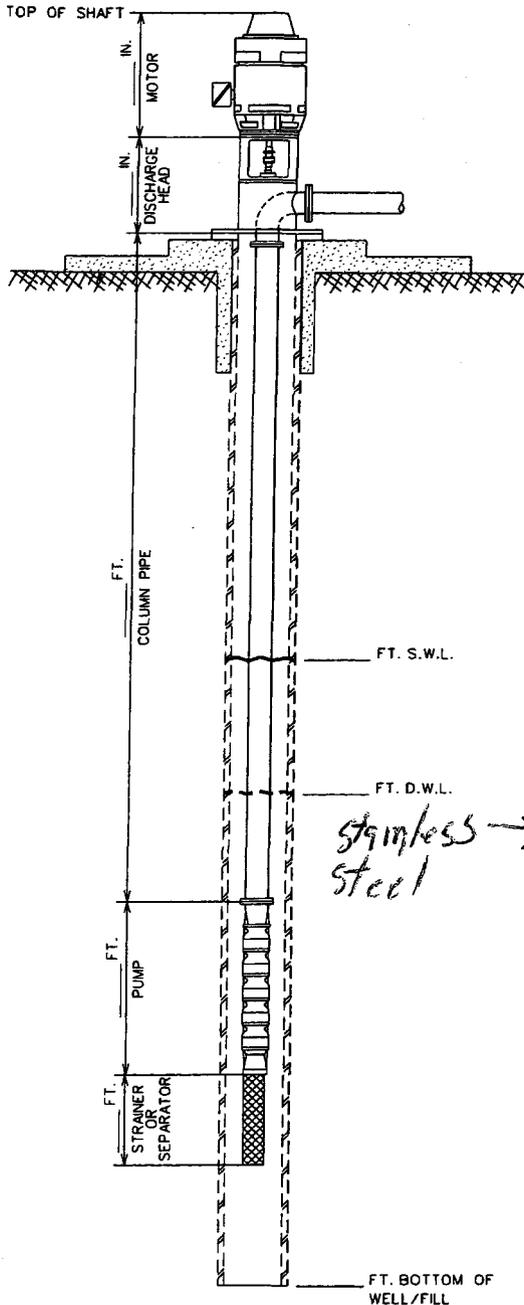
44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.



VERTICAL TURBINE AS-BUILT



DATE: 11-2010

INSPECTOR Tim S.

WA NO. 1-4763

STATIC FT DYNAMIC FT PUMP DISCHARGE GPM

STATIC PRESSURE PSI DYNAMIC PRESSURE PSI

MOTOR

H. P. 200 MFGR U.S. motor

R. P. M. SIZE

PHASE / CYCLE / VOLTS 3 / 60 / 480

DISCHARGE HEAD

TYPE SIZE x

MECHANICAL SEAL

TYPE SIZE

COLUMN ASSEMBLY

PIPE SIZE 8" taper
PIPE WALL 11 all used pipe going back in the hole
SHAFT SIZE 1 1/2" new
TUBE SIZE 3" new
AIR LINE SIZE / MATERIAL 1/4 2 piece no couplings
SOUNDING LINE SIZE / MATERIAL 1" schedule 80 threaded
CHEMICAL LINE SIZE / MATERIAL 3/4 schedule 80 galvanized

stainless steel →

BOWL ASSEMBLY

MODEL SC 12 C-8 serial # 112657

NO. OF STAGES 8

SERIAL NO. 112657

STRAINER YES / NO SAND SEPARATOR YES / NO

NOTES: Manufacturer of Pump is
Sampla pump

6" cone on the bottom of the pump
18" long strainer

Shaft out of the pump is 1 1/16"

On the bottom of the PVC is going to be
capped off, drill holes in the bottom
and put the pump



ARIZONA WATER COMPANY

CONSTRUCTION COMPLETION NOTICE

CONSTRUCTION COMPLETION DATE:

12-20-10

WORK AUTHORIZATION NUMBER:

1-4763

PREPARED BY

THE FOLLOWING RECORD REQUIREMENTS ARE ATTACHED:

- 1. CONSTRUCTION DRAWINGS WITH "AS BUILT" LOCATION OF PIPE, FITTINGS, ETC. MARKED IN RED NA
- 2. VALVE CARDS..... NA
- 3. HYDRANT CARDS WITH COPY OF COVER LETTER..... NA
- 4. MATERIALS INSTALLED OR RETIRED LISTED ON THE REVERSE SIDE OF THE W.A. WITH R.O.S. AND P.D.R. NUMBERS..... NA
- 5. PRESSURE AND LEAKAGE TEST RESULTS:

DATE TESTED	<u>no water facilities installed</u>		
TIME STARTED	_____	_____	_____
TIME FINISHED	_____	_____	_____
PIPE DIAMETER	_____	_____	_____
FOOTAGE TESTED	_____	_____	_____
ALLOWABLE LEAKAGE	_____	_____	_____
LEAKAGE OBSERVED	_____	_____	_____
PRESSURE AT TEST POINT	_____	_____	_____
COMPANY EMPLOYEE OBSERVING TEST (print)	_____	_____	_____
INITIALS OF EMPLOYEE	_____	_____	_____

6. DISINFECTION SAMPLING:

INITIAL SAMPLING	DATE	_____	_____	_____
(minimum 50 ppm available chlorine)	TIME	_____	_____	_____
	PPM Cl ₂	_____	_____	_____
AFTER 24 HOURS DETENTION TIME	DATE	_____	_____	_____
(minimum 10 ppm free chlorine)	TIME	_____	_____	_____
	PPM Cl ₂	_____	_____	_____
AFTER SUFFICIENT FLUSHING	DATE	_____	_____	_____
(water is clear and system Cl ₂ residual is measured)	TIME	_____	_____	_____
	PPM Cl ₂	_____	_____	_____
BACTERIOLOGICAL SAMPLE(S)	DATE	_____	_____	_____
	TIME	_____	_____	_____

ATTACHED Yes No Yes No Yes No Yes No

I certify that construction on the above Work Authorization was completed as of the date shown above and for which all materials have been accounted. I further certify that I have inspected the work done and have found it to be satisfactory and in accordance with Company specifications.

[Signature]

Division Manager or Operations Superintendent (signature)

12-20-10

Date of Notice

ATTACH TO CONSTRUCTION & ENGINEERING FILE COPY OF WORK AUTHORIZATION

WA1-4766

ARIZONA WATER COMPANY

WORK AUTHORIZATION

W.A. NUMBER: 1-4766
 P.E. NUMBER:
 BUDGET ITEM NO.: Special #17
 SHEET NO.: 1 of 2

SYSTEM: PV	WORK TO START BY: UPON AUTHORIZATION
DIVISION: PV	WORK TO BE FINISHED BY: WITHIN
TAX CODE: 2103	

DESCRIPTION OF WORK:

Replace approximately 200LF of 6" PVC and DIP with 12" DIP on Vah Ki Inn Rd at the PMIP Canal Crossing. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

Pima Maricopa Irrigation Project is reconstructing the Vah Ki Inn/Pinal Lateral Bridge. The existing waterline is on the bridge by permit. Under the terms of the permit AWC is required to relocate at its expense.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	<i>James Wilson</i> 9/25/10	10/14/10
LABOR	5,500	REVIEWED FOR ESTM/ROW VERIFICATION:	
CONTRACT PORTION	30,000	<i>Charles Briggs</i> 11-01-2010	10-14-2010
OVERHEAD	8,520	REVIEWED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 44,020	<i>Andy Haas</i> AJH 10-25-10	10-14-10
FUNDS RECEIVED:		APPROVED BY ENGINEERING:	
CONTRIBUTIONS RECEIVED	0	<i>Fred Schneider</i> 10-25-10	10-19-10
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE:	
TOTAL CONTRIBUTIONS/ADVANCES	0	<i>Joe Harris</i>	10/21/10
NET CASH REQUIRED	\$ 44,020	SPECIAL ITEM EXCEEDING \$10,000; AUTHORIZED BY PRESIDENT:	
		<i>William M. Garfield</i>	10-21-2010
		SPECIAL ITEM EXCEEDING \$10,000; AUTHORIZED BY CHAIRMAN:	
		APPROVED VIA FAX	10/22/2010
		M.L. Whitehead	

COMMENTS:

① Project funding to be provided via the 2010 Contingency fund.

② Encroachment permit for canal crossing attached.

③ Unable to have current bridge contractor complete waterline work as they are not agreeable to our GCC's. Project will be B.O. to other contractors.

FS

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION

Authorized by **FRED SCHNEIDER**

Date 10/25/10

ARIZONA WATER COMPANY

W.A. NUMBER: 1-4766

P.E. NUMBER:

BUDGET ITEM NO.:

Special #17

SHEET NO.:

2 of 2

WORK AUTHORIZATION - DETAIL SHEET

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	343	6" PVC and DIP	200	1988 1-9868

PROJECT DESCRIPTION:

Replace approximately 200LF of 6" PVC and DIP with 12" DIP on Vah Ki Inn Rd at the PMIP Canal Crossing.

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Install 12" DIP bridge crossing w/ polywrap and related fittings	343	200	\$ 150.00	\$ 30,000
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				
TOTAL CONTRACT WORK				\$ 30,000	

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
SERVICE CONNECTIONS: SINGLE-SHORT	345				
METERS	346				
TOTAL MATERIALS				\$ -	

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE	343	1	\$ 500.00	500
	PERMIT FEE	343	1	1,500.00	1,500
	SURVEY FEE				
	FIELD INSPECTION	343	1	3,500.00	3,500
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345				
INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345				

TOTAL LABOR				\$ 5,500
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR				\$ 35,500
OVERHEAD				8,520
TOTAL	REFUNDABLE PORTION <input type="checkbox"/>	NON-REFUNDABLE PORTION <input type="checkbox"/>	COST ESTIMATE	\$ 44,020



United States Department of the Interior

BUREAU OF RECLAMATION

Phoenix Area Office

PO Box 81169

Phoenix, Arizona 85069-1169

IN REPLY REFER TO:

PXAO-4000 LND-3.00

SEP 19 1998

Mr. Mike Whitehead
Arizona Water Company
PO BOX 29006
Phoenix, Arizona 85038-9006

Subject: San Carlos Irrigation Project Encroachment Permit

Dear Mr. Whitehead:

The United States of America and the Gila River Indian Community have entered into a Master Contract whereby the Bureau of Reclamation (Reclamation) has agreed to fund the costs of construction of the Pima-Maricopa Irrigation Project (P-MIP). This Master Contract provides that title to all P-MIP works shall remain in the name of the United States.

The eastern portion of the P-MIP will include the current United States Department of Interior, Bureau of Indian Affairs, San Carlos Irrigation Project (SCIP). Pursuant to the reconstruction and enlargement of the Pima Canal, this is to request your company's assistance and cooperation in relocating and/or modifying your facilities to accommodate this construction.

Enclosed is a copy of your SCIP Encroachment Permit dated March 24, 1966, for the crossing identified at the Casa Grande National Monument. Please submit to Reclamation a copy of your encroachment permits for the two other identified crossings of the Pima Canal at Vah Ki Inn Road and near the Union Pacific railroad bridge (reference letter dated October 28, 1998, from P-MIP). If permits are required, please contact Mr. Carl Christensen of SCIP at 520-723-7829. Please note all SCIP Encroachment Permits state, "The grantee further agrees should the grantor elect to reconstruct the canal, the grantee would make the necessary realignment of its facilities at no cost to the grantor."

Construction of these P-MIP facilities is scheduled to begin as early as October 2001 and Reclamation would like all utility relocations completed by that time. Your cooperation in this matter is most appreciated. There have been numerous design revisions that will require analysis by your firm. We

would also like to be informed of any concerns and recommendations regarding construction near your utility line. To assist in this effort, please provide us with any as-built drawings you may have for the above crossings.

Please contact Mrs. Margie Geedey, Reclamation Realty Specialist, at the above address or call her at 602-216-3851, as soon as possible to provide the requested information and coordinate the relocation of your facilities.

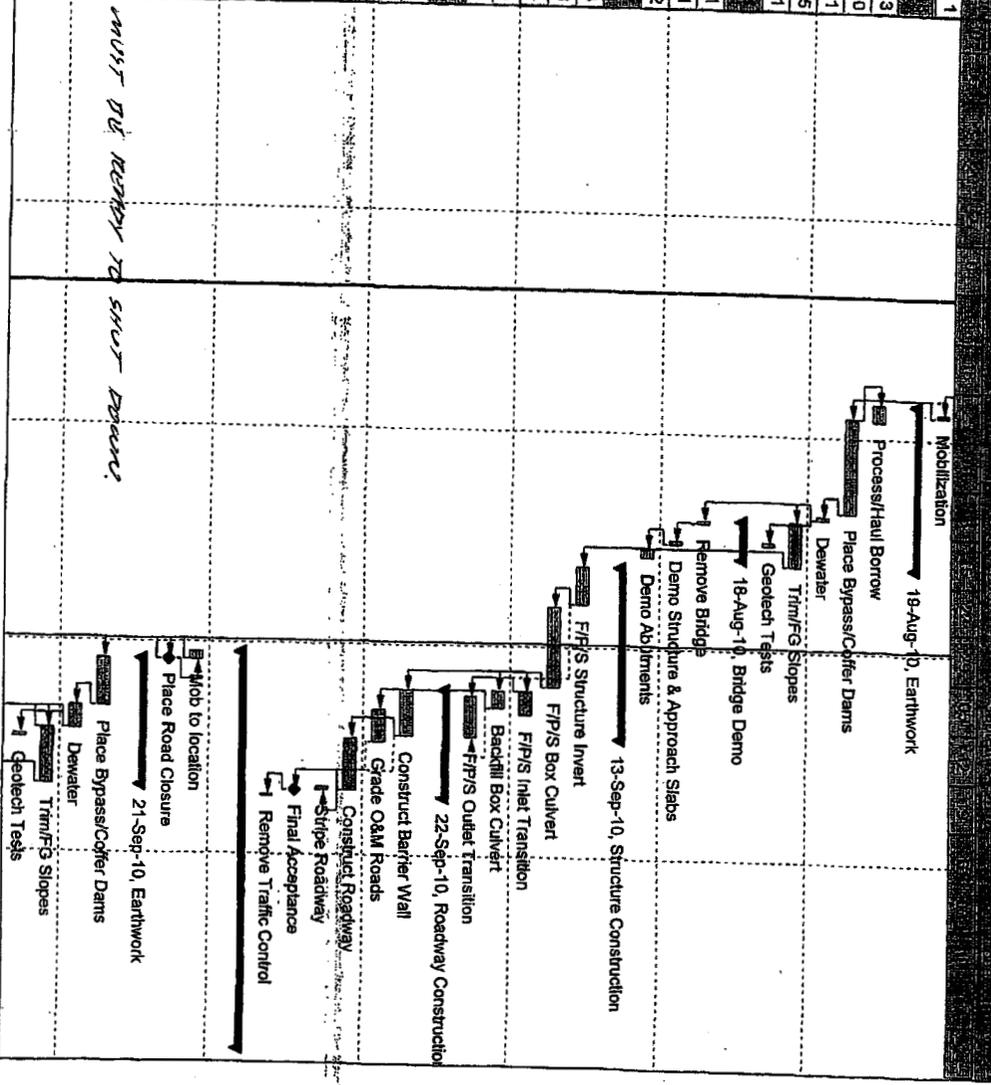
Sincerely,

RANDY CHANDLER
FOR Carol Lynn Erwin
Area Manager

Enclosure

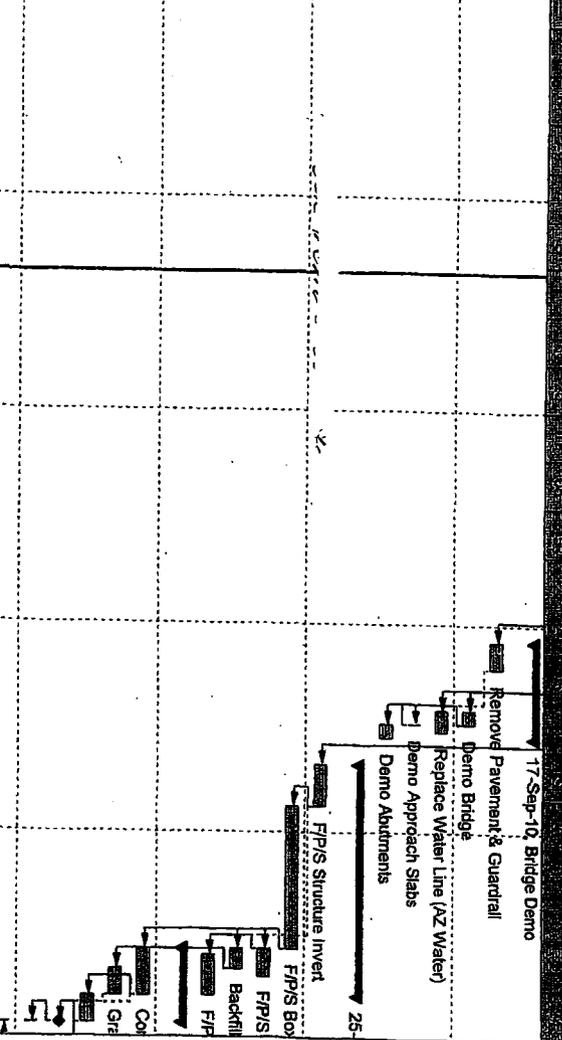
cc: Mr. Lee Thompson, Pima-Maricopa Irrigation Project, 192-A South
Route "A" Street, PO Box "C", Sacaton, Arizona 85247
Mr. Larry Sinclair, Pima-Maricopa Irrigation Project, 192-A South
Route "A" Street, PO Box "C", Sacaton, Arizona 85247
Mr. Carl Christensen, San Carlos Irrigation Project, PO Box 250,
Coolidge, Arizona 85228
(w/o encl to ea)

Item ID	Description	Start Date	End Date	Duration	Notes
30002	Mobilization	28-Jul-10*	28-Jul-10	1	
22008	Process/Haul Borrow	27-Jul-10	29-Jul-10	3	
22005	Place Bypass/Coffer Dams	29-Jul-10*	11-Aug-10	10	
22006	Dewater	12-Aug-10	12-Aug-10	1	
22007	Trim/F/G Slopes	13-Aug-10	19-Aug-10	5	
22013	Geotech Tests	16-Aug-10	16-Aug-10	1	
Bridge Demo					
21005	Remove Bridge	13-Aug-10	13-Aug-10	1	
21009	Demo Structure & Approach Slabs	16-Aug-10	16-Aug-10	1	
21010	Demo Abutments	17-Aug-10	18-Aug-10	2	
Structure Construction					
23006	F/P/S Structure Invert	20-Aug-10	25-Aug-10	4	
23009	F/P/S Box Culvert	26-Aug-10	06-Sep-10	8	
23007	F/P/S Inlet Transition	07-Sep-10	10-Sep-10	4	
23010	Backfill Box Culvert	07-Sep-10	09-Sep-10	3	
23008	F/P/S Outlet Transition	08-Sep-10	13-Sep-10	4	
Roadway Construction					
24011	Construct Barrier Wall	07-Sep-10	13-Sep-10	5	
24009	Grade O&M Roads	10-Sep-10	14-Sep-10	3	
24010	Construct Roadway	14-Sep-10	21-Sep-10	6	
24013	Stripe Roadway	21-Sep-10	21-Sep-10	1	
24008	Final Acceptance	21-Sep-10	21-Sep-10	0	
24012	Remove Traffic Control	22-Sep-10	22-Sep-10	1	
20005	Job to location	02-Sep-10	03-Sep-10	1	
20006	Place Road Closure	03-Sep-10	03-Sep-10	0	
Other Work					
22009	Place Bypass/Coffer Dams	10-Sep-10	10-Sep-10	5	
22010	Dewater	10-Sep-10	13-Sep-10	1	
22011	Trim/F/G Slopes	13-Sep-10	21-Sep-10	6	
22015	Geotech Tests	14-Sep-10	14-Sep-10	1	



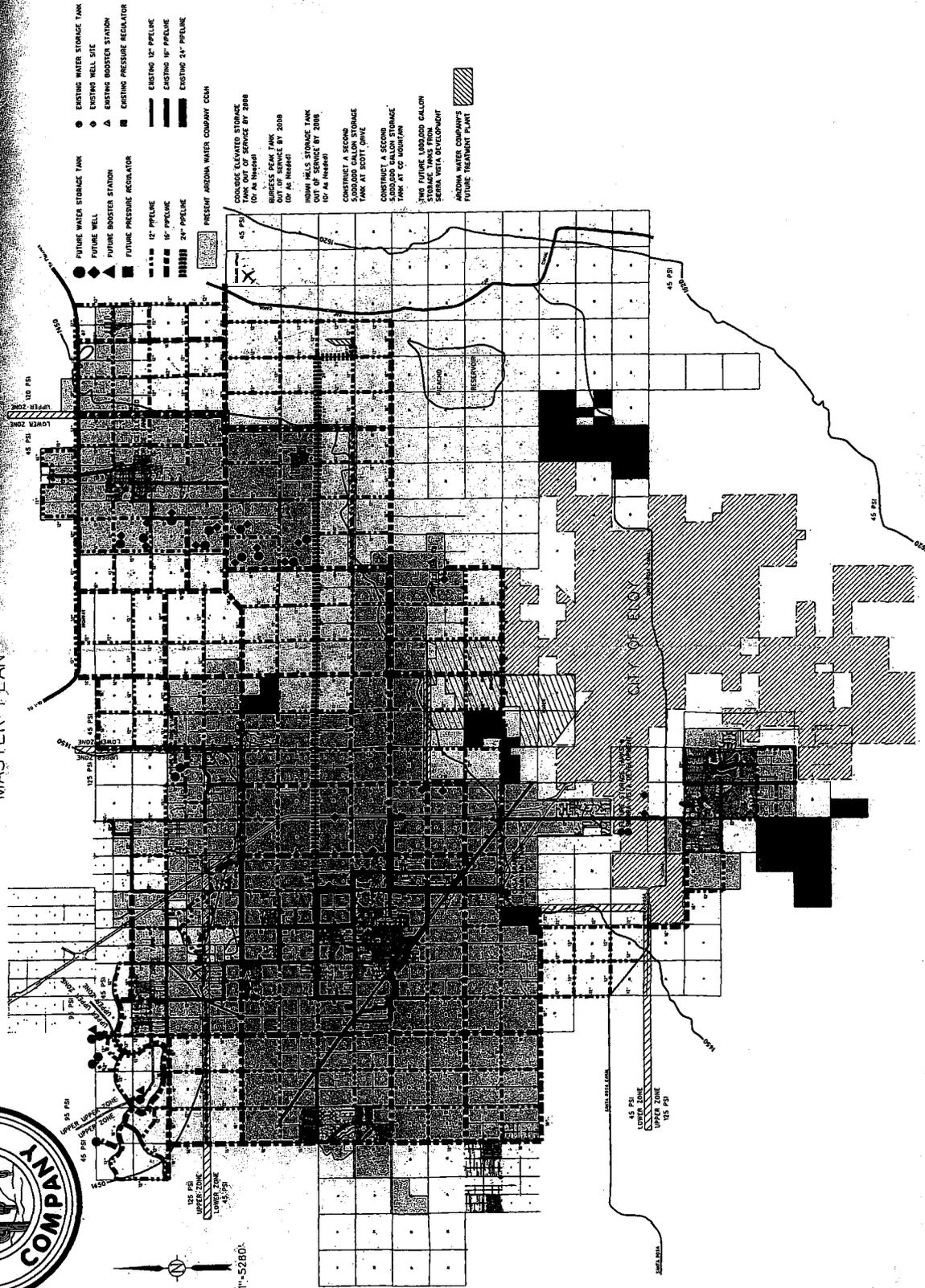
Actual Work Remaining Work Critical Remaining Work Milestone

Item ID	Description	Start Date	End Date	Quantity
21006	Remove Pavement & Guardrail	03-Sep-10	07-Sep-10	2
21008	Demo Bridge	13-Sep-10	15-Sep-10	2
21011	Replace Water Line (AZ Water)	13-Sep-10	16-Sep-10	3
21012	Demo Approach Slabs	15-Sep-10	15-Sep-10	0
21013	Demo Abutments	15-Sep-10	17-Sep-10	2
STRUCTURE CONSTRUCTION				
23011	F/P/S Structure Invert	27-Sep-10	27-Sep-10	4
23014	F/P/S Box Culvert	27-Sep-10	18-Oct-10	15
23012	F/P/S Inlet Transition	18-Oct-10	22-Oct-10	4
23015	Backfill Box Culvert	18-Oct-10	21-Oct-10	3
23013	F/P/S Outlet Transition	19-Oct-10	25-Oct-10	4
ROADWAY CONSTRUCTION				
24016	Construct Barrier Wall	18-Oct-10	25-Oct-10	5
24005	Grade O&M Roads	21-Oct-10	26-Oct-10	2
24015	Construct Roadway	25-Oct-10	29-Oct-10	4
24014	Final Acceptance	29-Oct-10	29-Oct-10	0
24017	Remove Traffic Control	29-Oct-10	29-Oct-10	0
24018	Strip Roadway	29-Oct-10	29-Oct-10	0



Actual Work Critical Remaining Work Remaining Work Milestone Su...

PINAL VALLEY WATER SYSTEM MASTER PLAN



T5s R8E Sec 13

ENCROACHMENT PERMIT FOR CANAL CROSSING

In consideration of Ten Dollars (\$10.00) the receipt of which is hereby acknowledged, the San Carlos Project, hereinafter called the "Grantor" does grant to Arizona Water Company, hereinafter called "Grantee", his successors and assigns, an encroachment permit to construct, operate and maintain facilities over/under the surface of the following described premises:

S.W. 1/4 Section 13 T 5 S. & R. 8 E.

Will bore under Pima Lateral on the North side of Vah Ki Road and approximately 2600 feet west of Attaway Road.

as shown in the attached plat marked EXHIBIT "A" ³
Situating in the County of PINAL, State of ARIZONA.
Together with the rights to repair, replace, maintain and remove any tree or shrubs that in the judgment of the grantee, may interfere with the construction or endanger the operation of said facilities. By accepting this permit, the grantee agrees to exercise reasonable care to avoid damage to said premises and all property that may at any time be thereon. It is understood that the premises crossed by this permit is an irrigation canal and grantee hereunder agrees not to interfere with the flow of the water herein either in the construction, use or maintaining its facilities. The grantee further agrees should the grantor elect to reconstruct the canal the grantee would make the necessary realignment of its facilities at no cost to the grantor. Upon the removal of the said facilities without the intention of replacing the same this permit shall become invalid.

This encroachment permit is limited to whatever rights San Carlos Irrigation Project has to this land and is entered into primarily to limit applicants encroachment with the Project's facilities.

Facilities must be a minimum of 3' under the canal bottom or 20' above the canal bank road.

William Deebold
GRANTEE
Address: Arizona Water Company
P.O. Box 1568
Coolidge, AZ. 85228
Date: 5/9/88

Ralph L. Guern
PROJECT ENGINEER
San Carlos Irrigation Project
Date: 8/3/88



ARIZONA WATER COMPANY

Casa Grande Office: PO Box 11030 - Casa Grande, AZ 85230 - 1030
Voice : 520-836-8785 Fax : 520-836-2650

PROPOSAL/CONTRACT

CONTRACTOR:	PARKS EXCAVATING, INC.	SYSTEM:	Coolidge
ADDRESS:	P.O. BOX 11024	W.A. No(s):	1-4766
	CASA GRANDE, AZ 85230-1024	BID DUE DATE:	October 22, 2010

CONTRACTOR SUBMITS this PROPOSAL/CONTRACT to ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

- Contractor certifies that it has a complete copy of, and has read, understands and accepts, the Company's General Conditions of Contract, and the Company's Construction Specifications and Standard Specification Drawings, (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and related construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
- Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands Work and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
- Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
- Contractor acknowledges that one hundred percent (100%) Performance and Payment Bonds are required and must be provided to the Company prior to the commencement of work.
- Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. The materials list will include the manufacturer, part number, price and quantity included in this Proposal/Contract.
- Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project after Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statutes ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipes or valves (A.R.S. §42-5061 B.6.), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
- Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
- The Estimated Total Cost of the Project, shown on Page 2, is based on estimated labor and material quantities to be furnished. It includes an estimate of the Contracting Tax and the cost of the required Performance and Payment Bonds. Contractor will not cancel, modify or withdraw this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
- Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, training of Company Personnel and final Project invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
- Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 30 calendar days after the Commencement Notice is issued.
- Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/constructed will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
- The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time limit shown in Paragraph 10 may be deducted from the Company's payment of the final Project invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

Use mega Lugs on all MJ fittings

CONTRACTOR PARKS EXCAVATING, INC.	PROPOSAL/CONTRACT ACCEPTED:
By: Steven W. Parks	ARIZONA WATER COMPANY
Print Name: PRESIDENT	By: <i>Fredrick R. Schneider</i>
Title: <i>Steve Parks</i>	Print Name: FREDRICK R. SCHNEIDER
Date: October 22, 2010	Title: VP- ENGINEERING
	Date: 10-25-2010

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.

QUANTITIES LIST	QTY TOTAL
12" DIP W/POLYWRAP	200 LF
6" C-900 PIPE	20 LF
12" 8" MJ REDUCER	2 EA
12" MJ 45° EL	4 EA
12" MJ x FLG 45° EL	4 EA
6" TRANSITION COUPLING	2 EA
1" AIR RELEASE VALVE	1 EA

SHEET INDEX
Sheet 2/3 of 3
Sheet 3 of 3 AWC Notes
Sheet 3 AWC Specs.

BENCHMARK

DATE	DESCRIPTION
10/8/2010	

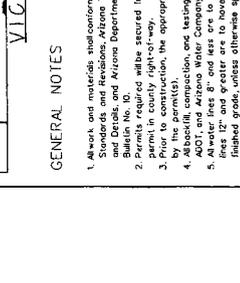
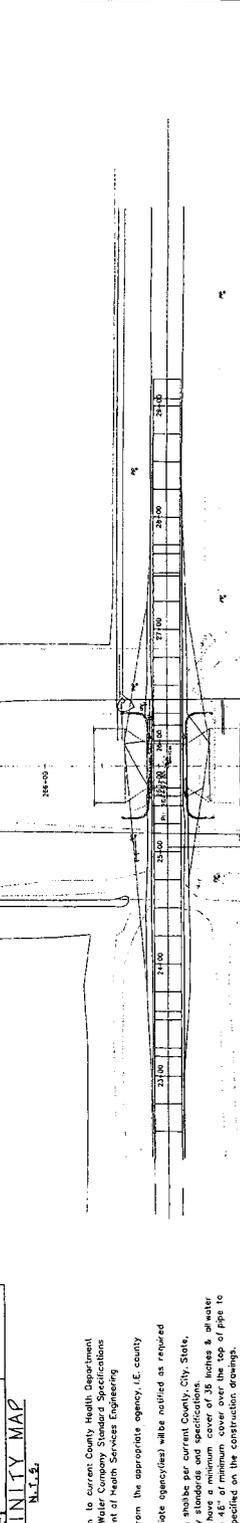
SYSTEM	COORDE	LOCATION	COUNTY	SCALE	DATE
M.A. - 4786		NE 1/4 SEC. 24 - T.5S. R.8E	AS SHOWN	AS SHOWN	10/8/2010

DESCRIPTION	DATE

DESCRIPTION	DATE

DESCRIPTION	DATE

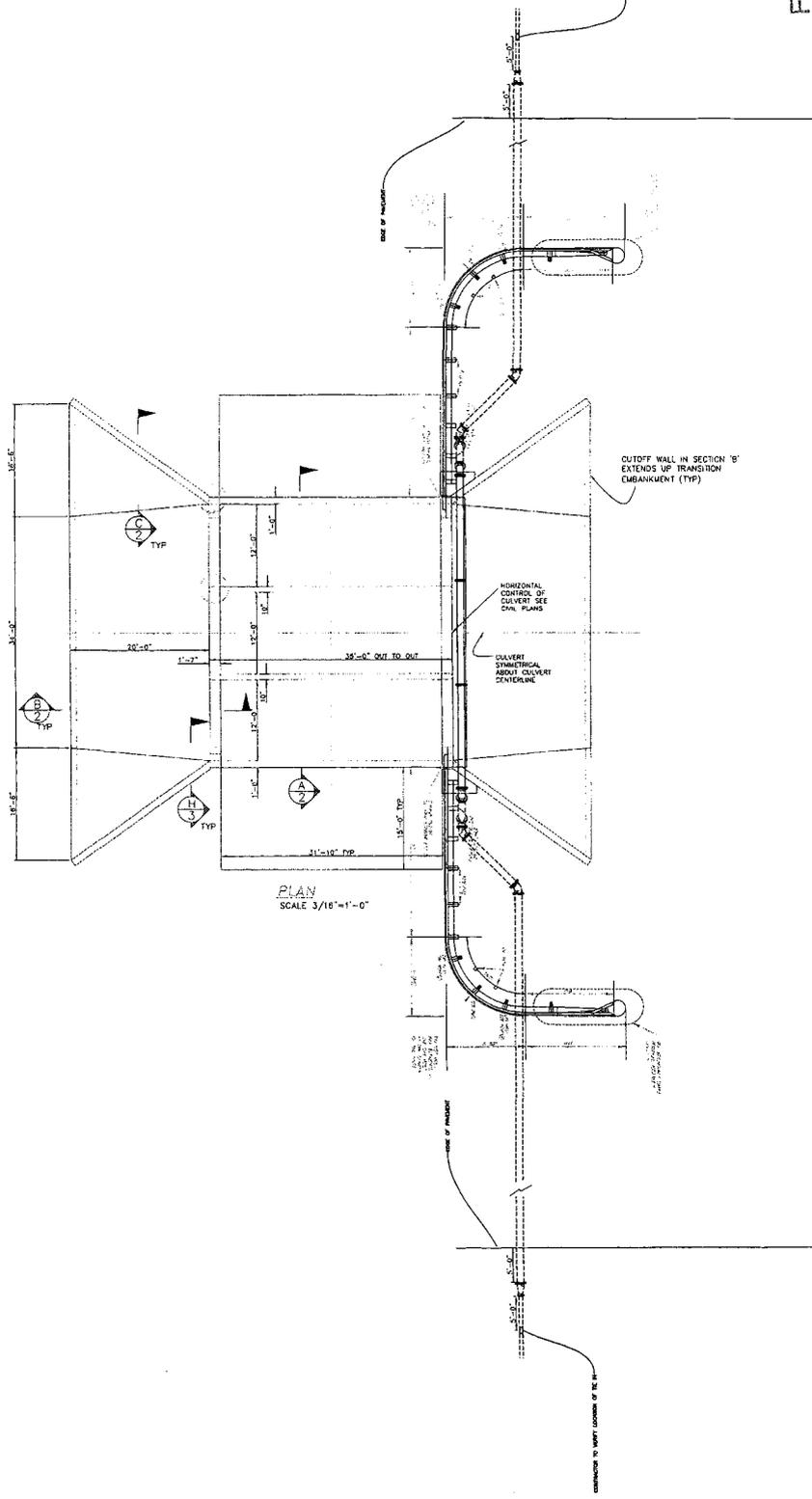
DESCRIPTION	DATE



GENERAL NOTES

1. Work and materials specifications to current County Health Department and District and Arizona Water Company Standard Specifications Bulletin No. 10.
2. Permits required will be secured from the appropriate agency, i.e. county by the permit(s).
3. Prior to construction, the appropriate agency(ies) will be notified as required by the permit(s).
4. All backfill, compaction, and testing shall be per current County, City, State, and District specifications.
5. All water lines 8" and less are to have a minimum cover of 36 inches & all water lines 12" and greater are to have 48" of minimum cover over the top of pipe to finished grade, unless otherwise specified on the construction drawings.
6. All water lines shall be installed in accordance with the appropriate code of practice for the applicable jurisdiction.
7. All water lines shall be pressure and leakage tested in accordance with AWMA C-600 or AWMA 610-14.
8. All water lines shall be tested in accordance with AWMA C-600 or AWMA 610-14.
9. All water lines shall be tested in accordance with AWMA C-600 or AWMA 610-14.
10. All water lines shall be tested in accordance with AWMA C-600 or AWMA 610-14.
11. All water lines shall be tested in accordance with AWMA C-600 or AWMA 610-14.
12. All water lines shall be tested in accordance with AWMA C-600 or AWMA 610-14.
13. All water lines shall be tested in accordance with AWMA C-600 or AWMA 610-14.
14. All water services shall be set a minimum of 2 feet on the customers property and NOT within right-of-way.
15. Unless otherwise specified on the construction drawings, all water mains are to be installed in accordance with the applicable code of practice for the applicable jurisdiction.
16. Water valves shall be spaced not more than 500 feet in commercial districts and not more than 800 feet in other districts. Variations may be required for transmission mains or special applications. Sufficient valves are required where water lines cross streams, roads and major highways.
17. For 18" Fall Length Pipe, For A Maximum Curve Of 165 Feet.
18. Maximum Joint Deflection For 6", 8", & 12" Push-On Joint Ductile Iron Pipe Is 3'-0" / 8" For 18' Fall Length Pipe, For A Maximum Curve Of 265 Feet.
19. Maximum Joint Deflection For 8" & 12" Mechanical Joint Ductile Iron Pipe Is 5'-210" / 20" For 18' Fall Length Pipe, For A Maximum Curve Of 195 Feet.

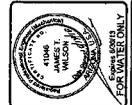
ADDITIONAL NOTES



PLAN
SCALE 3/16"=1'-0"

FILE

FOR BIDDING PURPOSES ONLY
OCT 14 200
Engineered by
D. J. WILSON



ARIZONA WATER COMPANY
DRAWING NO. CL-0352
SHEET 2 OF 4
FOR WATER ONLY



CONNECTION TO WATER CONTROL OF RE. 16

SIZE OF PRECINCT

OUTLET WALL IN SECTION 'B'
EXTENDS UP TRANSITION
EMBANKMENT (TYP)

HORIZONTAL
CONTROL OF
CULVERT SEE
CIVIL PLANS

CULVERT
SYMMETRICAL
ABOUT CULVERT
CENTERLINE

SIZE OF PRECINCT

CONNECTION TO WATER CONTROL OF RE. 16

INSTRUCTIONS

Please complete the test data and submit this form with the Engineers Certificate of Completion. An Approval of Construction cannot be issued without the data identified below in accordance with Arizona Administrative Code (A.A.C.) R18-5-508(C). Please attach all supplemental information and calculations to this form.

DATA

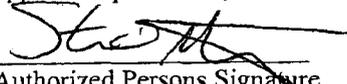
1.

PRESSURE TEST DATA				
	Indicate Segment Tested	BRIDGE	BRIDGE	
	Pressure and Leakage Test Results (Pass/Fail)	PASS	PASS	
	Date Tested	12/10/10	12/10/10	
	Time Started	11:00	11:00	
	Time Finished	13:00	13:00	
	Pipe Diameter	12"	6"	
	Footage Tested	199'	93'	
	Allowable Leakage	.4776	.093	
	Leakage Observed	0	0	
	Pressure at Test Point	150psi	150psi	
Employee Observing the Test (Please Print Legibly)				
Signature of Employee Observing the Test				
		<i>Steve</i>	<i>Steve</i>	

2.

DISINFECTION SAMPLING				
Initial Sampling (Minimum 50 ppm available chlorine)	Date	12/10/10		
	Time	08:30		
	ppm Cl ₂	200ppm		
After 24 Hours Detention Time (Minimum 10 ppm free chlorine)	Date	12/13/10		
	Time	10:00		
	ppm Cl ₂	100ppm		
After Sufficient Flushing (Water is clear and system Cl ₂ residual is measured)	Date	12/14/10		
	Time	10:00		
	ppm Cl ₂	.7		
Bacteriological Sampling(s):	Date	12/15/10		
	Time	12:40		
	Attached (Y/N)	YES		
		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Yes/No	Yes/No

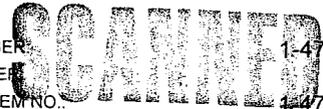
3.

Certification	Professional Seal
I, <u>STEVE ORTIZ</u> , certify that I have inspected the work performed and have found it to be satisfactory and in accordance with Arizona Administrative Code, Arizona Engineering Bulletins, and the approved specifications.	As per A.A.C. R18-5-507(B)(1)
<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  Authorized Persons Signature </div> <div style="text-align: center;"> 12/20/10 Date </div> </div>	

WA1-4774

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-4774
 P.E. NUMBER:
 BUDGET ITEM NO.: 1-4774
 SHEET NO.: 1 of 2



SYSTEM: PINAL VALLEY	WORK TO START BY: UPON AUTHORIZATION
DIVISION: PINAL VALLEY	WORK TO BE FINISHED BY: WITHIN 60 DAYS
TAX CODE: 2223	

DESCRIPTION OF WORK:

Install approximately 2,470 LF of 12" & 1,500 LF OF 16" DIP with polywrap and related fittings to serve Arizona City Water Campus. From Well #28 South along Lamb Road then East along Heather Street to AWC'S new Water Campus in Arizona City. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

APPROVED 2010 BUDGET ITEM (WA 1-4617)

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	<i>James Wilson</i> JW 11/15/10	11/9/10
LABOR	0	REVIEWED FOR ESMT ROW VERIFICATION:	
CONTRACT PORTION	251,225	<i>Charles Briggs</i> CB 11-15-2010	11-09-2010
OVERHEAD	60,294	REVIEWED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 311,519	<i>Mike Loggins</i> ML 11-15-10	11-9-10
FUNDS RECEIVED:		APPROVED BY ENGINEERING:	
CONTRIBUTIONS RECEIVED	0	<i>Fredrick Schneider</i> FS 11-16-10	11-9-10
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY FINANCE:	
TOTAL CONTRIBUTIONS/ADVANCES	0	<i>Joseph Harris</i>	11/9/10
NET CASH REQUIRED	\$ 311,519	AUTHORIZED BY PRESIDENT:	
		<i>William M Garfield</i>	11-15-10

COMMENTS:

FILE COPY

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
 Authorized by **FRED SCHNEIDER**
 Date 11/12/10

WORK AUTHORIZATION - DETAIL SHEET

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:
 Install approximately 2,470 LF of 12" & 1,500 LF OF 16" DIP with polywrap and related fittings to serve Arizona City Water Campus. From Well #28 South along Lamb Road then East along Heather Street to AWC'S new Water Campus in Arizona City.

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Tie into existing 12" DIP with an 12" TS & 12"TV w/related fittings		2	\$ 5,199.12	\$ 10,398
	Install a 12" TS with a 12" fig TV w/ an 16"x12" MJxFig reducer		1	5,277.43	5,277
	Install 12" DIP with polywrap & related fittings		2,470	41.05	101,394
	Install 16" DIP with polywrap & related fittings		1,500	50.57	75,855
	Install a 12" MJ Gate valve with related fittings		3	921.00	2,763
	Install a 12" FigxMJ Gate valve with related fittings		4	2,657.00	10,628
	Install a 16" MJ Gate valve with related fittings		1	4,568.00	4,568
	Install a 16" MJxFig GV with related fittings		1	1,990.00	1,990
	Install a 16"x6" FigxMJ Tee with a 6" FigxMJ GV w/related fittings		1	1,987.00	1,987
	Install a 6" Fire Hydrant with related fittings		1	2,502.00	2,502
	Provide Slurry back fill		1	10,000.00	10,000
	T-top pavement replacement		1	15,000.00	15,000
	Performance and Payment Bond		1	6,584.22	6,584
	Contractors Tax		1	2,278.63	2,279
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345			

TOTAL CONTRACT WORK \$ 251,225

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
METERS	346				

TOTAL MATERIALS \$ -

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION				
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345				
INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345				
INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345				

TOTAL LABOR \$ -

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 251,225

OVERHEAD 60,294

TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 311,519

AFH



ARIZONA WATER COMPANY

Casa Grande Office : P.O. Box 11838 - Casa Grande, AZ 85120 - 1630
Voice : 520-438-8785 Fax : 520-438-3858

PROPOSAL/CONTRACT

CONTRACTOR: <u>CENTRAL ARIZONA PIPELINE CONTRACTORS INC</u>	W.A. No: <u>1-4617</u>
ADDRESS: <u>PO BOX 338 Coolidge, AZ 85116</u>	W.D. Due Date: <u>November 3, 2010</u>

CONTRACTOR SUBMITS THIS PROPOSAL/CONTRACT TO ARIZONA WATER COMPANY, an Arizona corporation (the "Company"), to perform the work and complete the project described on Page 2 (the "Project"), as an independent prime contractor.

- Contractor certifies that it has a certain title (if any) has read, understood and agrees the General Contract Conditions of Payment, and the General Specifications and Standard Specification Drawings (the "Specifications"), all of which are attached hereto. Contractor has examined the specific plans and notes construction drawings for the Project (the "Drawings"), copies of which are also attached hereto. The General Conditions of Contract, Specifications and Drawings are incorporated into this Proposal/Contract. Contractor affirms that all work and materials to be furnished or purchased for the Project will be in strict conformance with the General Conditions of Contract, Specifications and Drawings.
- Contractor represents and warrants that it has satisfied and complied with the provisions of Section 6, Contractor Understands and Working Conditions, of the General Conditions of Contract prior to submitting this Proposal/Contract.
- Contractor represents that this Proposal/Contract is fair and honest in all respects, is submitted in good faith and is not submitted in collusion with any other company, entity or person.
- Contractor acknowledges that any bid or contract is void if it is not in accordance with the provisions of the General Conditions of Contract.
- Prior to the commencement of work, Contractor will submit to the Company a list of all materials to be used in the Project. Contractor's list will include the manufacturer, part number, size and quantity included in this Proposal/Contract.
- Contractor will furnish all labor, tools, equipment and materials required to complete the Project according to the General Conditions of Contract, Specifications and Drawings. No materials purchased by Contractor to be incorporated into the Project are subject to tax at the time of purchase and Contractor will not charge the Company for any such tax. Contractor will pay the applicable transaction privilege tax (the "Contracting Tax") on the Project and Contractor receives payment of the final Project invoice from the Company. The cost of materials incorporated into the Project which are exempt by Arizona Revised State Statute ("A.R.S.") from the Contracting Tax, for example, pipes or valves having a diameter of four (4) inches or larger, including equipment, fittings and any other related part that is used in operating the pipe or valve (A.S. §42-505) (6,6), will not be included in the total cost of the labor and materials upon which the Contracting Tax is computed. Contractor retains full liability and obligation to pay the Contracting Tax and will defend and indemnify the Company against any demand or obligation to pay the Contracting Tax.
- Contractor will maintain detailed accounting records of all materials purchased and incorporated into the Project. Such records will include all supporting original vendor invoices for all materials purchased. Following completion of the Project, Contractor will submit an itemized accounting to the Company which will include all supporting original vendor invoices and satisfactory evidence of payment thereof. The Company will not pay Contractor for materials not actually incorporated into the Project, and the disposition of such materials will remain Contractor's responsibility.
- The Company reserves the right to accept or reject any proposal or contract in whole or in part without obligation to the Contractor. The Company may accept this Proposal/Contract during a ninety-day (90) period commencing on the Bid Due Date. The Company may accept this Proposal/Contract by signing and mailing, or otherwise delivering, a copy hereof to Contractor during such ninety-day (90) period. If the Company does not accept this Proposal/Contract during such ninety-day (90) period, Contractor may cancel this Proposal/Contract by giving written notice of cancellation to the Company.
- Prior to the commencement of work, Contractor will provide the Company with a detailed construction schedule, in either Gantt or CPM form, identifying all tasks to be performed from the date of the written Commencement Notice through completion of the Project, including testing, testing of Company Personnel and final Project Invoicing. Contractor will provide the Company with a copy of such construction schedule documenting the progress of work on the Project at least monthly.
- Contractor will not commence work on the Project until the Company gives Contractor a written Commencement Notice. Contractor will complete the Project within 30 calendar days after the Commencement Notice is issued.
- Following the Company's written notice of satisfactory completion of the Project, and upon receipt of the final Project Invoice from Contractor, the Company shall pay Contractor the actual total cost of the Project, which will be calculated as shown on Page 2, except that actual labor and material quantities installed/construction will be substituted for the estimated labor and materials quantities and the Contracting Tax will be recalculated based on such actual labor and materials quantities.
- The amount of applicable liquidated damages for Contractor's failure to deliver or perform within the time frame shown in Paragraph 12 may be deducted from the Company's payment of the final Project Invoice. This provision shall not limit the Company's ability to terminate this Proposal/Contract for Contractor's unsatisfactory performance or failure to perform as provided in the General Conditions of Contract, Specifications or Drawings, or in this Proposal/Contract.

SPECIAL CONDITIONS:

MUST COMPLY WITH FINAL COUNTY REQUIREMENTS INCLUDING BEDDING OF PIPE, SLURRY B.T. TOP ASPHALT REPLACEMENT, POT HOLE OR OVER EXCAVATE THE SEWER LINE / RECLAIMED WATERLINE CROSSING AT LAMB ROAD & HEATHER TO CONFIRM THE MINIMUM 2' SEPERATION REQUIREMENT.

CONTRACTOR <u>CENTRAL ARIZONA PIPELINE CONTRACTORS INC</u>	PROPOSAL/CONTRACT ACCEPTED: ARIZONA WATER COMPANY
By: <u>Clinton White</u>	By: <u>Fredrick K. Schneider</u>
Print Name: <u>CLINTON WHITE</u>	Print Name: <u>FREDRICK K. SCHNEIDER</u>
Title: <u>PRESIDENT</u>	Title: <u>VP-ENGINEERING</u>
Date: <u>11-8-10</u>	Date: <u>11-15-10</u>

NOV.03.2010 14:26 520 836 2850

AZ WATER CO

1700 7.003/003



ARIZONA WATER COMPANY

Case Grande Office | P.O. Box 11830 - Casa Grande, AZ 85120 - 1000
Phone: 520-836-4785 Fax: 520-836-6830

PROPOSAL/CONTRACT

CONTRACTOR: <u>CENTRAL ARIZONA PIPELINE CONTRACTORS INC</u>	SYSTEM: <u>Casa Grande</u>
AZ CONTRACTOR LICENSE NO: <u>ROC 164758</u> CLASSIFICATION: <u>K-80</u>	(V.A. Note) <u>1-4617</u>
ADDRESS: <u>PO Box 338 Coolidge AZ 85128</u>	BID DUE DATE: <u>November 3, 2010</u>
BID BOND REQUIRED: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

DESCRIPTION OF PROJECT: **Install approximately 2470' of 12" & 1500' of 16" D.I.P. with polywrap and related fittings to serve The Arizona City Water Campus. From Well # 28 South along Lamb Rd then east along Heather Street to Arizona Water Company's New water Campus in Arizona City, AZ. Located in a portion of the NW 1/4 SEC. 1 T.8S. - R.6E. Per DWG CG - 1189**

	QUANTITY	LABOR	MATERIALS	LABOR	MATERIALS
1-2. MATERIALS EXEMPT FROM CONTRACTING TAX (see Paragraph 6)					
Tie in to existing 12" D.I.P. with an 12" T.S. & 12" T.V. with related fittings	2	352	4847.12	704	9694.24
Install a 12" T.S. with a 12" Flg. T.V. with an 16" x 12" MJ x Flg reducer	1	352	4425.42	352	4425.42
Install 12" Ductile Iron Pipe with polywrap & related fittings	2,470	6135	34.20	16911.00	84474.00
Install 16" Ductile Iron Pipe with polywrap & related fittings	1,500	945	48.12	12675.00	63150.00
Install a 12" MJ Gate valve with related fittings	3	176	745	528	2235.00
Install a 12" Flg x MJ Gate valve with related fittings	4	176	3781	704	4984.00
Install a 16" MJ Gate valve with related fittings	1	176	4392	176	4392.00
Install a 16" MJ x Flg GV with related fittings	1	176	1814	176	1814.00
Install a 16" x 5" Flg x MJ Tee with a 6" Flg x MJ GV w/related fits (FM)	1	176	1811	176	1811.00
Install a 6" Fire Hydrant with related fittings	1	352	2150	352	2150.00
Slurry backfill requirements along Heather between Lamb Rd & Kashmir Rd	1	3000	373.00	3000	373.00
7 - Top pavement replacement at the intersection of Heather & Kashmir Rd	4	300	400	1800	400
Put hole / over excavate the Sewer Backfilled waterline to maintain 2' sep.	1	740	400	740	400
Price only Per Ft to ship seal Heather St from Lamb Rd to Kashmir Rd.					
3. Total Labor to install Exempt Materials (add the amounts in column 1)				37902.50	
4. Total Exempt Materials (add the amounts in column 2)					223144.00
5. NON-EXEMPT MATERIALS					
7. Total Labor to install Non-Exempt Materials (add the amounts in column 5)				0	
8. Total Non-Exempt Materials (add the amounts in column 6)					0
9. Subtotal A (add lines 3, 7 and 8)					37902.50
10. Contracting Tax Base (multiply the amount on line 9 by 0.85)					32456.63
11. Applicable Contracting Tax Rate					10.7%
12. Contracting Tax (multiply the amount on line 10 by line 11)					3472.26
13. Subtotal B (add lines 4, 9 and 12)					43777.39
14. 100% Performance and Payment Bonds Cost					
15. Estimated Total Cost (add lines 13 and 14)					43777.39

NOTE: The Estimated Total Cost includes all labor and materials for backfill, pavement replacement, GWS seal, and traffic control devices for the Project.

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID 77
CENA-13
DATE (MM/DD/YYYY)
03/15/10

PRODUCER
THE MAHONEY GROUP - PHOENIX
20410 N. 19th Ave Ste 170
Phoenix AZ 85027-1405
Phone: 623-215-1300 Fax: 623-215-1333

INSURED
Central Arizona Pipeline
Clinton White
PO Box 338
Coolidge AZ 85228

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Financial Pacific Ins. Co.	31453
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR ADD'L LTR	INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS								
A	X	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PROJ. <input type="checkbox"/> LOC	180722A	01/14/10	01/14/11	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000								
A		AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS	180722A	01/14/10	01/14/11	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$								
		GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN AUTO ONLY: EA ACC \$ AGG \$								
		EXCESS/UMBRELLA LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE DEDUCTIBLE RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$								
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below OTHER				<table border="1"> <tr> <td>WC STATUTORY LIMITS</td> <td>UTR</td> </tr> <tr> <td>E.L. EACH ACCIDENT</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - EA EMPLOYEE</td> <td>\$</td> </tr> <tr> <td>E.L. DISEASE - POLICY LIMIT</td> <td>\$</td> </tr> </table>	WC STATUTORY LIMITS	UTR	E.L. EACH ACCIDENT	\$	E.L. DISEASE - EA EMPLOYEE	\$	E.L. DISEASE - POLICY LIMIT	\$
WC STATUTORY LIMITS	UTR													
E.L. EACH ACCIDENT	\$													
E.L. DISEASE - EA EMPLOYEE	\$													
E.L. DISEASE - POLICY LIMIT	\$													

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS
Arizona Water Company is named as additional insured per form CG2010 01/08R regarding General Liability. *Exception: 10 day notice of cancellation for non payment. THIS CERTIFICATE CANCELS & SUPERCEDES CERTIFICATE ISSUED 12/04/09.

CERTIFICATE HOLDER

ARIZWAT

Arizona Water Company
3805 N Black Canyon Highway
Phoenix AZ 85015

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL **30*** DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE



SCF General Insurance Company

Certificate of Insurance

Certificate Mailed To:

Name of Insured:

ARIZONA WATER COMPANY
3805 N BLACK CANYON HWY
PHOENIX AZ 85015

Central Arizona Pipeline
Contractors Inc
PO Box 338
Coolidge AZ 85128

Date Issued: 11/10/2010
Certificate Number: 10
Policy Number: G31275
Origin Date: 02/01/2009
Expiration Date: 02/01/2011
Liability Limits: 1000/1000/1000
(000 Omitted)

Proof of Coverage

Description of Operations

WATER MAIN OR CONNEC CONST-INCL TUN @ VARIOUS AZ LOCATIONS

Job Number:

Location:

Will be renewed for the next policy period unless we are otherwise directed by our policyholder. Should the above policy be canceled by the SCF General Insurance Company before the expiration date thereof, the SCF General Insurance Company will endeavor to mail 30 days written notice to the above named Certificate Holder, but failure to mail such notice shall impose no obligation or liability of any kind upon the SCF General Insurance Company.

This Certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policy listed hereon. This is to certify a workers' compensation policy has been issued to the insured listed hereon and is in force for the period referenced.

Certificate Issued To:

Arizona Water Company
3805 N Black Canyon Hwy
Phoenix AZ 85015

Authorized Representative

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph(s) 30 and 33 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 37.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

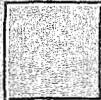
Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.



PINAL COUNTY DEPARTMENT OF PUBLIC WORKS

P.O. BOX 727, 31 N. PINAL STREET, BUILDING F, FLORENCE, AZ 85232

520-866-6411 FAX: 520-866-7943

DATE: BY:

TO:

ATTN:

REF #:

PROJECT NUMBER:

PROJECT NAME:

PROJECT LOCATION:

ITEMS BEING SENT:

- * For you to correct Return the redlines with sets of corrected plan report Electronic Copy
- * For you to correct Return the redlines with sets of corrected plans and one mylar cover sheet and one electronic copy
- as approved
- per your request **REVIEW STATUS** 1st 2nd 3rd Other Final
- * for review

ITEMS INCLUDED:

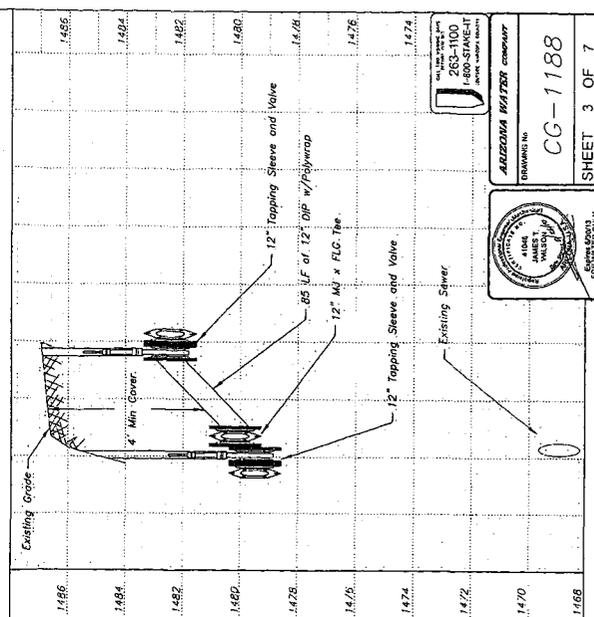
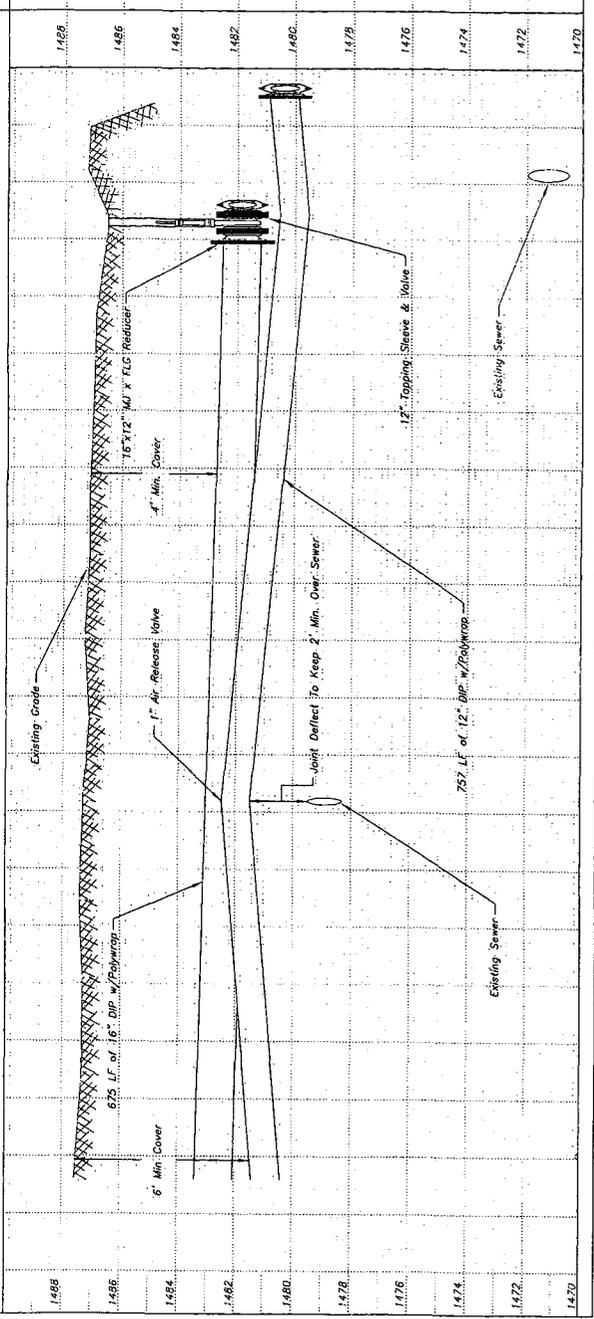
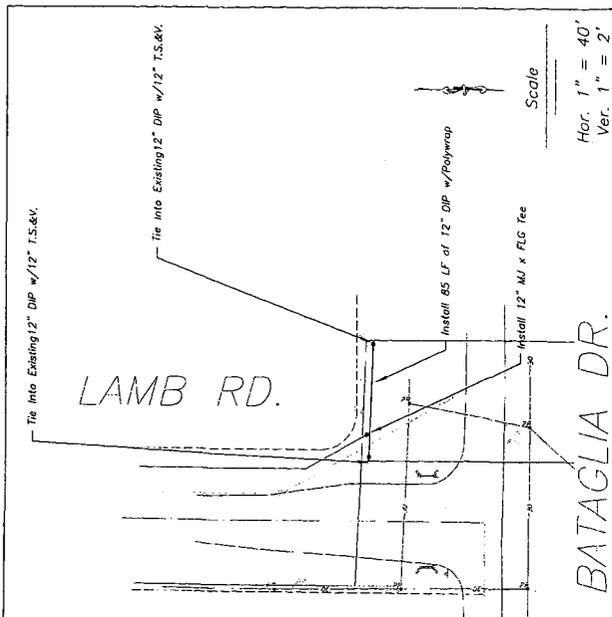
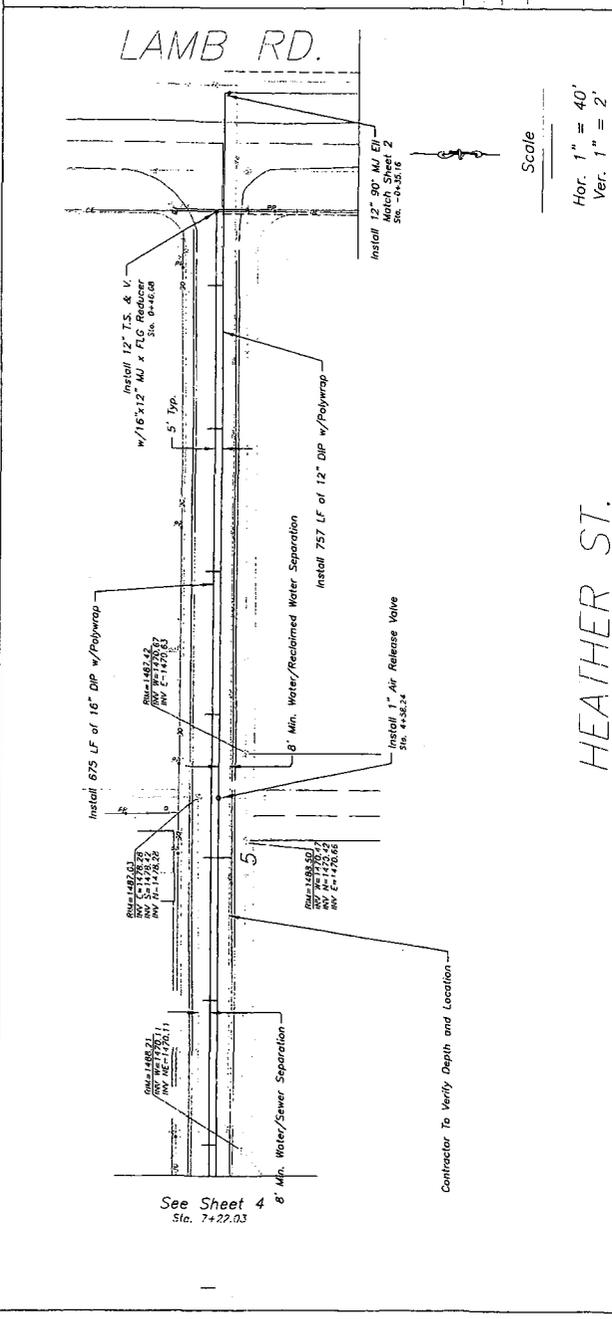
COMMENTS:

Review fees are due for: review @ \$ per page per plat per report

For the following plan/plat/report:

Please return the corrected plans with payment

Please return to: By:



J. J. ...

 REGISTERED PROFESSIONAL ENGINEER

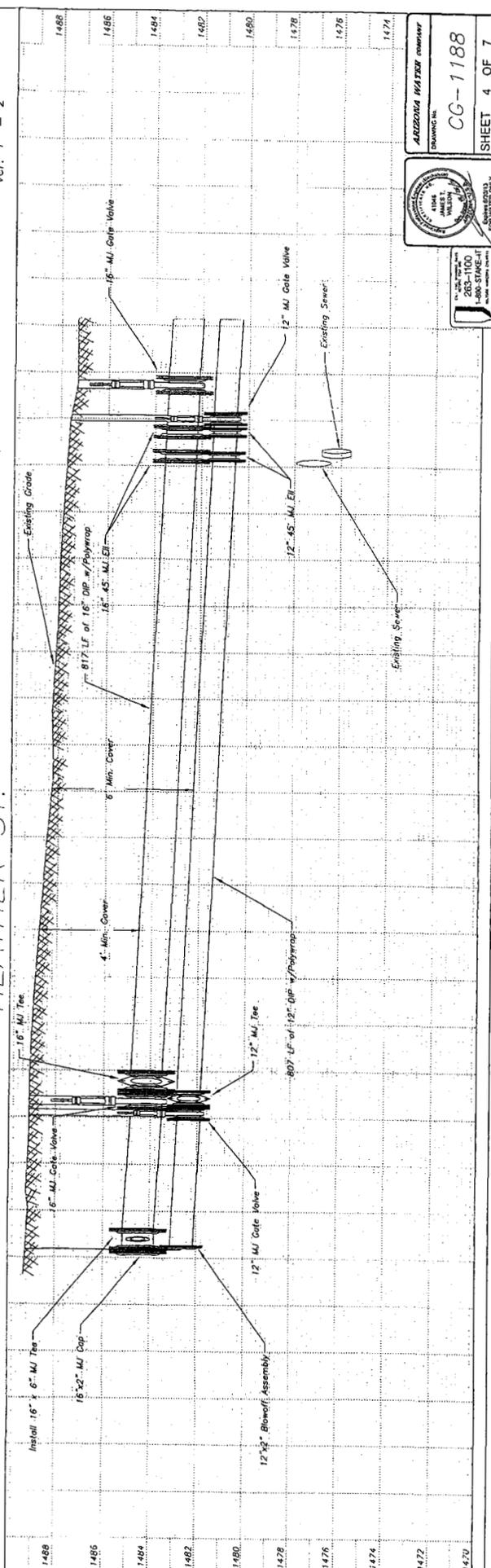
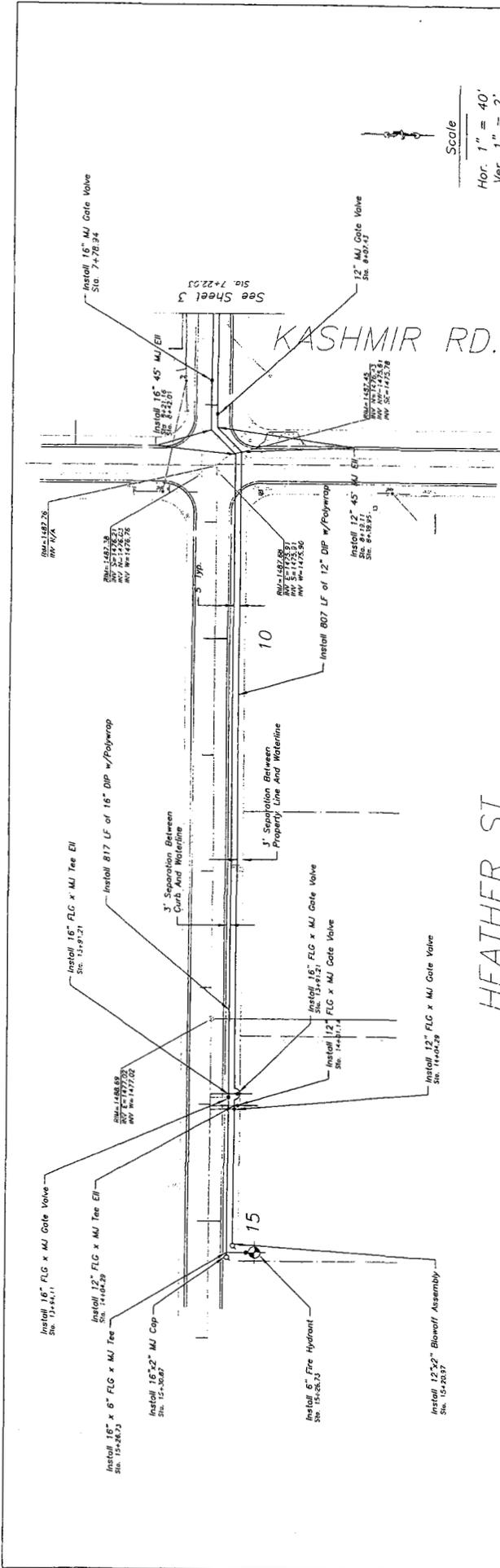
 STATE OF CALIFORNIA

ADDENDUM #147201 COMPANY

 DRAWN BY:

CC-1188

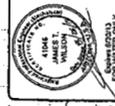
 SHEET 3 OF 7



Scale
 Hor. 1" = 40'
 Ver. 1" = 2'

KASHMIR RD.

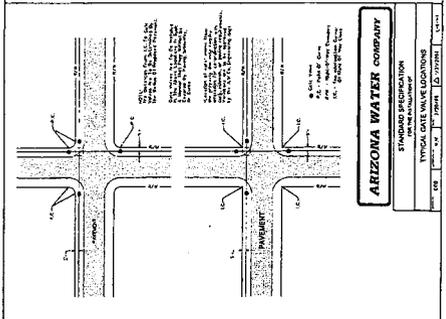
HEATHER ST.



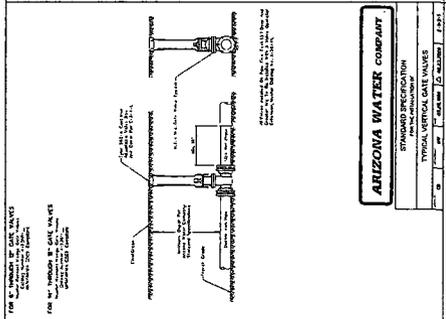
4022016 HATJOK owner
 DRAWING NO. CG-1188
 SHEET 4 OF 7

DATE: 11/15/2011
 TIME: 10:00 AM
 PROJECT: 4022016 HATJOK owner
 DRAWING NO. CG-1188
 SHEET 4 OF 7

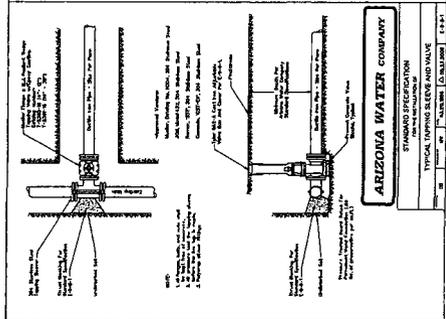
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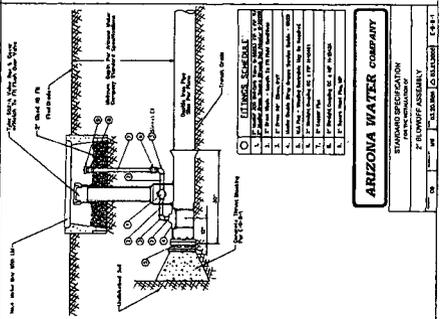
ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL GATE VALVE LOCATION



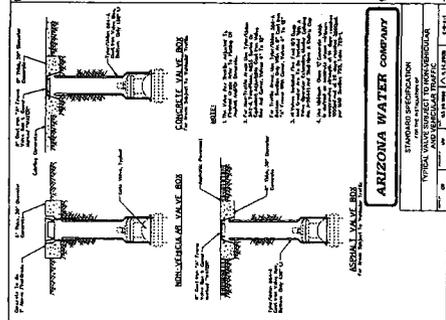
ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL GATE VALVE LOCATION



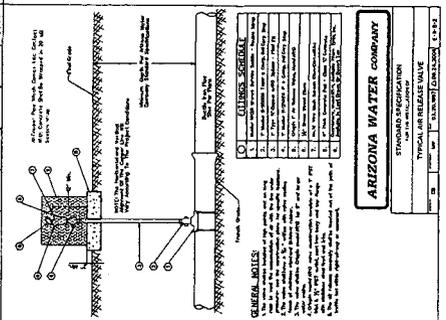
ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL TAPPING SLEEVE AND VALVE



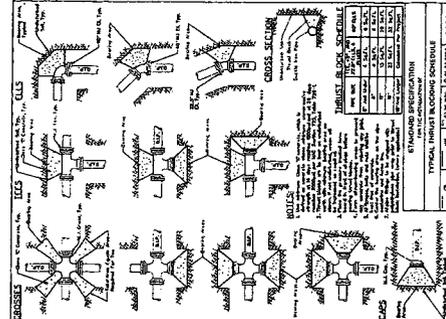
ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL AIR RELEASE VALVE



ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL VERTICAL RISING STEM VALVE



ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL AIR RELEASE VALVE



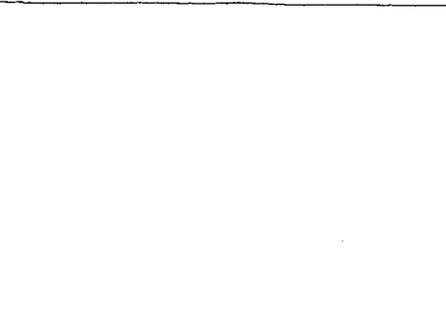
ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL VERTICAL RISING STEM VALVE



ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL AIR RELEASE VALVE



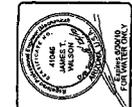
ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL AIR RELEASE VALVE



ARIZONA WATER COMPANY
 STANDARD SPECIFICATION
 TYPICAL AIR RELEASE VALVE

283-1100
 1-800-STAKE-IT

ARIZONA WATER COMPANY
 DRAWING NO. CG-1188
 SHEET 7 OF 7



WA1-4621

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-4621
P.E. NUMBER: WT
BUDGET ITEM NO.: B-1
SHEET NO.: 1 of 2

SYSTEM: WHITE TANK
DIVISION: CASA GRANDE
TAX CODE: 7900

WORK TO START BY: UPON AUTHORIZATION
WORK TO BE FINISHED BY: WITHIN 60 DAYS

DESCRIPTION OF WORK:

SCANNED

Replace the SES at Monte Vista (Phase 2 of 2)

FACTORS JUSTIFYING WORK:

APPROVED 2009 BUDGET ITEM (\$175,000) - SPENT \$151,854.53
APPROVED 2010 BUDGET ITEM (\$225,000)

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	James Wilson <i>gw 4/7/10</i>	4/1/10
LABOR	5,000	REVIEWED BY:	
CONTRACT PORTION	50,300	Charles Briggs <i>C.B. 4-8-10</i>	4-1-2010
OVERHEAD	13,272	REVIEWED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 68,572	Mike Loggins <i>ML 4-7-10</i>	4-1-10
FUNDS RECEIVED:		APPROVED BY:	
CONTRIBUTIONS RECEIVED	0	Fredrick Schneider <i>FS 4-8-10</i>	4-1-10
REFUNDABLE ADVANCES RECEIVED	0	APPROVED BY:	
TOTAL CONTRIBUTIONS/ADVANCES	0	Joe Harris <i>JH</i>	4/2/10
NET CASH REQUIRED	\$ 68,572	AUTHORIZED BY:	
		William M. Mansfield <i>WM</i>	4-6-2010
		William Garfield	

COMMENTS:

FILE COPY

Excess funds will be made available for other projects.

CONSTRUCTION RELEASE:

RELEASED TO
CONSTRUCTION

Authorized by FRED SCHNEIDER
Date 4/7/10

2010 BUDGET

AFH

ARIZONA WATER COMPANY

W.A. NUMBER: 1-4621
 P.E. NUMBER: WT
 BUDGET ITEM NO.: B-1
 SHEET NO.: 2 of 2

WORK AUTHORIZATION - DETAIL SHEET

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:
 Replace the SES at Monte Vista (Phase 2 of 2)

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	APS Service Upgrade - 167KVA Transformers and Wire	325	1	\$ 27,500.00	\$ 27,500
	Peerless 5x5x10.5 pump with 75HP motor	325	3	6,850.00	20,550
	Apex Construction Services	325	1	1,500.00	1,500
	Connect additional booster and add additional SES conduit	325	1	750.00	750
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				

TOTAL CONTRACT WORK \$ 50,300

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
SERVICE CONNECTIONS: SINGLE-SHORT	345				
METERS	346				

TOTAL MATERIALS \$ -

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	1	5,000.00	5,000
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345				
INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345				

TOTAL LABOR \$ 5,000

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 55,300

OVERHEAD 13,272

TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 68,572

AFH

ARIZONA WATER COMPANY
WORK AUTHORIZATION

SCANNED

W.A. NUMBER: 1-4621
 P.E. NUMBER: WT
 BUDGET ITEM NO.: B-1
 SHEET NO.: 1 of 2

SYSTEM: WHITE TANK	WORK TO START BY: UPON AUTHORIZATION
DIVISION: WHITE TANK	WORK TO BE FINISHED BY: WITHIN 60 DAYS
TAX CODE: 7900	

DESCRIPTION OF WORK:

Replace the SES at Monte Vista (Phase 1 of 2)

FACTORS JUSTIFYING WORK:

2009 BUDGET ITEM 175,000

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	James Wilson <i>gw</i>	9/17/09
LABOR	5,000	REVIEWED BY:	
CONTRACT PORTION	153,500	Mike Loggins <i>ML</i>	9/17/09
OVERHEAD	14,741	APPROVED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 173,241	Fredrick Schneider <i>FS</i>	9-17-09
FUNDS RECEIVED:		APPROVED BY:	
CONTRIBUTIONS RECEIVED	0	Joe Harris <i>JH</i>	9/16/09
REFUNDABLE ADVANCES RECEIVED	0	AUTHORIZED BY:	
TOTAL CONTRIBUTIONS/ADVANCES	0	William M Garfield <i>WG</i>	9-11-09
NET CASH REQUIRED	\$ 173,241		

COMMENTS:

This is phase 1 of 2 work. Phase 1 is the design & pre-purchase of the SES + panels. Phase 2, planned for 2010 will be for the completion of the panel work including the installation.

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
 Authorized by **FRED SCHNEIDER**
 Date 9/18/09

work to be bid to Felix, Keller + Sturgeon

AFH THIS work will also allow for increase booster capacity + the installation of a back-up pump.

FILE COPY

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-4621
 P.E. NUMBER: WT
 BUDGET ITEM NO.: B-1
 SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:
 Replace the SES at Monte Vista (Phase 1 of 2)

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Electrical Design and Survey	325	1	\$ 18,500.00	\$ 18,500
	SES enclosures and equipment	325	1	120,000.00	120,000
	APS Service Upgrade	325	1	15,000.00	15,000
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				

TOTAL CONTRACT WORK \$ 153,500

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
SERVICE CONNECTIONS: SINGLE-SHORT	345				
METERS	346				

TOTAL MATERIALS \$ -

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	1	5,000.00	5,000
INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345				
INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345				
INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345				
INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345				

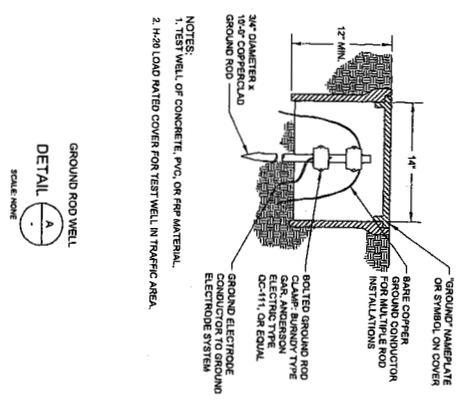
TOTAL LABOR \$ 5,000

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 158,500

OVERHEAD 14,741

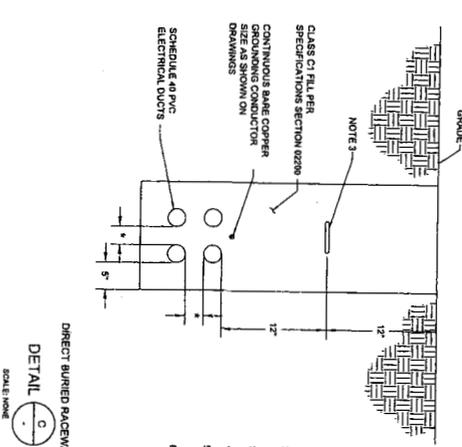
TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 173,241

AFH



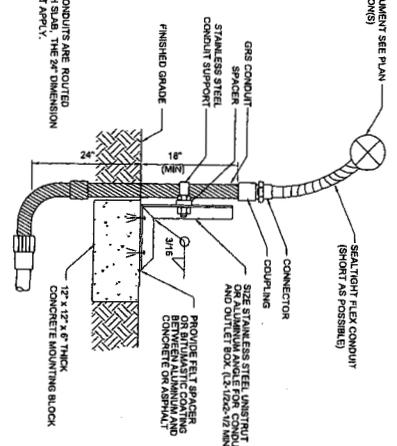
GROUND ROD WELL
DETAIL A
SCALE: NONE

NOTES:
1. TEST WELL OF CONCRETE, PVC, OR FRP MATERIAL.
2. H-20 LOAD RATED COVER FOR TEST WELL IN TRAFFIC AREA.



DIRECT BURIED RACEWAYS
DETAIL C
SCALE: NONE

NOTES:
1. REFER TO SPECIFICATION DIVISION 16 FOR DIRECT BURIED RACEWAY CONSTRUCTION REQUIREMENTS.
2. NUMBER AND SIZE OF ELECTRICAL DIRECT BURIED RACEWAYS AS INDICATED ON DRAWINGS OR SCHEDULES.
3. OSHA APPROVED 6" WIDE RED WARNING TAPE (IDEAL DU-601 OR EQUAL).
4. DIMENSIONS ARE MINIMUM.
5. BOND GROUNTING CONDUCTOR TO BUILDING GROUNDING ELECTRODES, POWER SOURCE AND LOAD ENCLOSURES.
6. SADDLE TYPE CONDUIT BUNCHES REQUIRED EVERY 8' (CARLON SNAK-LAC, SNAK-N-STAC, OR EQUAL).
7. PROVIDE 2" SEPARATION FOR CONDUITS LESS THAN 4".
8. PROVIDE 3" SEPARATION FOR CONDUITS 4" AND LARGER.



FIELD INSTRUMENT SEE PLAN FOR LOCATIONS)
FIELD DEVICE TRANSITION
DETAIL B
SCALE: NONE

NOTES:
1. WHERE CONDUITS ARE ROUTED THROUGH SOIL, THE 2" DIMENSION DOES NOT APPLY.
2. PROVIDE FELT SPACER BETWEEN ALUMINUM AND CONCRETE OR ASPHALT.

APEX Engineering & Automation, LLC
Quality Engineering...
1845 South Phoenix Road, Suite 101, Chandler, Arizona 85224-4849
Tel: 480-433-2328
Fax: 480-433-2329
www.apex-engineering.com

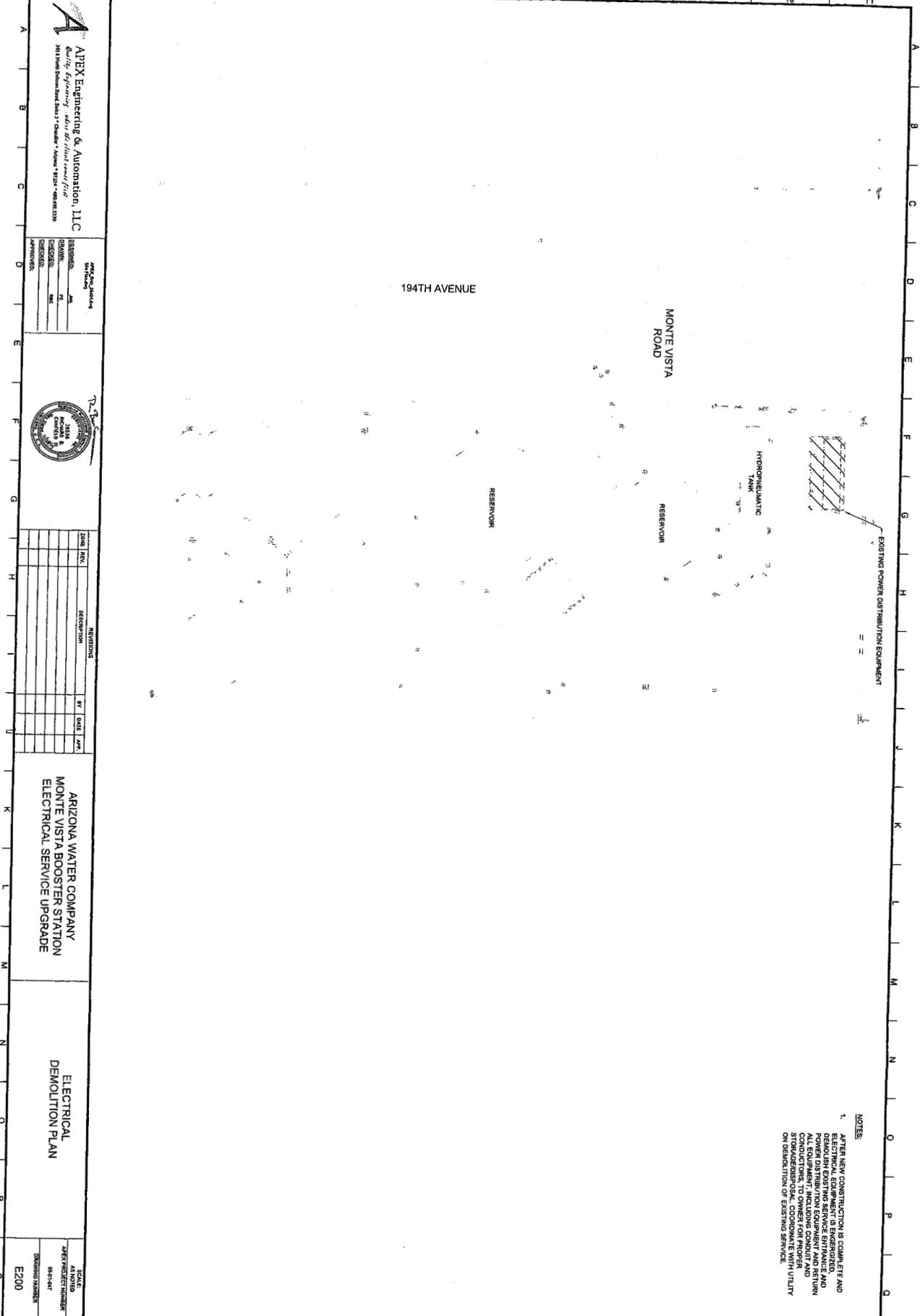
DATE	BY	DESCRIPTION
08-11-17	AS	ISSUE FOR PERMIT
08-11-17	AS	ISSUE FOR CONSTRUCTION
08-11-17	AS	ISSUE FOR RECORD

NO.	DATE	BY	DESCRIPTION
1	08-11-17	AS	ISSUE FOR PERMIT
2	08-11-17	AS	ISSUE FOR CONSTRUCTION
3	08-11-17	AS	ISSUE FOR RECORD

ARIZONA WATER COMPANY
MONTE VISTA BOOSTER STATION
ELECTRICAL SERVICE UPGRADE

ELECTRICAL
STANDARD DETAILS-
SHEET 1

DATE: 08-11-17
DRAWING NUMBER: E003



APEX Engineering & Automation, LLC
 Quality Engineering - when it counts most
 3801 North Phoenix Road, Suite 17, Chandler, AZ 85226 • 480.451.2339

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE



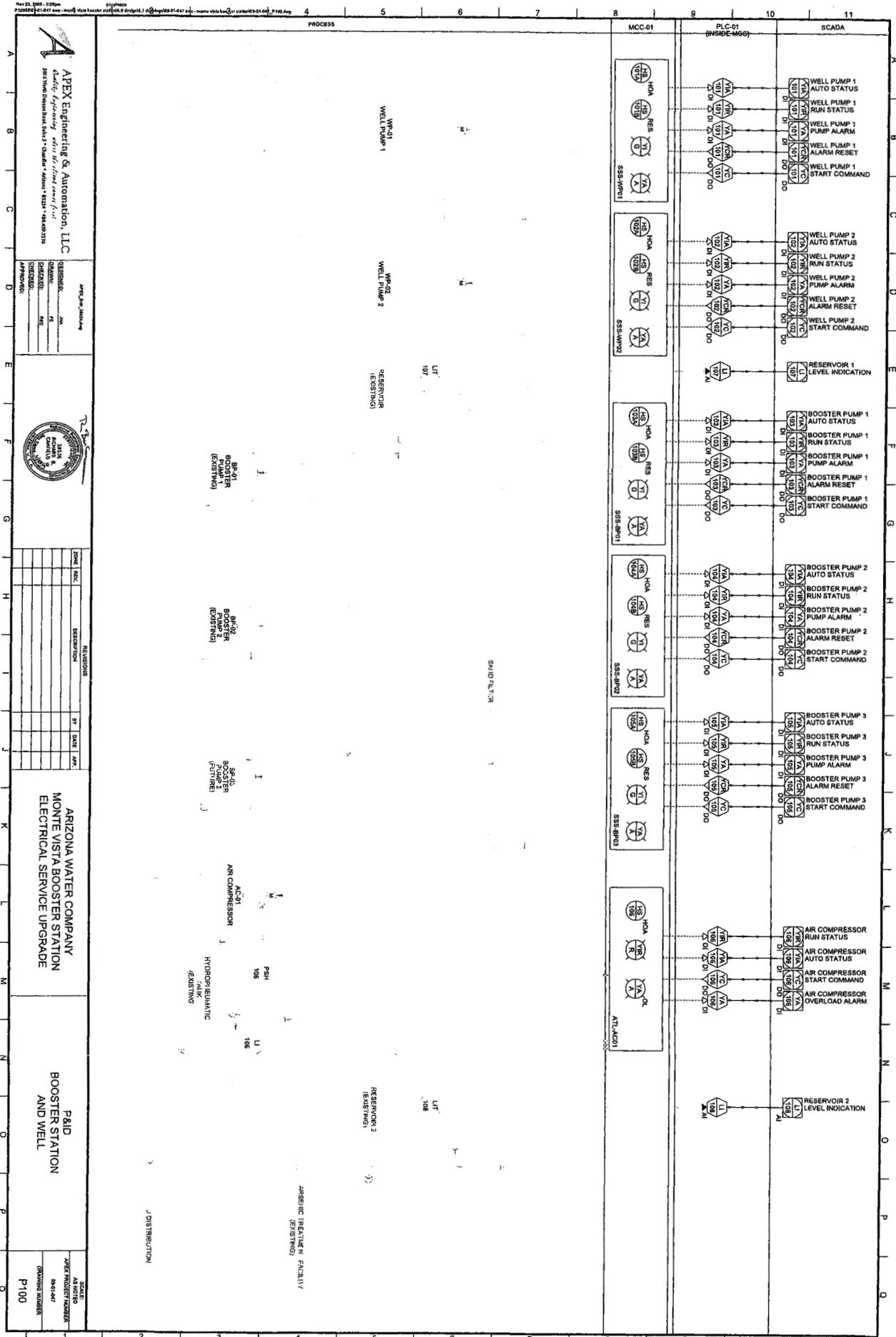
DATE	REV.	DESCRIPTION	BY	DATE

ARIZONA WATER COMPANY
 MONTE VISTA BOOSTER STATION
 ELECTRICAL SERVICE UPGRADE

ELECTRICAL
 DEMOLITION PLAN

SCALE	DATE
TWO INCHES EQUAL ONE FOOT	04-20-08
DRAWING NUMBER	E200

- NOTES:**
- AFTER NEW CONSTRUCTION IS COMPLETE AND ELECTRICAL EQUIPMENT IS ENERGIZED DEMOLISH EXISTING SERVICE ENTRANCE AND ALL EQUIPMENT AND CONDUIT AND RETURN CONDUITORS, TO OWNER FOR PROPER STORAGE/REPAIR. COORDINATE WITH UTILITY REPRESENTATION OF EXISTING SERVICE.



APEx Engineering & Automation, LLC
 Quality Engineering • 2010 10th Street, Suite 101
 2801 North Central Expressway, Suite 101 • Mesa, AZ 85215 • 480-492-2333

APEx Project Information

DESIGNER:	APEx
CLIENT:	AWC
PROJECT:	AWC
DATE:	08/11/2011
APPROVED:	



REVISIONS

NO.	DATE	BY	DESCRIPTION

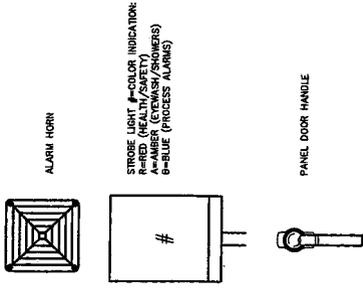
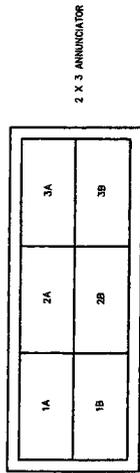
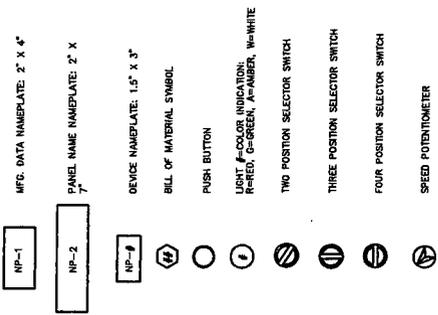
ARIZONA WATER COMPANY
 MONTE VISTA BOOSTER STATION
 ELECTRICAL SERVICE UPGRADE

P&ID
 BOOSTER STATION
 AND WELL

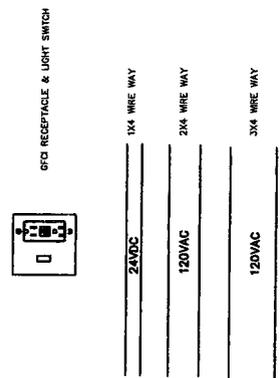
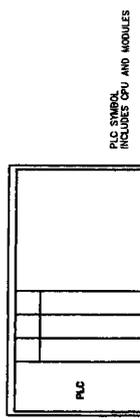
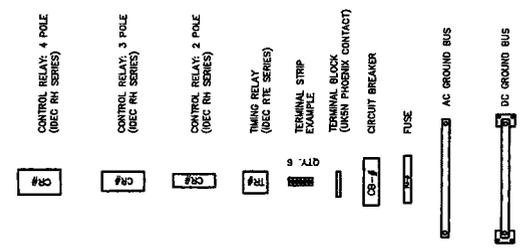
SCALE

AS NOTED
DATE PLOTTED: 08/11/2011
DRAWING NUMBER: P-100

EXTERIOR SYMBOLS



INTERIOR SYMBOLS



INSTRUMENT IDENTIFICATION TABLE

LETTER	FIRST LETTER - DESCRIBES INITIATING VARIABLE	SUCCESSING LETTERS - INDICATE POSSIBLE FUNCTION
A	ANALYSIS	ALARM
B	BURNER, COMBUSTION	CLOSE, STOP, DECREASE
C	CALCULATION	CONTROL
D	DENSITY, COMPUTER	CONTROL
E	ENERGY	CONTROL
F	FLOW RATE, RAND (FRACTION)	CONTROL
G	GRAVIMETER	CONTROL
H	HAND	CONTROL
I	INDICATOR	CONTROL
J	JUNCTION	CONTROL
K	KEY	CONTROL
L	LEVEL	CONTROL
M	MAGNETIC	CONTROL
N	NOISE	CONTROL
O	OPERATION	CONTROL
P	POSITION	CONTROL
Q	QUANTITY	CONTROL
R	RADIATION	CONTROL
S	SPEED, FREQUENCY, MOTION, SAFETY	CONTROL
T	TEMPERATURE	CONTROL
U	UNUSUAL	CONTROL
V	VIBRATION, VALVE	CONTROL
W	WEIGHT, FORCE, TORQUE	CONTROL
X	UNCLASSIFIED	CONTROL
Y	Y-Axis	CONTROL
Z	Z-Axis	CONTROL

WIRE COLOR TABLE

TYPE	FUNCTION	INSULATION COLOR
AC POWER/CONTROL (HOT)	120 VAC HOT	BLACK
AC POWER (NEUTRAL)	120 VAC NEUTRAL	WHITE
AC CONTROL	120 VAC LOGIC	RED
ISOLATED DC GROUND	GROUND	GREEN W/YELLOW STRIPE
AC GROUND	GROUND	GREEN
DC POWER	DC SOURCE	BLUE
DC POWER/CONTROL	COMMON	WHITE W/BLUE STRIPE
EXTERNAL 120 VAC	EXTERNAL 120 VAC	ORANGE
NEUTRAL	EXTERNAL	WHITE W/ORANGE STRIPE
TEMPORARY	TEMPORARY	PURPLE
LOW VOLTAGE AC CONTROL	24 VAC SOURCE	BROWN
LOW VOLTAGE AC CONTROL	COMMON	BROWN W/WHITE STRIPE
AC POWER	480 VAC PHASE A	BROWN
AC POWER	480 VAC PHASE B	ORANGE
AC POWER	480 VAC PHASE C	YELLOW
#16 AWG TWIS	ANALOG	RED (POSITIVE) BLACK (NEGATIVE)



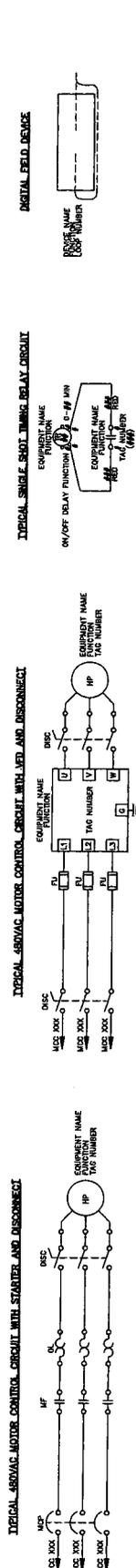
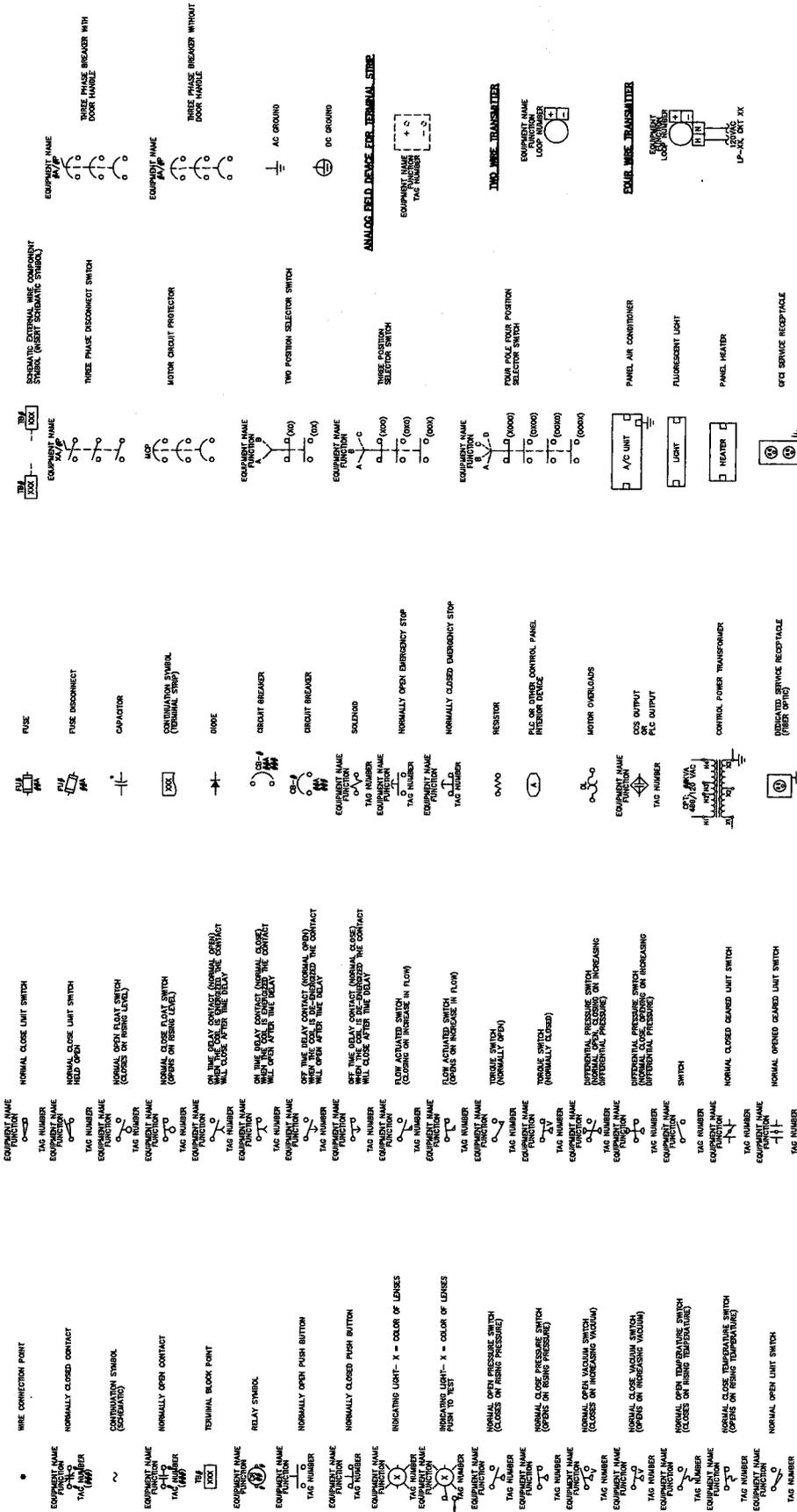
REVISIONS

NO.	BY	DATE	DESCRIPTION

ARIZONA WATER COMPANY
 WATER SERVICES DEPARTMENT
 MONTE VISTA BOOSTER STATION
 ELECTRICAL SERVICE UPGRADE

2049 N. 194TH AVE
 RTU/CONTROL SECTION IN MCC-01
 SYMBOLS AND LEGEND 1

SCHEMATIC SYMBOLS



DATE: AUGUST 4, 2010
SHEET 3 OF 8
CAD FILE: I-LEGEND.DWG

2049 N. 194TH AVE
ARIZONA WATER COMPANY
WATER SERVICES DEPARTMENT
MONTE VISTA BOOSTER STATION
ELECTRICAL SERVICE UPGRADE

REVISIONS		DES	DWN	CAD	ZEW
NO.	DATE	ZEW	ZEW	ZEW	ZEW

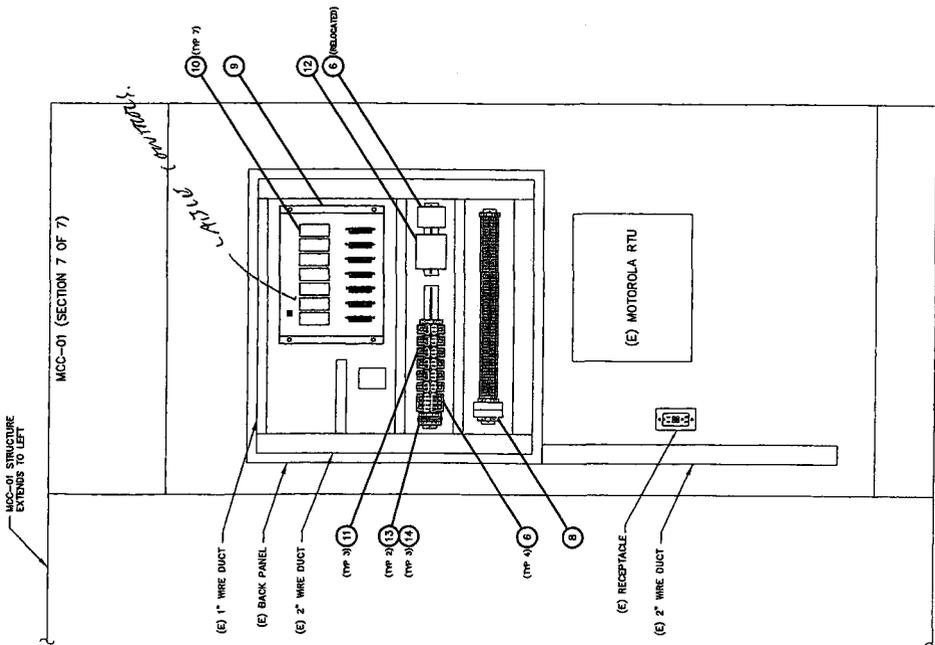
FELIX
CONSTRUCTION COMPANY

RTU/CONTROL SECTION IN MCC-01

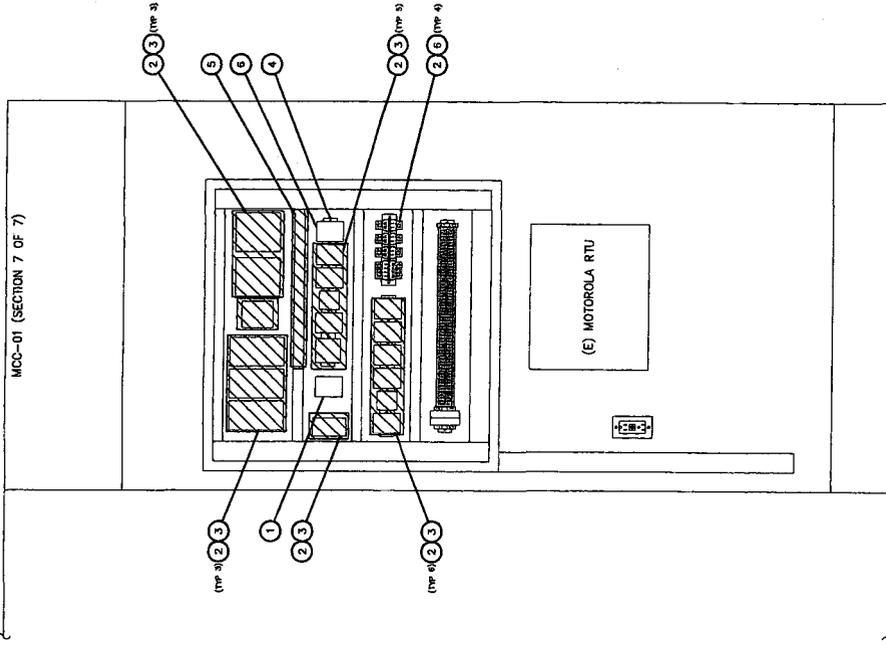
SYMBOLS AND LEGEND 2

THIS DRAWING MUST BE FIELD VERIFIED BEFORE USE
DRAWING NOT TO SCALE UNLESS SCALE BAR IS PRESENT

THIS DRAWING MUST BE FIELD VERIFIED BEFORE USE
DRAWING NOT TO SCALE UNLESS SCALE BAR IS PRESENT



INTERNAL ELEVATION
NTS



INTERNAL ELEVATION - DEMOLITION
NTS

KEY NOTES

- 1 WARRICK MODEL 82/40 1500C POWER SUPPLY/TRANSFORMER TO REMAIN IN PLACE. RE-WIRE AS NECESSARY PER WIRING DIAGRAMS.
- 2 DISCONNECT AND REMOVE WIRES FROM DEVICES BACK TO SOURCE.
- 3 DISCONNECT AND REMOVE DEVICES (TELEJAR RELAYS, CONTROL RELAYS, TIMER RELAYS, ETC.).
- 4 DISCONNECT AND REMOVE DIN RAIL.
- 5 CUT AND REMOVE WIRE DUCT AS INDICATED.
- 6 RELOCATE CONTROL RELAY AS INDICATED.
- 7 INSTALL NEW CONTROL RELAYS AS INDICATED.
- 8 EXISTING TERMINAL BLOCKS TO REMAIN (TYPICAL).
- 9 DC ALARM MODULE BACKBOARD (AGM MODEL 5500-8-7).
- 10 DC ALARM MODULE (AGM MODEL GA-4035-9).
- 11 CONTROL RELAY, DPST (DEC MODEL R128-UL-AC10-120V WITH BASE SW38-10).
- 12 2400C SWH POWER SUPPLY (DEC MODEL P5SR-124).
- 13 FUSED TERMINAL BLOCK (PHOENIX CONTACT MODEL UT-4-HESI-24).
- 14 TERMINAL BLOCK END ANCHOR (PHOENIX CONTACT).

DEMOLITION GENERAL NOTES

- A. ALL COMPONENTS THAT ARE DISCONNECTED AND REMOVED FROM BACK PANEL SHALL BE SALVAGED TO THE WATER COMPANY.

PROJECT NO.	PROJECT NAME	DATE	CAD FILE NAME	DWG NUMBER	REVISIONS

	ARIZONA WATER COMPANY WATER SERVICES DEPARTMENT MONTE VISTA BOOSTER STATION ELECTRICAL SERVICE UPGRADE	RTU/CONTROL SECTION IN MCC-01 FRONT ELEVATION	2049 N. 19TH AVE DATE: AUGUST 4, 2010 SHEET 4 OF 8 CAD FILE: FRONT-ELEVATION.DWG										
REVISIONS <table border="1" style="width: 100%;"> <thead> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>DESCRIPTION</th> <th>REVISIONS</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	BY	DATE	DESCRIPTION	REVISIONS						DEE ZEW DVM ZEW SLD ZEW	(E) MOTOROLA RTU (E) RECEPTACLE (E) 2" WIRE DUCT (E) 1" WIRE DUCT (E) BACK PANEL (E) 2" WIRE DUCT	(E) MOTOROLA RTU (E) RECEPTACLE (E) 2" WIRE DUCT (E) 1" WIRE DUCT (E) BACK PANEL (E) 2" WIRE DUCT
NO.	BY	DATE	DESCRIPTION	REVISIONS									



ARIZONA WATER COMPANY

CONTRACT

CONTRACTOR: Felix Construction Company

DATE OF CONTRACT: December 21, 2009

Address: 309 E. 10th Drive

SYSTEM: White Tank

Mesa, AZ 85239

W.A. #: 1-4621

DESCRIPTION OF WORK:

Install new 800 amp service entrance section and motor control center as per attached proposal December 14, 2009.

WORK SHALL BE COMPLETED ON OR BEFORE ~~30~~ ¹⁵⁴ CALENDAR DAYS AFTER COMMENCEMENT NOTICE IS ISSUED.

(See Paragraph 4, below).

TOTAL COST
(including taxes): \$133,674.00

THIS CONTRACT is made by and between ARIZONA WATER COMPANY, an Arizona corporation, (hereinafter referred to as the "Company"), and the CONTRACTOR named above.

1. The Contractor hereby certifies that it has read the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* ("AWC Specifications") and related construction drawings, and understands that all provisions of said AWC Specifications, and related construction drawings, apply to work covered under this Contract, and which, by this reference, are incorporated herein.
2. The Contractor agrees, as an independent contractor, to furnish all of the labor, tools and certain materials required to perform the work described above for the Company, in accordance with the General Conditions of Contract and related construction drawings.
3. The Company agrees to furnish to the Contractor, without any cost to Contractor, certain equipment and materials necessary to be used or expended in the performance of said work, as follows: NONE.
4. Work shall not commence upon this Contract until a written Commencement Notice has been given to the Contractor by the Company. In the event the Commencement Notice is not given to the Contractor by the Company within ninety (90) calendar days from the date of this Contract, the Contractor has the option to cancel the Contract by giving written notice of cancellation to the Company.

Upon the satisfactory completion of the work within the Contract time limit, the Company agrees to pay, in cash, to the Contractor the total cost of the work, including all taxes.

SPECIAL CONDITIONS:

THIS SIGNED CONTRACT TO SERVE AS THE COMMENCEMENT NOTICE

ARIZONA WATER COMPANY

Company

By: James T. Wilson, PE
Title: Senior Engineer

afh

FELIX CONSTRUCTION COMPANY

Contractor

By: Archie Lopez
Title: E/IT & C DIVISION MGR.

Archie Lopez Pres.

PROPOSAL

INCLUDING LABOR AND MATERIALS

In response to the Invitation To Bid from Arizona Water Company (the "Company"), and in accordance with the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* (the "AWC Specifications") thereto, and all applicable plans, the undersigned Contractor hereby proposes and agrees to furnish and to do everything required by the terms and conditions of the Company's standard construction contract (the "Contract") for the construction of a new service entrance section and motor cover center at the Monte Vista Water Campus at White Tank, Arizona, at the following unit and/or total prices for the work described:

ITEM	WORK	QUANTITY & UNIT PRICE	TOTAL
1.	Furnish & Install new 800 amp w/277/480 volt, 3 phase 4 wire underground feed for utility connection	1 - 12,000.00	12,000.
2.	Furnish & Install new 800 amp MCC complete as per plans	1 - 64,500.00	64,500.
3.	Construction	1 - 11,396.00	11,396.
4.	Threnching and Conduit	1 - 14,633.00	14,633.
5.	Concrete Pads	1 - 1,200.00	1,200.
6.	RTU, Controls and Instrumentation	1 - 5,853.00	5,853.
7.	Terminations	1 - 2,500.00	2,500.
8.	Electrical Testing	1 - 6,500.00	6,500.
9.	O & M Manuals and As-Built Drawing's	1 - 2,330.00	2,330.
		Subtotal	129,912.
		Taxes	11,232.
		Subtotal	132,144.
		100% Performance & Payment Bonds 1.19 %	1,439
		Total	133,674

The prices submitted in this Proposal are good for ninety (90) calendar days from the date of this Proposal. The work shall be completed within 154 (120) calendar days after the Commencement Notice is issued.

At the sole discretion of the Company, the 100% performance and payment bonds may not be required.

The Contractor represents that this Proposal, in all respects, is fair and honest, is submitted in good faith, and is not submitted in collusion with any other company, firm or individual. The Contractor represents that it is not in debt or default to the Company. The Contractor further represents that it has visited the site of the work and is knowledgeable of its environment. Within five (5) days of the Contractor receiving the Contract for the performance of this work, the Contractor will execute the Contract and return it to the appropriate Company office.

The Contractor agrees to provide the Company with a current Certificate of Insurance with coverage in the minimum amounts required by the General Conditions of Contract, before this Proposal will be accepted for consideration. It is understood and agreed that, if a claim is received by the Company in connection with the work performed under Contract with the Company, the claim will be referred to the insurance carriers of the Contractor and the Company in accordance with the General Conditions of Contract.

The Contractor is the holder of Arizona State Contractor's License No. ROC 172036, Classification L-11.

Contractor's Complete Business Address

309 E. 10th DRIVE
MESA, AZ. 85239

FELIX CONSTRUCTION COMPANY

Contractor

By: DANA WAITS
Dana Waits

Title: E-IBC DIVISION MANAGER

Date: 12/14/09

AFH

Monte Vista Water Campus SES / MCC & Upgrades

Project Description	Total Cost	Duration in Calendar Day's							Total Weeks
		SES Submittals	Submittal Review	Swgr / Equip Delivery " Approved Submittals "	Installation / Outside Lead Item/s	Contractor Testing	Start-up / Testing / Training	Total Calendar Days	
Monte Vista Water Campus SES / MCC & Upgrades	\$ 132,144	42	14	56	28	7	7	154	22.00

*** Enter # of Day's

Project Description	*** Notice to Proceed Date	Duration in Calendar Day's							Total Weeks
		SES Submittals	Submittal Review	Swgr / Equip Delivery " Approved Submittals "	Installation / Outside Lead Item/s	Contractor Testing	Start-up / Testing / Training	Total Calendar Days	
Monte Vista Water Campus SES / MCC & Upgrades	15-Jan-09	26-Feb-09	12-Mar-09	07-May-09	04-Jun-09	11-Jun-09	18-Jun-09	154	22.00

*** Enter Date

Project Scope / Quote Document

Project Location : Buckeye, Az.
Project Title : Monte Vista Water Campus SES / MCC & Upgrades
Date: December 10, 2009
Attn: James Wilson
Engineer
Felix Construction Company
Phone: (602)240-6860
Cell
E Mail jwilson@azwater.com
Prepared By: Dana Watts
E / I & C Division Manager
Felix Construction Company
Phone: 480-464-0011
Cell 602-390-4727
E Mail danaw@felixconstruction.com, daygeck@bluebottle.com

Scope Item Descriptions

Included Items

- 1 Furnish and Install new 800A SES, N3R, 42KAIC, APS with 800/3P MCB. Furnish and install new 800A MCC, N3R, 4 x 75 HP SSRV, 1 x Sz 1 AC Starter, 1 x 15KVA Transformer and Panel LP-01, TVSS, PQM and Future RTU control Section. Includes Grounding and Common Gear Pad. Coordination and Arc Flash Studies. New Disconnects NEMA 3R Non-fused 200/3P (4), 60/3P (1) & 30/3P (1) Arc Flash Labels and installation
- 2 Includes Blue Stake and Private Locator, 2 Sets of 4" per drawing one set stubbed out to west of SES for future Pad Mount Transformer (NIC) and the other Set routed to the existing Utility Pole for temporary Circuiting of new SES prior to Demo of existing Switchgear. Include all Site Excavation and backfill required to operate the equipment identified in the one line diagram and branch circuit power and Instrumentation to equipment identified in drawing package.
- 3 Demo existitng SES & MCC after completion and transtion of new equipment. (Stage demo equipment for disposal by Az Water).
- 4 3 x LIT's (Pressure Tansmitters) 1 x PSH. Wiring to existing Motor TSH's. Relocation of existing Motorolo Radio RTU (or installation of new Motorola (Furnished by Az Water)). I/O designations for I/O points on Radion to be supplied by Az Water prior to Demo and or Installation of new Motorola Radio RTU. Installation of existing phone line well relay relocated from existing cabinet.
- 5 Start-up, Contractor Acceptance Testing, Project As-Builts, Taxes. Scehedule as attached.
- 6 Warranty, 12 month's " Labor and Material " after acceptance for beneficial use.

Excluded Items

- 1 Building Permits and Inspection Service required to secure meter from APS.
- 2 RTU Hardware, Programming, Items or work not relected in bid package.
- 3 Engineering, Utility Company Fee's, Permits, Permit Fee's, and Bonds.

Sell Price: \$132,144

Quote Valid for 30 days from date of issue.

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.

AGREEMENT FOR CONSULTING SERVICES BETWEEN
ARIZONA WATER COMPANY AND
APEX ENGINEERING & AUTOMATION, LLC

THIS AGREEMENT is made and entered into on this 17th day of August, 2009, by and between Arizona Water Company, an Arizona corporation, hereinafter referred to as "Client," and APEX Engineering & Automation, L.L.C., a Limited liability company hereinafter referred to as "Consultant".

RECITALS

WHEREAS, Client is authorized to and desires to retain Consultant to provide engineering design, post design services for electrical upgrade design at the Monte Vista Booster Station.

WHEREAS, Consultant is agreeable to providing personnel and facilities necessary to perform the desired services within Client's required time; and

WHEREAS, Client desires to retain Consultant to perform the services in the manner, at the time, and for the compensation set forth herein;

NOW, THEREFORE, Client and Consultant agree as follows:

1. Description of Project.

Client and Consultant agree that Project is as described in Exhibit A, hereto, incorporated by reference herein and entitled "Scope of Work," dated August 10, 2009. If, during the course of Project, Client and Consultant agree to changes in Project, such changes shall be effective only after being incorporated in this Agreement by written amendment, signed by representative of Client and Consultant.

2. Scope of Consultant Services.

Consultant agrees to perform those services described hereafter. Unless modified in writing by both parties, duties of Consultant shall not be construed to exceed those services specifically set forth herein.

a. Basic Services. Consultant agrees to perform those services described in the Scope of Work (the "Services"). Any tasks not specifically described in the Scope of Work will be Additional Services.

b. Additional Services. Client shall pay Consultant all fees and costs incurred in performing Additional Services provided the services were authorized by Client in writing. Unless otherwise agreed in writing, Additional Services shall be compensated in accordance with Consultant's standard billing rates at the time the Additional Services are performed.

c. Litigation Assistance. Unless specifically stated therein, the Scope of Work does not include assistance to support, prepare, document, bring, defend or assist in litigation undertaken or defended by Client. All such services required or requested of the Consultant by Client or any third party (except claims between Client and Consultant) will be reimbursed at Consultant's applicable rates for such litigation services.

3. Responsibilities of Client.

In addition to payment for the Services performed under this Agreement, Client shall:

a. Assist and cooperate with Consultant in any manner necessary and within its ability to facilitate Consultant's performance under this Agreement.

b. Designate in writing a person to act as Client's representative with respect to this Agreement. Such person shall have complete authority to transmit instructions, receive information, interpret and define Client's policies, make decisions and execute documents on Client's behalf.

c. Furnish Consultant with all technical data in Client's possession including, but not limited to, maps, surveys, drawings, soils or geotechnical reports and any other information required by or useful to Consultant in performance of the Services under this Agreement.

d. Notify Consultant of any known or potential health or safety hazards existing at or near the project site.

e. Provide access to and/or obtain permission for Consultant to enter upon project related property during normal business hours, whether or not owned by Client, as required to perform and complete the Services.

4. Americans with Disabilities Act.

Any other provision of this Agreement to the contrary notwithstanding, unless otherwise specified in the Scope of Services, Client's contractors shall have sole responsibility as between Client and Consultant for compliance with the Americans With Disabilities Act ("ADA") 42 U.S.C. 12101 et. Seq. and the related regulations. Consultant shall provide client with applicable ADA criteria, which maybe required.

5. Authorization and Completion.

In signing this Agreement Client grants Consultant specific authorization to proceed with work as described in Scope of Work and under the terms of this Agreement.

6. Compensation.

a. Amount. For the Services described in Exhibit A, Client agrees to pay, and Consultant agrees to accept compensation in accordance with Exhibit B, attached hereto and incorporated herein. Where Consultant has provided Client with a breakdown of the total compensation into subtasks, such breakdowns are estimates only. Consultant may reallocate compensation between tasks, provided total compensation is not exceeded without the prior written approval of Client.

b. Payment. As long as Consultant has not defaulted under this Agreement, Client shall pay Consultant within thirty (30) days of the date of Consultant's invoices for services performed and reimbursable expenses incurred under this Agreement. If Client has reason to question or contest any portion of any such invoice, amounts questioned or contested shall be identified and notice given to Consultant within thirty (30) days of the date of the invoice. Any portion of any invoice not contested shall be deemed to be accepted and approved for payment and shall be paid to Consultant within thirty (30) days of the date of the invoice. Client agrees to cooperate with Consultant in a mutual effort to resolve promptly any contested portions of Consultant's invoices.

In the event any uncontested portions of any invoice are not paid within thirty (30) days of the date of Consultant's invoice, interest on the unpaid balance shall accrue beginning with the 31st day at the rate of 1.5% per month, and Consultant shall have the right to suspend work per Article XV, Suspension of Work.

7. Responsibility of Consultant.

a. Standard of Care Professional Services.

Subject to the limitations inherent in the agreed scope of work as to the degree of care, amount of time and expenses to be incurred, and subject to any other limitations contained in this Agreement, Consultant shall perform the Services and any Additional Services in accordance with generally accepted standards and practices customarily utilized by competent engineering firms in effect at the time Services and any Additional Services are rendered. Consultant does not expressly or impliedly warrant or guarantee its Services.

b. Reliance upon Information Provided by Others.

If Consultant's performance of services hereunder requires Consultant to rely on information provided by other parties (excepting Consultant's subcontractors), Consultant shall not independently verify the validity, completeness, or accuracy of such information unless otherwise expressly engaged to do so in writing by Client.

c. Consultant's Opinion of Costs.

Client acknowledges that construction cost estimates, financial analyses and feasibility projections are subject to many influences including, but not limited to, price of labor and materials, unknown or latent conditions of existing equipment or structures, and time or quality of performance by third parties. Client acknowledges that such influences may not be precisely forecasted and are beyond the control of Consultant and that actual costs incurred may vary substantially from the estimates prepared by Consultant. Consultant does not warrant or guarantee the accuracy of construction or development cost estimates, however, Consultant agrees to exercise its best Professional Judgment in rendering its opinions.

d. Construction Phase Services.

1. Consultant's Activities at Construction Site. The presence of Consultant's personnel at a construction site, whether as on-site representative, resident engineer, construction manager, or otherwise, does not make Consultant responsible for those duties that belong to Client and/or construction contractors or others, and does not relieve construction contractors or others of their obligations, duties, and responsibilities, including, but not limited to, construction methods, means, techniques, sequences, and procedures necessary for completing all portions of the construction work in accordance with the contract documents, any health or safety programs and precautions required by such construction work, and any compliance with applicable laws and regulations. Any inspection or observation of the contractor's work is for the purpose of determining that the work is proceeding in conformance with the intent of the project specifications and contract documents. Consultant has no authority to exercise control over any construction contractor in connection with their work or health or safety programs and precautions. Except to protect Consultant's own personnel and except as may be expressly required elsewhere in the Scope of Work, Consultant has no duty to inspect, observe, correct, or report on health or safety deficiencies of the construction contractor.

2. Shop Drawing and Submittal Review. If required by Consultant's Scope of Services, Consultant shall review shop drawings or other contractor submittals for general conformance with the intent of the contract documents. Except for services completed under direct contract to Consultant, Consultant shall not be required to verify dimensions, to engineer contractor's shop drawings or submittals, nor to coordinate shop drawings or other submittals with other shop drawings or submittals provided by contractor.

3. Record Drawings. Record drawings, if required, will be prepared, in part, on the basis of information compiled and furnished by others, and may not always represent the exact location, type of various components, or exact manner in which the Project was finally constructed. Except for services completed under direct contract to Consultant, Consultant is not responsible for any errors or omissions in the information from others that are incorporated into the record drawings.

e. Scope of Work.

1. Before preparing the scope of work, Consultant specifically acknowledges and agrees that it has inspected and familiarized itself with Client's site. The Consultant has received, or had the opportunity to inquire about and/or request all relevant information concerning the Scope of Work from Client or any other source Consultant deems necessary. The Scope of Work has been prepared by the Consultant and to the best of its knowledge includes all applicable work required to successfully complete the design of an electrical upgrade to feed the existing pumps, tanks, Arsenic treatment process and the demolition of existing equipment to be removed.

8. Asbestos/Hazardous Material.

Consultant and Consultant's subcontractors shall have no responsibility for the discovery, handling, removal, or disposal of, or exposure of persons to asbestos or hazardous or toxic materials that are present in any form at the Project site. Professional services related to or in any way connected with the investigation, detection, abatement, replacement, use, specification, or removal of products, materials, or processes containing asbestos or hazardous or toxic materials are beyond the scope of this Agreement.

In the event Consultant encounters asbestos or hazardous materials at the jobsite, Consultant may, at its option and without liability for damages, suspend the performance of services on the Project until such time as Client and Consultant mutually agree on an amendment to this Agreement to address the issue, or Client retains another specialist consultant or contractor to identify, classify, abate and/or remove the asbestos and/or hazardous materials.

9. Consultant's Work Product.

a. Scope.

Consultant's work product which is prepared solely for the purposes of this Agreement, including, but not limited to, drawings, test results, recommendations and technical specifications, whether in hard copy or electronic form, shall become the property of Client when Consultant has been fully compensated as set forth herein. Consultant may keep copies of all work product(s) for its records.

Consultant and Client recognize that Consultant's work product submitted in performance of this Agreement is intended only for the project described in this Agreement. Client's alteration of Consultant's work product or its use by Client for any other purpose shall be at Client's sole risk.

b. Electronic Copies.

If requested, solely as an aid and accommodation to Client, Consultant may provide copies of its work product documents in computer-readable media ("electronic copies",

"CADD"). These documents will duplicate the documents provided as work product, but will not bear the signature and professional seals of the registered professionals responsible for the work. Client is cautioned that the accuracy of electronic copies and CADD documents may be compromised by electronic media degradation, errors in format translation, file corruption, printing errors and incompatibilities, operator inexperience and file modification. Consultant will maintain the original copy, which shall serve as the official, archived record of the electronic and CADD documents.

10. Indemnification.

a. The Consultant shall indemnify the Client against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Client or of the Consultant or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Client or of the Consultant or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from, or in any manner arising out of, or in connection with, the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Client's active or passive negligence. The Consultant shall also, upon request by the Client, and at no expense to the Client, defend the Client in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Client or of the Consultant or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Client.

b. Consultant shall indemnify the Client against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

c. Consultant further agrees to defend, indemnify and hold harmless the Client, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the site of any material, substance, or waste, hazardous or nonhazardous, including, without limitation, drilling fluids, mud, cuttings

and development and test water howsoever same may be caused, including, without limitation, the Client's active or passive negligence.

11. Consultant's Insurance.

Consultant shall procure and maintain the following minimum insurance:

a. Commercial general liability insurance, including personal injury liability, blanket contractual liability and broad-form property damage liability coverage. The combined single limit for bodily injury and property damage shall be not less than \$1,000,000.

b. Automobile bodily injury and property damage liability insurance covering owned, non-owned, rented, and hired cars. The combined single limit for bodily injury and property damage shall be not less than \$1,000,000.

c. Statutory workers' compensation and employer's liability insurance as required by state law.

d. Professional liability insurance. The policy limit shall be not less than \$1,000,000.

Consultant shall either require each of its subconsultants to procure and to maintain the insurance specified in this section or insure its subconsultants in the Consultants own policy, in like amounts.

Client shall be named as additional insured on policies 1 and 2 above. Upon execution of this Agreement, Consultant will provide a certificate of insurance to Client. Consultant will keep the certificate current at all times while this Agreement is in effect. The Consultant will provide a 30-day written notice in the event the above policies are cancelled.

12. Confidentiality.

Consultant agrees it will maintain the confidentiality of all material it receives from Client and will not disclose, distribute, or publish to any third party such information without the prior permission of Client. Notwithstanding the foregoing, Consultant shall have no confidentiality obligation with respect to information that:

a. becomes generally available to the public other than as a result of disclosure by Consultant or its agents or employees;

b. was available to Consultant prior to its disclosure by Client;

c. becomes available to Consultant from a third party who is not, to the knowledge of Consultant, bound to retain such information in confidence.

In the event Consultant is compelled by subpoena, court order, or administrative order to disclose any confidential information, Consultant shall promptly notify Client and shall cooperate with Client prior to disclosure so that Client may take necessary actions to protect such confidential information from disclosure.

13. Subcontracts.

Consultant shall be entitled, to the extent determined appropriate by Consultant, to subcontract any portion of the services to be performed under this Agreement.

14. Suspension of Work.

Work under this Agreement may be suspended as follows:

a. By Client. By written notice to Consultant, Client may suspend all or a portion of the Work under this Agreement if unforeseen circumstances beyond Client's control make normal progress of the Work impracticable.

b. By Consultant. By written notice to Client, Consultant may suspend the work if Consultant reasonably determines that working conditions at the Site (outside Consultant's control) are unsafe, or in violation of applicable laws, or in the event Client has not made timely payment in accordance with Article VI, compensation

15. Termination of Work.

a. This Agreement may be terminated by Client as follows: (1) for its convenience on thirty (30) days' notice to Consultant, or (2) for cause, if Consultant materially breaches this Agreement through no fault of Client and Consultant neither cures such material breach nor makes reasonable progress toward cure within fifteen (15) days after Client has given written notice of the alleged breach to Consultant.

b. This Agreement may be terminated by Consultant as follows: (1) for cause, if Client materially breaches this Agreement through no fault of Consultant and Client neither cures such material breach nor makes reasonable progress toward cure within thirty (30) days after Consultant has given written notice of the alleged breach to Client.

c. Payment upon Termination. In the event of termination, Consultant shall perform such additional work as is reasonably necessary for the orderly closing of the work. Consultant shall be compensated for all work performed prior to the effective date of termination, plus work required for the orderly closing of the work, including: (1) authorized work performed up to the termination date plus termination expenses, including all labor and expenses, at Consultant's standard billing rates, directly attributable to termination; (2) all efforts necessary to document the work completed or in progress; and (3) any termination reports requested by Client.

16. Assignment.

This Agreement is binding on the heirs, successors, and assigns of the parties hereto. Except as otherwise set forth under Article VIII, Assignment of Tasks to Affiliates, this Agreement may not be assigned by Client or Consultant without prior, written consent of the other.

17. No Benefit for Third Parties.

The services to be performed by Consultant are intended solely for the benefit of Client, and no benefit is conferred on, nor contractual relationship established with any person or entity not a party to this Agreement. No such person or entity shall be entitled to rely on Consultant's services, opinions, recommendations, plans, or specifications without the express written consent of Consultant. No right to assert a claim against the Consultant, its officers, employees, agents, or consultants shall accrue to the construction Contractor or to any subcontractor, supplier, manufacturer, lender, insurer, surety, or any other third party as a result of this Agreement or the performance or nonperformance of the Consultant's services hereunder.

18. Force Majeure.

Consultant and Client shall not be responsible for delays caused by circumstances beyond their reasonable control, including, but not limited to: (1) strikes, lockouts, work slowdowns or stoppages, or accidents; (2) acts of God; (3) failure of Client to furnish timely information or to approve or disapprove Consultant's instruments of service promptly; and (4) faulty performance or nonperformance by Consultant or Client, Client's or Consultant independent consultants or contractors, or governmental agencies. Consultant and Client shall not be liable for damages arising out of any such delay, nor shall the Consultant or Client be deemed to be in breach of this Agreement as a result thereof.

19. Integration.

This Agreement represents the entire understanding of Client and Consultant as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered herein. This Agreement may not be modified or altered except in writing signed by both parties.

20. Severability.

If any part of this Agreement is found unenforceable under applicable laws, such part shall be inoperative, null, and void insofar as it conflicts with said laws, but the remainder of this Agreement shall be in full force and effect.

21. Choice of Law/Jurisdiction.

This Agreement shall be administered and interpreted under the laws of the State of Arizona. Jurisdiction of litigation arising from the Agreement shall be in The State of Arizona.

22. Attorneys' Fees.

In the event any claim, controversy, or legal action arises under this Agreement, the prevailing party shall be entitled to recover from the other party all attorneys' fees, costs, expenses and other fees incurred by the prevailing party.

23. Notice Provisions.

Notices concerning this Agreement shall be in writing and sent by certified mail or by courier (such as Federal Express), or by hand-delivery addressed as follows:

To the Company: Arizona Water Company
3805 North Black Canyon Highway
Phoenix, Arizona 85015-5351
Attention: President

or

Arizona Water Company
Post Office Box 29006
Phoenix, AZ 85038-9006
Attention: President

To Consultant: APEX Engineering & Automation, LLC
3016 N. Dobson Road, Suite 5
Chandler, AZ 85224
Attn: R. Ben Canfield, P.E.

Either party may change its address for purposes of this Section by giving written notice of such change of address to the other party

24. Authorization.

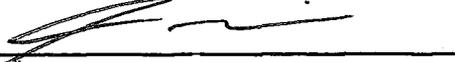
The persons executing this Agreement on behalf of the parties hereto represent and warrant that the parties have all legal authority and authorization necessary to enter into this Agreement, and that such persons have been duly authorized to execute this Agreement on their behalf.

IN WITNESS WHEREOF, each of the parties hereto has caused this instrument to be executed by their respective duly authorized officers as of the date first written above.

APEX ENGINEERING & AUTOMATION
an Limited liability company

ARIZONA WATER COMPANY,
an Arizona corporation

By: 

By: 

Its: VP of Engineering

Its: SR. ENGINEER



APEX Engineering & Automation, LLC

Quality Engineering...where the client comes first

August 14, 2009

James T. Wilson
Arizona Water Company
3805 N. Black Canyon Hwy.
Phoenix, AZ 85015
Office: 602-240-6860
Fax: 602-240-6878

Re: AWC - Monte Vista Booster Station Electrical Upgrade Design and Construction
Administration Services

Proposal No.: 09-01-047

Delivered via E-mail

Mr. Wilson:

On behalf of the APEX staff, I would like to thank you for inviting us to participate in the bid process for this project. In response to your request for quotation for the above named project, we have attached our professional services proposal.

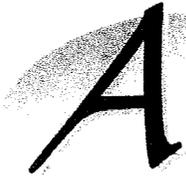
Please do not hesitate to contact me at anytime if you have questions or concerns regarding this proposal.

Sincerely,

R. Ben Canfield, P.E.
Owner

Attachments: Proposal

Cc: Chris Weber
File



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PROPOSAL NO.: 09-01-047

AWC - MONTE VISTA BOOSTER STATION ELECTRICAL UPGRADE
DETAIL AND CONSTRUCTION ADMINISTRATION
SERVICES PROPOSAL

PREPARED FOR:

**ARIZONA
WATER
COMPANY**

Client

Signature: _____

Printed Name: _____

Date: _____

August 14, 2009



APEX Engineering & Automation, LLC

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Project Overview:

Arizona Water Company (AWC) is seeking electrical design services for the Monte Vista Site Well / Booster Pump Station Electrical Upgrade. This facility upgrade will consist of new electrical service and distribution equipment to feed the existing pumps, tanks, arsenic treatment process ponds and the demolition of existing equipment to be removed.

This project proposal is for the electrical design to upgrade the existing facility and electrical service for the purpose of permitting and construction direction.

Scope of Work:

Phase 100 - Booster Station Electrical Upgrade Design Documents

Task 100 Design Documentation

This phase includes management of the project including staff resources and outside correspondence to assure timely project execution and completion.

Equipment for this project includes (1) existing booster station with (2) two existing 50HP booster pumps, (1) one provision for a future third 50HP pump, a Hydro tank and Air Compressor, (1) one 75HP submersible well pump, (1) one 30HP submersible well pump with provisions for a future upsizing of (1) one well pump to 200HP and an existing Arsenic Treatment System.

APEX will create an electrical design to integrate the existing site equipment to remain and electrical service along with the demolition of exiting equipment to be removed. Coordination with the utility transformer and the electrical service entrance section will be provided. Instrumentation and Controls design will be provided through P&IDs and schematic diagrams. The design will be based on maintaining the existing Motorola MOSCAD RTU, a couple SPA relay controls will be required to turn the wells on and off based on the local tank level and existing level transducer. Well run

permissive signals from the arsenic plant and nitrate analyzer will be incorporated into the well controls. The RTU enclosure will be sized for the future SCADA system.

APEX will visit the site after construction installation is complete to assess that the installation meets NEC and local codes and standards.

Deliverables:

ELECTRICAL

- E001 – Electrical Legends and Symbols – Sheet 1
- E002 – Electrical Legends and Symbols – Sheet 2
- E003 – Electrical Standard Details – Sheet 1
- E004 – Electrical Standard Details – Sheet 2
- E010 – Electrical Single-Line Diagram, Schedules and Calculations
- E011 – Electrical Schematic Diagrams
- E012 – Electrical Instrumentation Schematic Diagrams
- E100 – Electrical Facility Site Plan for Power and Conduit Routing
- E101 – Electrical Facility Site Plan for General Lighting and Grounding
- E110 – Electrical Site / Enlarged Electrical Plan
- E200 – Electrical Site Demolition Plan

ELECTRICAL

- P001 – P&ID Legends and Symbols – Sheet 1
- P002 – P&ID Legends and Symbols – Sheet 2
- P100 – P&ID Booster Station and Wells
- P101 – P&ID Arsenic Facility

SPECIFICATIONS

Specifications are not part of this scope of work.

Task 300: Construction Administration Services

APEX will provide Construction Administration services as listed below in the deliverables portion of this phase.

Deliverables:

1. (5) Request-For-Information (RFI)s
2. (5) Contractor Submittal Reviews
3. (1) Field Observations
4. Record Drawings based on contractor redlines and site visit

Phase 200 – Monte Vista Booster Station Site Survey

Task 100 Boundary Survey

This phase includes a site boundary survey as provided by APEX that will include the following:

- Provide measured ties to (2) two quarter section corners.
- Locate all above ground structures/improvements on property and extend to the street centerlines on the North and West and extend 25ft on the South and East outside of property boundaries (buildings, fences, valves/valve boxes, concrete pads/equipment pads, well, treatment equipment, above ground piping, tanks, electrical panels, edge of pavement, trees/shrubs, etc.).
- Spot elevations on a 25ft grid and at property corners, finish floors of buildings, tanks, top of equipment pads and well and electrical panel pads.
- Vertical Datum: NAVD88
- Deliverables: (4) four copies of sealed and signed AutoCAD files on compact disk.

Project Approach:

APEX will develop the drawings based on electronic AutoCAD copies of the site plans, functional operation and existing equipment from AWC. APEX will provide a PDF check print for intermittent reviews and (1) one sealed and signed set of prints at the final submittal to AWC for reproduction and delivery.

Project Schedule:

APEX is ready to begin this work based on a notice to proceed and provide a 30% review package, which will consist of the Single Line Diagram Drawings and Load Calculations, (2) two weeks from receipt of AWC supplied site plans. APEX understands that the Booster Station schedule is as follows; 90% (1) one week after 30% review comments from AWC and 100% (1) week after 90% review comments from AWC.

Project Fee:

APEX is ready to begin this work. APEX will then begin work based on a notice to proceed and provide a review package as per project schedule above. In addition we have provided the APEX 2009 hourly rate structure for your use.

APEX proposes the following fee schedule for the Scope discussed herein:

Phase 100

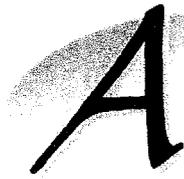
Task 100	\$15,000
Task 300	\$ 2,000

Phase 200

Task 100	\$ 1,500
----------	----------

Exceptions and Clarifications:

- Fabrication, construction, or material supply is not included in this proposal.
- Field Adjustments or modifications are not included in this proposal.
- Construction oversight and programming services are not included in this proposal.
- Check prints will be sent in PDF format.
- One (1) Final set will be sent in PDF, AutoCAD, and signed sealed reproducible formats.
- RTU and PLC design and programming is not included.
- AWC will convert AutoCAD files to Microstation version 8, APEX will assist with AutoCAD files when conversion errors occur with AWC conversion
- Payment due Net 30.



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APEX 1009 RATE SHEET

Job Title	Hourly Rate
Owner/Principal	\$180
Project or Procurement Manager	\$130
Project Engineer	\$130
Sr. Design Engineer	\$110
Jr. Design Engineer	\$80
Sr. Designer/ Construction Observer	\$90
Jr. Designer/ Construction Observer	\$75
Sr. Programmer	\$100
Jr. Programmer	\$75
CAD Drafter	\$60
Project Administrator / Accountant	\$60
Word Processor	\$55

Part Refundable and Part Non-Refundable (requires the Applicant to also be the electric service customer at subject property)
 Non-Refundable

APS Work Order # W496427



AGREEMENT TO CONSTRUCT ELECTRIC DISTRIBUTION FACILITIES

The parties to this Agreement are ARIZONA PUBLIC SERVICE COMPANY, an Arizona corporation, hereinafter called "APS" and

Arizona Water Company hereinafter called "Applicant."

In consideration of the promises and provisions set forth below, the parties to this Agreement agree as follows:

1 CONSTRUCTION

- 1.1 APS shall construct electric distribution facilities as an extension of its present facilities in order to serve 2049 N. 194th Ave, Arizona in accordance with the attachments set forth in Section 5 to this Agreement and APS' line extension tariff, "Schedule 3: Conditions Governing Extensions of Electric Distribution Lines and Services," hereinafter called "Extension Policy." The terms and conditions of APS' Extension Policy and the attachments described in Section 5 are hereby incorporated in full into this Agreement.
- 1.2 The earthwork, conduits and materials necessary for construction shall be provided by the parties as follows: Applicant shall provide distribution line and service line earthwork; APS shall provide and Applicant shall install equipment pads, manholes, pull boxes, junction boxes, and associated appurtenances (unless otherwise noted on sketch); Applicant shall provide and install all conduit(s) (unless otherwise noted on the sketch). Applicant-provided earthwork, conduits, materials, and installation(s) shall be provided in accordance with the attached sketch(es), specifications, and Trenching Agreement - Requirements, and shall be approved by an authorized representative of APS prior to APS commencing the installation of lines and equipment.
- 1.3 Distribution facilities shall be installed by APS in the location indicated on the attached sketch(es). All suitable easements or rights-of-way required by APS for any portion of the extension which is either on premises owned, leased or otherwise controlled by Applicant, or other property required for the extension, shall be conveyed to APS (in APS' standard Utility Easement form attached hereto) by Applicant without cost to or condemnation by APS and in reasonable time to meet proposed service requirements. Applicant shall provide APS access to these distribution facilities at all times, and shall not block or interfere with said access in any way, including fencing or the placement of obstructions adjacent to and on the door-side of cabinets, transformers, or any other equipment.
- 1.4 All meters are to be located as shown on the sketch, a copy of which is attached to this Agreement. No variation to the meter locations identified may be made unless approved in writing by an authorized representative of APS.
- 1.5 Applicant's "on and off" site construction required in support of APS' construction is estimated to begin on 5/1/2010 and to be completed on 7/31/2010. APS' construction is estimated to begin on 5/24/2010 and to be completed on 7/31/2010 contingent upon scheduled completion of Applicant's "on and off" site construction in accordance with APS' specifications. The dates of APS' construction are provided only as estimates, are not binding upon APS, and are subject to change to accommodate APS' workload, material requirements, or other factors.

2 PAYMENT

APS shall not schedule or begin any construction pursuant to this Agreement until it receives from Applicant a payment of \$20,465.75 DOLLARS, which sum equals the installation cost to APS of extending service to Applicant, as authorized by the Extension Policy. Such payment shall include all costs for the facilities (and municipal street lighting facilities, if applicable) required to serve Applicant's anticipated load. A breakdown of these costs is attached hereto as the Applicant Charges. Such payment is due to APS upon Applicant's execution of this Agreement.

3 REFUNDS

- 3.1 Single-family residential and non-residential extensions may be eligible for a refund of a portion of the payment if all of the applicable requirements to qualify for a refund as set forth in Sections 1.1 or 2.0 of the Extension Policy are met (including the requirement that Applicant will be the customer of record and pay the monthly electric bills at the subject property).

Applicant hereby declares that Applicant will X will not _____ be the customer of record and pay the monthly electric bills at the subject property.

- 3.2 If, at the time a refund becomes payable, Applicant no longer owns the property intended to be served by this Agreement, the refund will be provided to the current property owner.
- 3.3 APS reserves the right to withhold refund to Applicant if Applicant's account(s) are delinquent, and apply these refund amounts to past due bills.
- 3.4 If prior to the start of APS' construction, Applicant notifies APS in writing of their request to cancel this Agreement, Applicant shall be entitled to receive a refund of the amount paid less all fees and costs incurred by APS associated with the Agreement prior to cancellation.

4 GENERAL PROVISIONS

- 4.1 This Agreement shall be binding upon and inure to the benefit of the heirs, administrators, executors, or assignees of the parties to this Agreement, provided, however, that no assignment or other transfer of this Agreement shall be binding upon APS or create any rights in Applicant's assignee until such assignment or other transfer is approved and accepted in writing by an authorized representative of APS.
- 4.2 All electric facilities installed pursuant to this Agreement shall be owned by APS.
- 4.3 APS may use the installed facilities to serve other customers, and may extend service to other customers from the facilities located within the rights-of-way and easement(s) conveyed to APS pursuant to this Agreement.
- 4.4 This Agreement does not require APS to construct any line extensions to future customers not included in the attached sketches.
- 4.5 If Applicant fails to complete its "on and off" site construction requirements in support of APS' construction within six months of the estimated date of completion for said Applicant construction, as set forth in Section 1.5 hereof, APS shall have the right to revise the payment amount required pursuant to Section 2 hereof which Applicant will be required to pay prior to APS proceeding with construction or energizing its facilities.
- 4.6 The prevailing party in any proceedings instituted by either party regarding a dispute concerning this Agreement shall be entitled to recover its reasonable attorney's fees, costs, and expenses.
- 4.7 If any term or condition of this Agreement is held to be invalid, void, or otherwise unenforceable by any court of competent jurisdiction, that holding shall not affect the validity or enforceability of any other term or condition of this Agreement, unless enforcing the balance of this Agreement would deprive either party of a fundamental benefit of its bargain.
- 4.8 This Agreement contains the final and complete agreement between the parties for the construction of the line extension described herein and supersedes all prior and contemporaneous conduct, agreements, statements, representations, negotiations, course of conduct, course of dealing, and communications pertaining to the subject matter hereof, whether written or oral. The parties shall not be bound by or be liable for any statement, representation, promise, inducement, or understanding of any kind not set forth in or formally incorporated into this Agreement.

5 ATTACHMENTS

The provisions, terms, and conditions of each of the following documents, attached to this Agreement, are hereby incorporated in full into this Agreement.

NOTE: Documents marked below are attached

- Design Sketches
- Applicant Charges
- Pro-Rata Refund Calculation
- Pro-Rata Refund Exhibit
- Sales Invoice
- Electric Supply Agreement
- Trenching Agreement – Requirements
- Utility Easement
- Dusk-to-Dawn Work Order
- Developer Streetlight Agreement
- Street Light Details

6 EFFECTIVE DATE

This Agreement will become effective only upon the execution of this document by duly authorized representatives of the parties and payment by Applicant to APS of the total amount set forth in Section 2, and will be deemed effective as of the date signed by APS.

ARIZONA PUBLIC SERVICE COMPANY

Signature: *Larry Cunningham*
 Name: Larry Cunningham
 Title: CSR Sr.
 Date: 6/16/10
 APS Invoice #: _____
 Prepared By: Larry Cunningham
 Date Prepared: 5/17/2010

APPLICANT or APPLICANT'S REPRESENTATIVE

Signature: *[Signature]*
 Name: JAMES WILSON
 Title: SR. ENGINEER
 Date: 6/2/10
 Mailing Address: PO Box 29006
Phoenix, AZ 85038
 Permanent Phone #: 602-240-6860

Amount Paid (including taxes) : _____
 Date Received: _____

The individual executing this Agreement on behalf of Applicant represents and warrants: (i) that he or she is authorized to do so on behalf of Applicant; (ii) that he or she has full legal power and authority to bind Applicant in accordance with the terms herein and, if necessary, has obtained all required consents or delegations of such power and authority.





STUDY AND DESIGN AGREEMENT

This Study and Design Agreement (the "Agreement"), dated FEBRUARY 24, 2010, is entered into, by and between Arizona Public Service Company, an Arizona corporation ("APS") and ARIZONA WATER COMPANY, an _____, ("Customer") hereinafter referred to individually as "Party" or collectively as "Parties."

RECITALS

- A. Customer wants APS to (*check the applicable*):
 extend a line convert a line relocate a line,
at 2049 N 194TH AVENUE; BUCKEYE, AZ referred to as the
"Project" and referenced as APS Work Order No. W496427.
- B. The Parties intend to enter into an agreement for the Project (the "Project Agreement") outlining the Parties' obligations and responsibilities;
- C. Because of the nature of the Project, the Project will require the preparation of special studies or detailed plans, specifications or cost estimates for the required work. Customer would like APS to prepare the studies or designs even though the Project Agreement has not been finalized and executed; and
- D. APS is willing to prepare the studies and/or designs before Customer executes the Project Agreement if Customer advances to APS the estimated amount for preparing the studies and/or designs.

AGREEMENT

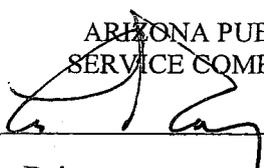
NOW, THEREFORE, for and in consideration of the foregoing recitals and further consideration of the covenants and agreements contained herein, the Parties agree as follows:

1. APS will prepare the special studies or detailed plans, specifications or cost estimates for the Project (the "Project Study and Design") described in *Exhibit A*, which is attached and hereinafter made a part of this Agreement.
2. Customer shall pay APS, upon signing this Agreement, a Study and Design Payment in the amount of ONE-THOUSAND TWO-HUNDRED, FIFTY-EIGHT & 00/ DOLLARS (\$ 1,258.00).
3. If, within six (6) months of entering into this Agreement, the Parties execute the Project Agreement, the Study and Design Payment will be applied to Customer's payment obligations as set forth under the executed Project Agreement. If the Parties do not enter into the Project Agreement, the Study and Design Payment will not be refunded. – Specified six month period may be extended upon mutual agreement by both Parties and shall be confirmed in writing.

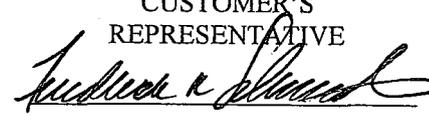
4. This Agreement shall be binding upon and for the benefit of the heirs, administrators, executors, or assigns of the Parties to this Agreement; provided however, that no assignment or other transfer of this Agreement shall be binding upon APS or create any rights in Customer's assignee until such assignment or other transfer is approved and accepted in writing by APS.
5. If either Party successfully brings suit to compel performance or for breach of this Agreement, the successful Party shall be entitled to recover reasonable attorney's fees, judgment and costs.
6. This Agreement constitutes the final and complete agreement between the Parties concerning its subject matter and supersedes all prior agreements and conduct, whether written or oral.

This Agreement has been executed by duly authorized representatives of the Parties and shall be effective as of the date signed by APS.

ARIZONA PUBLIC
SERVICE COMPANY

SIGNATURE 
NAME Les Rainey
TITLE CCW Section Leader
DATE SIGNED 3/11/10

CUSTOMER OR
CUSTOMER'S
REPRESENTATIVE

SIGNATURE 
NAME Fredrick K. Schneider
TITLE VP - Engineering
DATE SIGNED 3-5-2010
MAILING ADDRESS 380 N Black Canyon Hwy
Phoenix, AZ 85015
PERMANENT PHONE # 602-240-6860



The individual executing this Agreement on behalf of Customer represents and warrants: (i) that he or she is authorized to do so on behalf of Customer; (ii) that he or she has full legal power and authority to bind Customer in accordance with the terms herein and, if necessary, has obtained all required consents or delegations of such power and authority.

APS Invoice No: _____
Prepared By: _____
Date: _____

Amount Paid (should be the same amount stated in Section 2 of this agreement): _____
Date Received: _____

EXHIBIT A

TO STUDY AND DESIGN AGREEMENT

PROJECT STUDY AND DESIGN (DESCRIPTION OF THE SPECIAL STUDIES OR DETAILED PLANS, SPECIFICATIONS OR COST ESTIMATES FOR THE PROJECT)

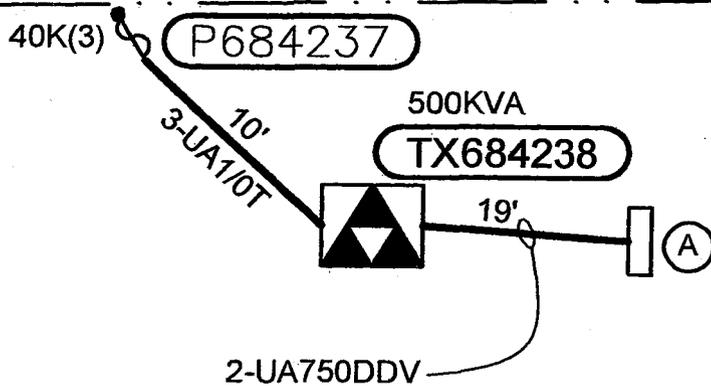
APS TO UPGRADE 3-PHASE OVERHEAD TRANSFORMER BANK AND RUN NEW UG SERVICE TO A NEW 800AMP, 277/480V COMMERCIAL SES. EXISTING OH SERVICE TO BE REMOVED WHEN NEW SERVICE IS CONNECTED.

PRO-RATA REFUND EXHIBIT

MONTE VISTA RD

3-4R-NC-CBA

194TH AVE



NOTES: Shown are symbols of facilities paid for by initial customer and eligible for refund.
Equipment numbers reflect the actual equipment installed.

EXAMPLE: Single Phase Junction cabinet installed, but charged customer for pull box only.
Three Phase Switching cabinet installed by initial customer for future development is not shown on exhibit because it is NOT eligible for refund.



LEGEND

CUSTOMER "A": _____	EXIST./PROP. TERMINATION CABINET  	EXISTING 3Ø TRANSFORMER 
CUSTOMER "B": _____	EXIST./PROP. MAN HOLE  	PROPOSED 3Ø TRANSFORMER 
CUSTOMER "C": _____	EXISTING 1Ø TRANSFORMER 	EXIST./PROP. SWITCH CABINET  
EXIST./PROP. STEEL POLES  	PROPOSED 1Ø TRANSFORMER 	
EXIST./PROP. PULL BOX  		

Customer "A":

Work Order #: W496427
 Address: 2049 N. 194th Ave.
 City, State, Zip: Buckeye, AZ 85396
 Site ID: 774601387
 Date: 5-3-10

Customer "B":

Work Order #: _____
 Address: _____
 City, State, Zip: _____
 Site ID: _____
 Date: _____

Customer "C":

Work Order #: _____
 Address: _____
 City, State, Zip: _____
 Site ID: _____
 Date: _____



CONSTRUCTION COMPLETION DATE:

12-20-10

WORK AUTHORIZATION NUMBER:

1-4621

PREPARED BY

THE FOLLOWING RECORD REQUIREMENTS ARE ATTACHED:

- 1. CONSTRUCTION DRAWINGS WITH "AS BUILT" LOCATION OF PIPE, FITTINGS, ETC. MARKED IN RED
- 2. VALVE CARDS
- 3. HYDRANT CARDS WITH COPY OF COVER LETTER
- 4. MATERIALS INSTALLED OR RETIRED LISTED ON THE REVERSE SIDE OF THE W.A. WITH R.O.S. AND P.D.R. NUMBERS
- 5. PRESSURE AND LEAKAGE TEST RESULTS:

NA

NA

NA

JSS

no water facilities installed

DATE TESTED

TIME STARTED

TIME FINISHED

PIPE DIAMETER

FOOTAGE TESTED

ALLOWABLE LEAKAGE

LEAKAGE OBSERVED

PRESSURE AT TEST POINT

COMPANY EMPLOYEE OBSERVING TEST (print)

INITIALS OF EMPLOYEE

6. DISINFECTION SAMPLING:

INITIAL SAMPLING

(minimum 50 ppm available chlorine)

DATE

TIME

PPM Cl₂

AFTER 24 HOURS DETENTION TIME

(minimum 10 ppm free chlorine)

DATE

TIME

PPM Cl₂

AFTER SUFFICIENT FLUSHING

(water is clear and system Cl₂ residual is measured)

DATE

TIME

PPM Cl₂

BACTERIOLOGICAL SAMPLE(S)

DATE

TIME

ATTACHED Yes No Yes No Yes No Yes No

I certify that construction on the above Work Authorization was completed as of the date shown above and for which all materials have been accounted. I further certify that I have inspected the work done and have found it to be satisfactory and in accordance with Company specifications.

Division Manager or Operations Superintendent (signature)

Date of Notice

ATTACH TO CONSTRUCTION & ENGINEERING FILE COPY OF WORK AUTHORIZATION



Monte Vista Booster Station

Submittal for Approval

General Order
SPX0127200
Volume 1 of 1

Equipment:

Switchboards
Motor Control Centers
Safety Switches

BROWN WHOLESALE ELEC CO PHOENIX AZ PO# 7539-417229

FELIX CONSTRUCTION

Date: 01/11/2010

© 2008 Eaton Corporation, All Rights Reserved



Monte Vista Booster Station

GO # SPX0127200

Submittals

Table of Contents

VOLUME	TAB	DESCRIPTION
1		Contact Sheet
1		Project Comments
1	1	Switchboards Detailed Bill of Material Submittal Shop Drawings Technical Data
1	2	Motor Control Centers Detailed Bill of Material Submittal Shop Drawings Technical Data
1	3	Safety Switches Detailed Bill of Material Submittal Shop Drawings Technical Data



Contact Information

For new project opportunities, contact:

Sales Person

PHILLIP FULMER
921 S PARK LANE SUITE 2
TEMPE, AZ 85281
Phone: 480-449-4252
Fax: 480-449-4203
PhillipLFulmer@eaton.com

For logistical support, contact:

Project Coordinator

Judy Messer
175 VISTA BOULEVARD
ARDEN, NC, 28704
Phone: 828-651-0874
Fax: 800-647-9112
JudyRMesser@eaton.com

For technical support, contact:

Project Engineer

Jonathan Ray
175 VISTA BOULEVARD
ARDEN, NC, 28704
Phone: 828-651-0875
Fax: 800-651-0980
JonathanKRay@eaton.com



PROJECT COMMENTS

Approved

Release all for manufacture.
No re-submittal required.

Approved as Noted

Release all for manufacture.
Make necessary changes
Show changes on const. drawings.

Partial Approval Revise and Re-submit

Release approved sections
for manufacture. Re-submit.
Rejected sections

Rejected

No release
Re-submit all.

The following information is pertinent with the return of this submittal. Cutler Hammer requires all information to be initialed and a final signature of responsible party.

- Lug Sizes for all equipment have been verified
- Top or Bottom Entry for all equipment has been verified
- Shipping splits have been verified
- Nameplate information has been verified for all equipment
- Orientation of breakers has been verified for all equipment

Stamp or Signature

Customer Comments:

No Comments (check here).....

General Order Number: SPX0127200

EATON

TAB 1 Switchboards

Neg# PX501202G904 Alt# C000

01/09/10

08:43:23

Customer Bill of Material

1 PRLC Switchboard

Pow-R-Line C Switchboard, Front Access/ Front and Rear Align, Type 3R (nonwalk-in) Flat Roof
480Y/277V 3-Phase 4-Wire, 800 Silver Plated Copper, Minimum Interrupt Rating: 65kA, Bus Bracing Rating: 65kA

- 1 Pow-R-Line C
- 1 Seismic Label (IBC/CBC Seismic Qualified)
- 2 Type 3R (nonwalk-in) Flat Roof
- 1 Vertical Isol. Barrier (Service Entrance)
- 1 Horizontal Isol. Barrier (Service Entrance)
- 2 Silver Pltd. Cu. .25 X 2.0 Ground Bus
- 1 Service Entrance Label
- 1 800 Amp Silver Plated CU Main Structure
- 1 800A Utility Metering - ARIZONA PUBLIC SERVICE
- 1 Utility Meter Socket
- 1 800 Amp Silver Plated CU Feeder Structure
- 1 Thermal Mag Trip - Standard
- 1 Nameplate
- 1 800A 3P [HMDL 800A Frame], Trip 800 A., Thermal Mag, (3) 3/0-400 kcmil, Mechanical, Bottom

Designations: SES-01

All orders must be released for manufacture within 90 days of date of order entry. If approval drawings are required, drawings must be returned approved for release within 60 days of mailing. If drawings are not returned accordingly, and/or if shipment is delayed for any reason, the price of the order will increase by 1.0% per month or fraction thereof for the time the shipment is delayed.

Switchboard General Information

Pow-R-Line C -Specifications

Quantity: 1
 Alignment: Front Access/ Front and Rear Align
 Service: 480Y/277V 3-Phase 4-Wire Minimum Interrupt Rating: 65 kA

Bus Specifications

Bus Amps: 800 Bus Bracing Rating: 65kA
 Neutral Amps: 800
 Bus Material: Silver Plated Copper Heat Test
 Silver Pltd. Cu. .25 X 2.0 Ground Bus Bolted To Frame, (1) 350 kcmil Ground Lug

Incoming Information

Incoming Entry: Bottom Incoming Location: Left

Structure Specifications

Service Entrance
 Enclosure Type: Type 3R (nonwalk-in) Flat Roof
 Seismic Label (IBC/CBC Seismic Qualified)
 Allow a minimum of an additional 6 in. on each end of the switchboard for bolt down brackets (Seismic Anchoring).
 Refer to seismic installation data sheet 1A32007 and drawing 1A32010 for details.
 Nameplates: Mastic - White with Black letters

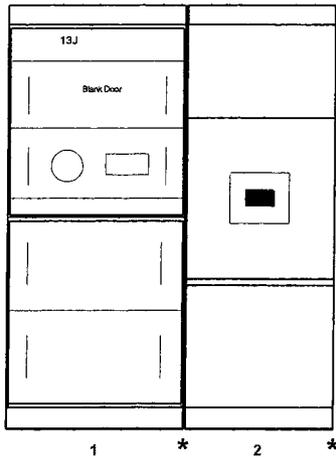
Utility Specifications

800 Amps Util. Mtr. Compt. - ARIZONA PUBLIC SERVICE
 Utility Service Requirements Page References:
 Lug Drillings Per Page: 347 CT Compartment Per Page 320
 UGPS Per Page 345 Meter Door per Page 332
 13J Meter Socket(s) 2 Drillings
 (2) EUSERC Press Bolts

Enclosure properties

Struct #	Description/Modifications
1	Incoming Utility Structures (Incoming Utility Section) Vertical isolating barrier Horizontal isolating barrier Auxiliary Bus
2	Individually mounted feeder BREAKER exiting bottom, or SWITCH exiting top or ...

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	APPROVED BY: DATE:		JOB NAME: Monte Vista Booster Station DESIGNATION: SES-01		
	VERSION: 6.9		TYPE: Switchboards		DRAWING TYPE: Customer Appr.
NEG-ALT NUMBER: PX501202G904-C000	REVISION: 1	DWG SIZE: A	G.O.: SPX0127200	ITEM: 003	SHEET: 1 OF 4

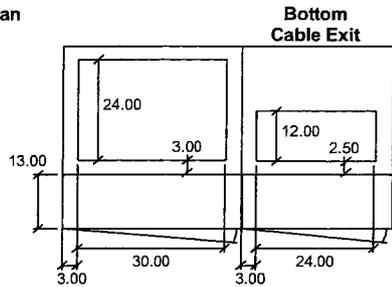


Front View

Power Flow



Floor Plan



Total of 2 Structures, Total Width of 66 Inches with Front Hinged Doors
 Allow a Minimum of an Additional 6 inches on each end for Seismic Anchoring Brackets.

Width-Inches	36.00	30.00	
Width-MM	914	761	
Depth(Inner)-In.	30.00	30.00	
Depth(Inner)-MM	761	761	
Depth(Outer)-In.	43.00	43.00	
Depth(Outer)-MM	1092	1092	
Height-Inches	90.00	90.00	
Height-MM	2285	2285	
Weight-Lbs(Est.)	1600	1600	
Weight-Kg(Est.)	725	725	

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	APPROVED BY	DATE	JOB NAME Monte Vista Booster Station	DESIGNATION SES-01	
	VERSION 6.9		TYPE Switchboards	DRAWING TYPE Customer Appr.	
NEG-ALT NUMBER PX501202G904-C000	REVISION 1	DWG SIZE A	G.O. SPX0127200	ITEM 003	SHEET 2 OF 4

Switchboard Units Information

Str#	Unit	Description/Modifications	Nameplate
1		PRLC32_ Utility-800A Utility Metering - ARIZONA PUBLIC SERVICE	
2		Feeder Brkr.-800A 3P [HMDL 800A Frame], Trip 800 A. Thermal Mag Terminals, Mechanical, (3) 3/0-400 kcmil, Bottom	SES MAIN BREAKER AND FEEDER BREAKER MCC-01

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	APPROVED BY		DATE		JOB NAME Monte Vista Booster Station		DESIGNATION SES-01	
	VERSION 6.9		TYPE Switchboards		DRAWING TYPE Customer Appr.			
NEG-ALT NUMBER PX501202G904-C000	REVISION 1	DWG SIZE A	G.O. SPX0127200		ITEM 003	SHEET 3 OF 4		

ENGINEERING DATA SHEET
SEISMIC GUIDELINES FOR USERS OF
PRLC / PRLI LOW VOLTAGE SWITCHBOARDS

IA32007
EXCEL
SHEET 1 OF 1

2/12/07

1. A generic type NEMA 1 and NEMA 3R PRLC/PRLI low voltage switchboard assembly was attached to a triaxial seismic simulator to duplicate the effects of an earthquake.
2. When type PRLC/PRLI switchboard is subjected to an earthquake, stress is applied to the foundation. The importance of an adequate foundation to mount the equipment, cannot be under-estimated. In fact, proper mounting is the single most important factor in withstanding a seismic occurrence. The foundation must be designed to withstand the reaction loads imposed on it by the equipment. Foundation embedments shall be designed to transfer the ultimate capacity of the anchor bolts. The ultimate capacity is to be calculated by the architect or consulting engineer.
3. When a PRLC/PRLI switchboard is subjected to an earthquake, it moves. The amount of motion depends on the magnitude of the earthquake. The top of the cabinets experience the greatest degree of motion. The maximum top-of-cabinet response motions measured during the seismic tests are listed below. The user should reference these to decide what (if any) special flexibility may be needed at interfaces.

<u>MAGNITUDE OF ACCELERATION</u>	<u>TOP OF CABINET RESPONSE MOTION</u>
1.2 G's	4.0 IN. FRT. TO BACK 3.25 IN. SIDE TO SIDE 2.75 IN. VERT.

Conduit layout in concrete for loads entering and/or exiting the bottom must be designed and installed to prevent damage from an earthquake. If top entry is necessary, seismic fittings or flexible conduit is needed.

4. When a switchboard assembly is separated into groups of vertical sections for shipment, the user must be sure to install the inter-unit tie bolts. Failure to join sections together could result in damage to the equipment during an earthquake.
5. Incoming power cables should be lashed together, and they should be secured to the structure at least every four feet.
6. Any drawout type circuit breaker and/or fuse truck should always remain in the connected position, or they should be secured somewhere remote from the switchboard.
7. The user should provide storage areas to secure mobile pieces of equipment (such as spare breakers or drawout ratchets) away from hinged panels on which relays and other instruments are mounted so they are not damaged during an earthquake.
8. **WARNING** - Certain types of protective relays have rather delicate operating mechanisms. Especially when set to operate quickly or at low pick-up levels, these relays may cause subsequent spurious circuit breaker operations during the earthquake.
9. **Center of Gravity** - For seismic calculations, the following dimensions should be used to locate the center of gravity for type PRLC and PRLI low voltage switchboards. These dimensions are applicable for all switchboard lineups.

Vertical: 80 inches from base of switchboard
 From left to right: Geometric center of the switchboard
 From Front: Two fifths the depth of the switchboard

Weights may be found on the equipment drawings provided for the specific project.

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	VERSION 6.9		DESIGNATION SES-01	TYPE Switchboards	DRAWING TYPE Customer Appr.
NEG-ALT NUMBER PX501202G904-C000	REVISION 1	DWG SIZE A	G.O. SPX0127200	ITEM 003	SHEET 4 OF 4

EATON

Technical Data

General Description

Application Considerations and Definitions

Eaton's Cutler-Hammer® Pow-R-Line family of distribution switchboards incorporates new design concepts that fit the ever-increasing need for applications on high short circuit systems, while retaining maximum standardization, safety and convenience throughout the line.

Front Accessibility

Front accessibility switchboards align at the rear, enabling them to be placed against a wall (Cutler-Hammer Type Pow-R-Line C™ front accessible). If the main section is deeper than others, due to physical size of the main device, the necessary offset in lineup will occur in front, and the main section will be accessible from the side as well as from the front. Eaton also offers front accessible switchboards that align at the front and rear.

Rear Accessibility

Rear accessible switchboards align at the front and the rear. Bus maintenance and cable entry and exit require rear access. There are two types of rear accessible switchboards. Both types utilize the same incoming utility and/or main structures. The first type utilizes group mounted feeder devices with panel construction (Cutler-Hammer Type Pow-R-Line C rear accessible). The second type utilizes individually compartmentalized feeder devices with load side insulated bus bar extensions (Cutler-Hammer Type Pow-R-Line i).

Standard Switchboard Height

Standard Pow-R-Line switchboard height is 90 inches (2286.0 mm).

Group Mounting

Group mounted circuit protective devices are an assembly of units mounted on a panelboard type base (panelboard construction). Units may be molded case breakers or fusible switches. Circuit protective devices are accessible from the front.

A main molded case breaker or main fusible switch, within the sizes listed for panelboard design, can be included in the panel mounted assembly in lieu of a separate, individually mounted unit.

Space Only for Future Devices Group Mounted Construction

Where space only for future circuit protective devices is required, the

proper space and a blank filler plate will be supplied. Connections and mounting hardware are not included.

Provision for Future Devices

Where provisions for future circuit protective devices are required, space for the device, corresponding vertical bus, device connectors and the necessary mounting hardware will be supplied.

Bus Bar System

Standard bus in the switchboards is tin-plated aluminum. Copper and silver-plated copper are also available.

Main bus and sub-main buses meet UL® and NEMA® standards for temperature rise on all Pow-R-Line switchboards. Special bus densities are available.

Overcurrent Devices

To properly select and size overcurrent devices for use in a switchboard, the allowable temperature rise must be taken into account as to its effect on the tripping characteristics of the devices in question.

Accordingly, Article 215.3 of the NEC® requires overcurrent devices to be rated not less than 125% of the continuous load they are protecting. To comply with this, an 80% derating factor must be used with all overcurrent devices such as molded case breakers and FDPW fusible switches unless they are tested and approved for application at 100% of the rating.

Short Circuit Rating

Standard bus and connectors on all switchboards are rated for use on systems capable of producing up to 65,000 amperes rms symmetrical short circuit current at the incoming terminals.

Increased bus short circuit ratings equal to that of connected switchboard devices, up to 200,000 amperes rms symmetrical, are available in most Pow-R-Line C switchboards when approved main devices are installed. Contact Eaton for more information. UL labeled switchboard sections are marked with their applicable short circuit rating.

Provision for Busway Entrance and Exit

Busway connections to switchboard sections include cutout and drilling in the top of the switchboard with riser connections from the switchboard

device or bus, up to the point where the bus duct enters the switchboard. No connections are furnished external to the switchboard.

In all transactions involving busway attached to switchboards, it is essential that information regarding orientation of the busway with respect to the front of the switchboard be supplied to the coordinating assembly plant.

On Pow-R-Line C switchboards, solid bus bar is used to connect the bus duct to the individually mounted main device, main or sub-main switchboard bus, or vertical main bus of panel mounted circuit protective device panels. **Busway fed by group mounted branch devices are cable connected.**

Aluminum riser connections are standard. Copper- or silver-plated copper is available as an option.

Transitions

Transition structures are required for connecting switchboards to the secondary of power center transformer (dry or fluid filled), motor control centers, and for other special switchboard configurations such as "L" or "U" shaped lineups. In some applications, an extra structure complete with connections is required; in others, where switchboard depth and space permit, only the connection conductors are required. (Refer to factory for these applications.)

Auxiliary Structures

These are normally mounted adjacent to service structures or distribution structures and used where incoming service or feeder conductors require additional space or facilities not included in the standard switchboard, such as:

1. Mounted adjacent to a top connected service structure and used as a cable pull structure where service conductors are brought in underground. Auxiliary structures are the same depth and height as the service structure, and are wide enough to accommodate the incoming cables.
2. Mounted adjacent to a service structure and used as a bus transition compartment for running riser bus from the load-side of the service structure up to top outgoing bus duct connection when distribution structures are not required. Auxiliary structure are the same depth and height as service structures.

General Description

In addition to the above applications, auxiliary structures may be mounted adjacent to a distribution structure and used as a structure for lighting panel or other device which may be cable-connected to a branch circuit device in the distribution structure. Dimensions are compatible with arrangements required.

Switchboards Used as Service Equipment

Service equipment is the electrical equipment that constitutes the main control and means of power cutoff the electric service (normally Power Company supply) brought into the building.

Where switchboards are to be used as service equipment, certain NEC and UL requirements apply that necessitate modifications not normally supplied in switchboards.

The following is a summary of the requirements which are pertinent to the application of a switchboard for service equipment:

- A. A switchboard with main lugs only (no main disconnect) must be designed so that all circuits in the switchboard can be disconnected from the supply source by the operation of no more than six operating handles (breaker or switch).

Switchboard equipped with main disconnect devices are not subject to the above six disconnect limitation, as the entire board can be de-energized with the main disconnect device.

Ground fault protection of equipment should be provided for solidly grounded wye electrical services of more than 150 volts to ground, but not exceeding 600 volts phase-to-phase for each service disconnecting means rated 1000 amperes or more.

- B. For testing purposes, means are also required to disconnect the switchboard neutral bus from the grounded service neutral conductor (1-phase, 3-wire and 3-phase, 4-wire systems). To comply with this requirement, a removable link (solid bar) is provided in the switchboard neutral bus. This link is generally located near the point where the main feeders enter the switchboard or in the area of the main disconnect device where one is provided.

To further comply with NEC and UL requirements, a separate bonding strap is connected from the neutral bus to the switchboard frame. This bonding connection is located on the line side of the removable neutral link, maintaining a service ground to the switchboard frame when the test link is removed. See **Figure 21.0-1**.

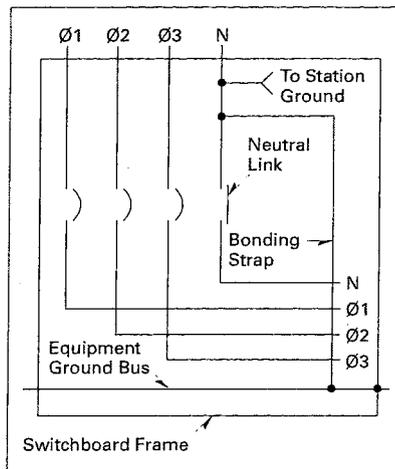


Figure 21.0-1. Neutral Link

Where switchboards are to be used for service equipment, it should be clearly indicated.

Underwriters Laboratories Requirements and Labeling

The basic requirement for obtaining an Underwriters Laboratories label on a switchboard, is that all the component devices (breakers, switches, etc.) in the switchboard assembly are UL listed. In addition, the switchboard must comply with all applicable provisions of UL 891.

Today's modern electrical systems require that switchboards offer a wide selection of electrical devices, many of which do not fall within the scope of Underwriters' listed devices. Therefore, the conditions under which a switchboard may be labeled are limited.

Listed below are several important guidelines for consideration when an Underwriter Laboratories label is specified:

1. Underwriters' nameplates, where applicable, are supplied for each vertical structure rather than one common nameplate for the complete switchboard lineup. Where all of the component devices in the switchboard are UL listed and all applicable provisions of UL 891

are met, each of the switchboard may be labeled.

2. Individual vertical structures of a switchboard may be labeled where they comply with underwriters' requirements, although other vertical structures in the same switchboard lineup may not meet the UL standards, and will not be labeled.
3. All Pow-R-Line C switchboards are UL labeled if all mounted devices are UL listed.

Automatic Transfer Equipment

For continuity of service, automatic transfer equipment between two (2) incoming services may be required. This equipment transfers the load upon failure of the normal (or preferred) source to the standby (or emergency) source. Upon restoration of the normal source, the load is automatically transferred back to it. To accomplish this, electrically operated main protective devices (and bus tie devices, if required) must be employed. Additional relays also are required to detect source voltage failure and to transfer control power when required. A manual selector switch is usually provided to select the mode of operation — automatic or manual transfer.

Seismic Considerations

The Uniform Building Code®, as well as local and state building codes, place an emphasis on seismic building design requirements. Electrical distribution systems are treated as attachments to the building, and therefore, fall into this category.

All Cutler-Hammer switchboards are seismic qualified at the highest possible level, Seismic Zone 4, and have been tested in accordance with ANSI C37.81. This standard quantifies actual earthquake conditions, as well as equipment seismic capability through use of the acceleration frequency response spectrum. Additionally, verification tests are conducted on structural integrity, relative motion and hold-down requirements by repeated exciting the equipment at all its natural frequencies.

Three 0.2g sine sweep single axis resonance search tests and three triaxial multifrequency seismic tests were also performed at increasing levels of severity. Summaries of these tests are available from Eaton.

21.0-4 Switchboards — Low Voltage Type 1, Type 2 and Type 3 Switchboards

EAT•N | Cutler-Hammer

January 2008
Sheet 0754

General Description — Type 1, Pow-R-Line C, Front Accessible, Group Mounted Feeders

Type 1 Cutler-Hammer Pow-R-Line C Switchboards

Meets NEMA Standard PB-2 and UL 891.

Construction Details

- 6000 ampere main bus maximum.
- Front accessible — main sections front and/or side accessible.
- Feeder devices group mounted.
- Sections rear aligned or front and rear aligned.
- Designed for mounting against a wall, but self-supporting, or with code clearance to a wall.

Main Devices, Individually Mounted

- Molded Case Circuit Breakers, 400 – 2500 amperes, fixed or drawout.
- Air Power Circuit Breakers, Magnum™ DS, 800 – 5000 amperes, fixed or drawout.
- Air Power Circuit Breakers with Current Limiting Fuses, DSL, 800 – 5000 amperes.
- Bolted Pressure Switches, 800 – 5000 amperes, fixed.
- Fusible Switches, 400 – 1200 amperes, fixed.

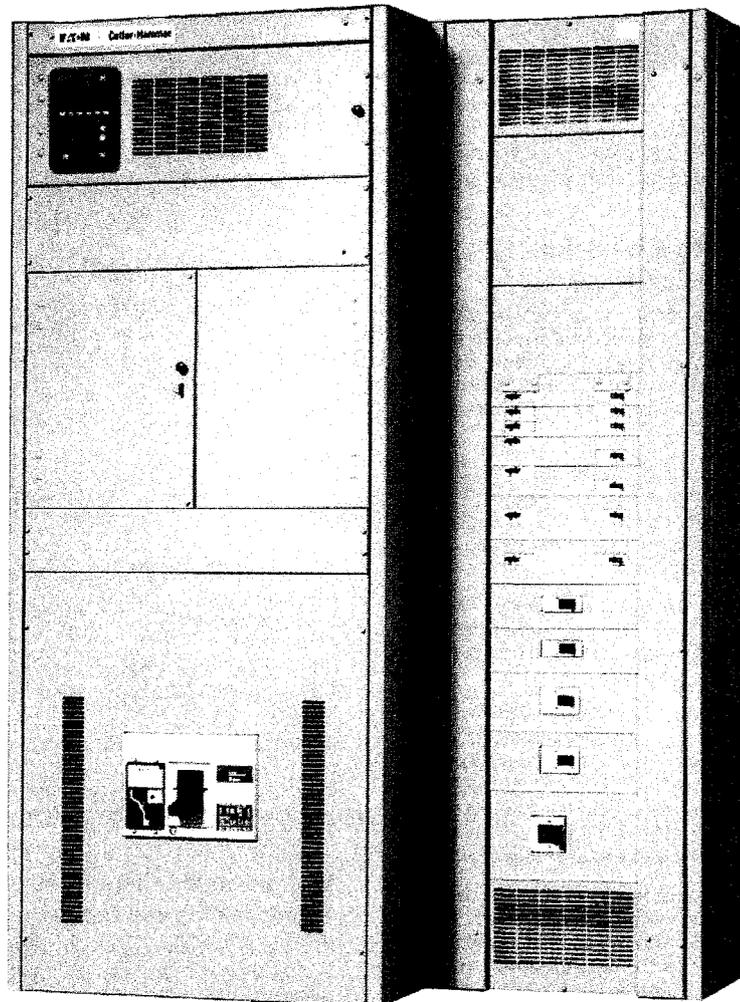
Feeder Devices, Group Mounted

- Molded Case Circuit Breakers, 15 – 1200 amperes.
- Fusible Switches, 30 – 1200 amperes.

Feeder Devices, Individually Mounted

- Molded Case Circuit Breakers, 800 – 2500 amperes, fixed.
- Air Power Circuit Breakers, DS and Magnum DS, 800 – 4000 amperes.
- Bolted Pressure Switches, 800 – 1600 amperes, fixed.

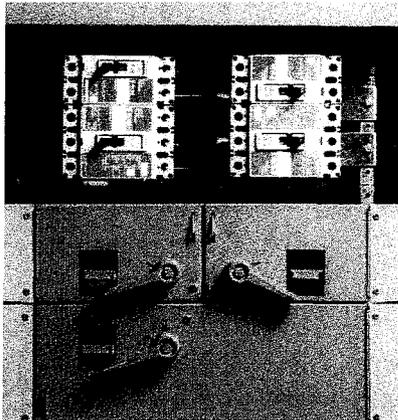
Note: For selection and layout guidelines, please reference **Page 21.1-1**.



Type 1 Pow-R-Line C Switchboard

Features

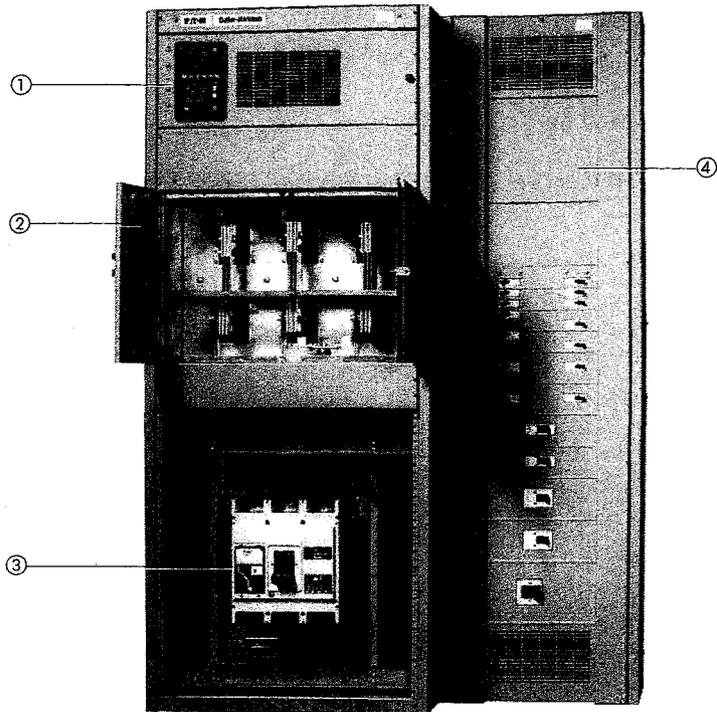
- Eaton's Cutler-Hammer circuit breakers provide higher ratings in a standard chassis and increased series ratings.
- Available with circuit breakers and fusible switches on the same chassis.
- UL listed and labeled. Meets NEC and NEMA standards.
- Cutler-Hammer IQ microprocessor-based metering device is standard when metering is specified. Conventional metering is available. IQ devices can provide a communications capability. See **Section 3**.
- Optional integral Cutler-Hammer Visor Series TVSS is available in Pow-R-Line C switchboards, when specified. See **Section 36**.
- Front accessible.
- Aluminum, copper, or silver-plated copper main bus.
- A full range of device modifications is available.
- Available in NEMA Type 1 and 3R enclosures, UL listed.



The Single Chassis Design Provides Device Flexibility

Modifications

- Ground fault protection on mains and distribution devices.
- Coordination with other Cutler-Hammer divisions for busway and transformer connections.



Type 1 Pow-R-Line C Features

- ① Customer metering.
- ② NEMA utility metering.
- ③ Main.
- ④ Group mounted distribution.

Table 21.0-1. Pow-R-Line C Group Mounted Switchboards
Voltage: 240 – 480 – 600 Vac, 250 Vdc
Mains: 400 through 6000 Amperes

Main Device Type	Amperes	Short Circuit Symmetrical Rating (kA)
Molded Case Circuit Breakers	400 – 2500	14 – 200
Air Power Circuit Breakers, DS and Magnum DS	800 – 5000	30 – 100
Air Power Circuit Breakers with CL Fuses, DSL	800 – 5000	200
Bolted Pressure Switches	800 – 5000 ①	200
Fusible Switches	400 – 1200	200
Main Lugs Only	400 – 6000	Rating Determined by Distribution Device

Feeder Device Type	Amperes	Short Circuit Rating (kA)
Molded Case Circuit Breakers	15 – 1200	10 – 200
Fusible Switches	30 – 1200	200
Stacked — Main with Branch Devices	400 – 2500	18 – 200

① 5000 ampere bolted pressure switches are not UL listed.

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28.1-28 Molded Case Circuit Breakers & Enclosures Molded Case

EATON

Cutler-Hammer

January 2008
Sheet 1222

Selection Data — M-Frame

M-Frame
Electronic RMS, 400 – 800 Amperes
Thermal-Magnetic, 300 – 800 Amperes



M-Frame Breaker

Table 28.1-60. Dimensions in Inches (mm)

Width	Height	Depth
8.25 (209.6)	16.00 (406.4)	4.06 (103.2)

Table 28.1-61. Thermal-Magnetic Trip Ratings

Frame	Ratings
MDL	300, 400, 450, 500, 600, 700, 800

Table 28.1-62. Digitrip 310 Electronic Trip Unit Rating Plugs

Frame	Rating Plugs
MDL	400, 500, 600, 700, 800, 400/800 Adjustable

Table 28.1-63. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Type of Trip ①	Interrupting Capacity (rms Symmetrical Amperes)			
			Volts ac (50/60 Hz)			Volts dc ②③
			240	480	600	250
MDL, CMDL ④	2, 3	N.I.T.	65,000	50,000	25,000	22,000
HMDL, HMDL ④	2, 3	N.I.T.	100,000	65,000	35,000	25,000

① N.I.T. is non-interchangeable trip unit.

② Two poles or two poles of 3-pole circuit breaker. Thermal-magnetic trip units only, MDL, HMDL breakers with electronic trip unit are not dc rated.

③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

④ 100% rated. Not for use on dc.

Table 28.1-64. Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material ⑤	Wire Type	AWG/kcmil Wire Range/Number of Conductors	Catalog Number
-------------------------	--------------------------	-----------	---	----------------

Standard Cu/Al Pressure Terminals

600	Aluminum	Cu/Al	(2) #1 – 500 kcmil	TA700MA1
800	Aluminum	Cu/Al	(3) 3/0 – 400 kcmil	TA800MA2
800	Aluminum	Cu/Al	(2) 500 – 750 kcmil	TA801MA

Optional Copper and Cu/Al Pressure Type Terminals

600	Copper	Cu	(2) 2/0 – 500 kcmil	T600MA1
800	Copper	Cu	(3) 3/0 – 300 kcmil	T800MA1

⑤ UL listed for use with copper or aluminum conductors as noted.

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TAB 2 Motor Control Centers



Eaton Corporation
Power & Controls Systems Operations
Tel: (949)-689-1107
Fax: (562)-366-9851
Email: christopherjbutler@eaton.com

Monte Vista Water Campus
SES & MCC Replacement
GO Number: SPX0127200
Submittal Package

Sales Contact Information:
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Eaton Corporation
480 449-4252
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Drawings Completed By:
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PatrickHecht@Eaton.com



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Fax: (562)-366-9851
Email: christopherjbutler@eaton.com

Section 1: Bill of Materials

Section 2: Catalog Information

Section 3: Approval Drawings

Section 4: Wiring Schematics



Eaton Corporation
Power & Controls Systems Operations
Tel: (949)-689-1107
Fax: (562)-366-9851
Email: christopherbutler@eaton.com

Section 1: Bill of Materials

Itemized Bill of Material

Cubicle	Qty	Catalog Number	Description
1B	1	IQA6630	IQ Analyzer
1M	1	HND3800T33	800A Main Breaker w/ LS Trip
2A	1	HFD3060C	60A Feeder
2F	1	PRL1a (1 PHASE/3 WIRE) 30 BAB 1 POLE 20A	1P/3W Panelboard 20A BAB Breaker
2M	1	T20P11S15EE	1P 480 to 240/120 XFMR
	1	HFD3040C	40A Primary Breaker
	1	HFD3080C	80A Secondary Breaker
3C	1	SPD160480D3J	160kA SPD with Surge Counter
3E	1	HMCP015E0	15A HMCP Breaker
	1	C0100E2A	100VA CPT
	1	CN15DN3AB	Size 1 Contactor
	1	C441CA	Motor Insight Relay
	2	10250T25B	Black Pushbutton
	1	10250T25R	Red Pushbutton
	1	10250T21LB	3 Pos Selector Switch
	1	10250T221LAP06	Amber PTT Pilot Light
	1	10250T221LRP06	Red PTT Pilot Light
	1	549-156A-PNC6-ZH	Elapsed Time Meter
	1	D7PR41A	4 Pole D7 Relays
3M	1	HMCP150T4	150A HMCP Breaker
	1	C0100E2A	100VA CPT
	1	S811T18N3S	IT S811 Soft Start
	2	10250T25B	Black Pushbutton
	1	10250T25R	Red Pushbutton
	1	10250T21LB	3 Pos Selector Switch
	2	10250T221LAP06	Amber PTT Pilot Light
	1	10250T221LRP06	Red PTT Pilot Light
	1	549-156A-PNC6-ZH	Elapsed Time Meter
	4	D7PR41A	4 Pole D7 Relays

4E	<ul style="list-style-type: none"> 1 HMCP050K2 1 C0150E2A 1 CN15KN3AB 1 C441CB 2 10250T25B 1 10250T27R 1 10250T21LB 3 10250T221LAP06 1 10250T221LRP06 1 549-156A-PNC6-ZH 4 D7PR41A 	<ul style="list-style-type: none"> 50A HMCP Breaker 150VA CPT Size 3 Contactor Motor Insight Relay Black Pushbutton Mushroom Pushbutton 3 Pos Selector Switch Amber PTT Pilot Light Red PTT Pilot Light Elapsed Time Meter 4 Pole D7 Relays
4M	<ul style="list-style-type: none"> 1 HMCP150T4 1 C0100E2A 1 S811T18N3S 2 10250T25B 1 10250T25R 1 10250T21LB 2 10250T221LAP06 1 10250T221LRP06 1 549-156A-PNC6-ZH 4 D7PR41A 	<ul style="list-style-type: none"> 150A HMCP Breaker 100VA CPT IT S811 Soft Start Black Pushbutton Red Pushbutton 3 Pos Selector Switch Amber PTT Pilot Light Red PTT Pilot Light Elapsed Time Meter 4 Pole D7 Relays
5M	<ul style="list-style-type: none"> 1 HMCP150T4 1 C0100E2A 1 S811T18N3S 2 10250T25B 1 10250T25R 1 10250T21LB 2 10250T221LAP06 1 10250T221LRP06 1 549-156A-PNC6-ZH 4 D7PR41A 	<ul style="list-style-type: none"> 150A HMCP Breaker 100VA CPT IT S811 Soft Start Black Pushbutton Red Pushbutton 3 Pos Selector Switch Amber PTT Pilot Light Red PTT Pilot Light Elapsed Time Meter 4 Pole D7 Relays

6M

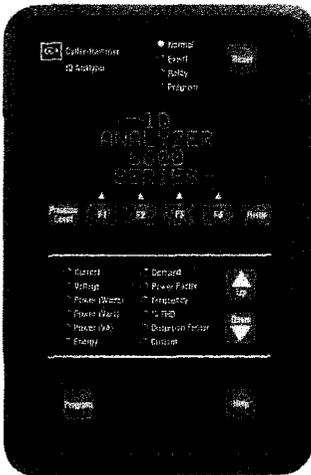
1 HMCP150T4
1 C0100E2A
1 S811T18N3S
2 10250T25B
1 10250T25R
1 10250T21LB
3 10250T221LAP06
1 10250T221LRP06
1 549-156A-PNC6-ZH
8 D7PR41A
2 TRNP240AC

150A HMCP Breaker
100VA CPT
IT S811 Soft Start
Black Pushbutton
Red Pushbutton
3 Pos Selector Switch
Amber PTT Pilot Light
Red PTT Pilot Light
Elapsed Time Meter
4 Pole D7 Relays
On Delay Timer



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Section 2: Catalog Information

IQ Analyzer
IQ Analyzer 6400/6600 Series

IQ Analyzer
Product Description
IQ Analyzer-Comprehensive Electrical Distribution Monitoring

Eaton's IQ Analyzer is a complete solution for users who want to monitor and manage all aspects of their electrical distribution system. Based on input from customers and consultants, it provides extensive metering, power quality analysis, remote input monitoring, control relaying, analog input/outputs and communications capability.

Its high performance metering exceeds ANSI C12.16 (1%) specification for revenue meters and meets ANSI C12.20 Class 0.5%, provides quality true rms readings through the 50th harmonic, accurately measures nonsinusoidal waveforms up to a 3.0 crest factor, and displays even and odd multiples of the fundamental current and voltage through the 50th harmonic. Both magnitude and phase angle of the harmonics are displayed.

The unique operator interface, which includes a reverse mode LCD display, easy to use *Meter Menu* screens and detailed *Analysis* screens, is designed to allow a wealth of real-time and recorded information to be accessed easily by an operator. All programming can be accomplished through the faceplate or the communications port. The comprehensive on-line Help feature provides useful information on device operation, programming and troubleshooting.

Metered and Monitored Parameters

- rms sensing.
- Phase neutral, and ground currents.
- Volts: L-L, L-N, Avg. L-L, Avg. L-N, N-G.
- Power: real, reactive, apparent (system and per phase).
- Frequency.
- Power factor: apparent and displacement (system and per phase).
- Energy and demand (forward, reverse, net) real, reactive apparent at four different utility rates.
- Individual current and voltage harmonics: magnitude, phase angle.
- % THD: current and voltage.
- Waveform capture.
- Minimum and maximum values.
- Event logging/disturbance recording.
- ANSI C12.20 Class 0.5% revenue metering accuracy, IEC687 Class 0.5%.
- Industry Canada 0.5% revenue accuracy.

Communications

- Optional interface capability to computer network for data collection, storage and/or printout via Eaton's Power Management Software.

Physical Characteristics

- Graphical reverse mode LCD display with LED backlight.
- Up to seven lines of information.
- Height: 10.25 inches (260.4 mm).
- Width: 6.72 inches (170.7 mm).
- Depth:
 - 4.70 inches (119.4 mm) without PONI
 - 5.83 inches (148.1 mm) with PONI
- Membrane faceplate NEMA 3R and 12 rated.

Application Description

- Monitoring of over 150 electrical parameters.
- Power quality management.
- Energy management.

Features, Benefits and Functions
Disturbance Information

With the communications option and Eaton's Power Management Software and Waveform Display software, a *Waveform Analysis* will construct waveforms of up to 56 cycles of all currents and voltages (including neutral and ground) to help troubleshoot undervoltage/sag and overvoltage/swell conditions. (See CBEMA Trend Logging section, next page.) By programming a reset threshold, the duration of the voltage disturbance can also be indicated.

The IQ Analyzer 6600 series with Graphic Waveform Display offers the ability to view the captured waveform right at the device. The 6600 series also offers the ability to detect and capture sub-cycle voltage disturbances.

Extensive Harmonic Distortion Analysis

Current and voltage distortion data are displayed at the device and accessible through the communications port. This includes % THD, K-Factor, Crest Factor, CBEMA factor, and both magnitudes and phase angles of all harmonics through the 50th. A snapshot sample of this information may be activated by user commands, discrete inputs or programmable thresholds to capture distortion data during conditions of real interest. To help eliminate nuisance alarms, harmonic distortion information can be captured and relay outputs activated when THD exceeds a programmable percentage of fundamental or a programmable magnitude (e.g., amperes) threshold.

Time-of-Use Metering

The IQ Analyzer offers the ability to store energy usage data for time of use revenue metering. It can be programmed for any combination of weekday, Saturday, Sunday, 22 holidays, 8 seasons, 32 schedules, and 10 time periods per schedule. The IQ Analyzer will keep track of the following parameters for four different utility rates:

- Watthours.
- Var hours.
- VA hours.
- Current demand.
- Watt demand.
- VA demand.
- Var demand.

IQ Analyzer

Historical Trend Logging

The IQ Analyzer is equipped with onboard logging capability, which includes the ability to log a total of 24 parameters with intervals ranging from 0.13 seconds (every 8 cycles) to twice a week (5040 minutes). The trending function can begin immediately or can be triggered upon receipt of a discrete input into the IQ Analyzer. Onboard logging provides a cost-effective means of distributed data storage where real-time communications may not be feasible or for applications where data storage redundancy is desired. Four trend data logs are stored in non-volatile memory aboard the IQ Analyzer and can be retrieved at the display or via communications for viewing using Eaton's Power Management Software.

- Up to 24 parameters with storage capacity for up to 90,000 data points.
- Up to 234 days of data can be stored when recording a parameter every 15 minutes.
- Trends 1, 2 and 3 can save data on a discrete contact input.
- Trend 4 can save data on a power quality or meter event.
- Minimum and maximum recording (minimum and maximum 3-phase average current, maximum I_G , minimum and maximum 3-phase average V_{LL} and V_{LN} , maximum V_{NG} , maximum system Watts, vars, and VA, minimum and maximum apparent and displacement PF). Using this feature, minimum and maximums reached during each trend interval are recorded.

CBEMA Trend Logging

The IQ Analyzer can be configured to store the necessary data so that the software can display a sag or swell voltage event on the industry standard CBEMA (now ITIC) curve for predictive maintenance and troubleshooting. This application utilizes the IQ Analyzer waveform capture for high-speed events along with historical trend logging for longer term voltage disturbances. Once this data is uploaded to a PC running the Power Management Software's Event Viewer the information is analyzed, displayed and stored. Automatic uploading of CBEMA events can be selected in the software. A three-phase event will be correctly displayed as a single point on the CBEMA curve.

Event Logging

The IQ Analyzer will store in non-volatile memory the time and reason for last 504 events. These events can be viewed from the graphical display or accessed via communications. In addition to all of the meter events listed in the Event Conditions section (Page 56-38), the following events are entered into the event log:

Time and date of:

- Alarms.
- Meter power up.
- All resets.
- All setting changes.
- Communications established or lost.

Event logging is another powerful troubleshooting tool within the IQ Analyzer.

Extensive I/O and Communications Capability

One analog and three digital inputs are provided to interface with sensors and transducers. Three analog outputs and four relay contacts are furnished to share data with PLCs and control systems and to actuate alarms and control relays. Terminals are captive clamp type and finger safe. With the communications option, the device can be remotely monitored, controlled and programmed.

Ratings

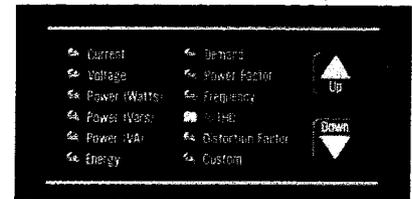
- Application to 500 kV, no PTs to 600 volts.
- CT ratios selectable from 5:5A to 10,000:5A.
- Standard 120/600 Vac line.
- 3-phase power supply module, 100 – 600 Vac. Separate source power supply module available, 100 – 240 Vac or 100 – 250 Vdc.
- dc only separate source power module also available, 24 – 48 Vdc.

Displayed Information Features

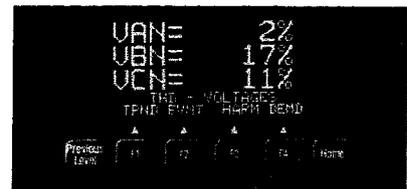
- All information accessible at device or through communications port via Eaton's Power Management Software.
- Quality true rms readings through 50th harmonic.
- Complies with the accuracy portion of ANSI C12.20 Class 0.5% revenue metering specification.

- Accurate readings for nonsinusoidal waveforms with up to 3.0 crest factor.
- Screens display auto ranging units, kilo units, mega units as needed.
- 10-digit energy readings.
- Displays multiple parameters at the same time.
- Programmable custom screens.

Meter Menu Screens



Meter Menu



Examples of Meter Menu



Custom Screen



Custom Screen

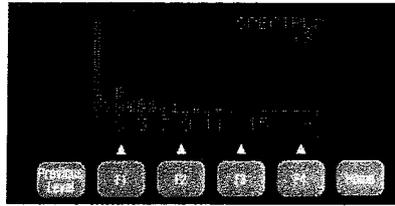
IQ Analyzer

The IQ Analyzer allows a user to view commonly used parameters by scrolling through its LED indicator Meter Menu.

Meter Menu Displayed Information

- Current:
 - Phases A, B, C, Average
 - Neutral
 - Ground (Separate CT)
- Voltage:
 - Phases A-B, B-C, C-A, Average
 - Phases A-N, B-N, C-N, Average
 - Neutral-Ground
- Power:
 - Real (Watts)
 - Reactive (Vars)
 - Apparent (VA)
 - Phases A, B, C and System
- Energy (Forward, Reverse and Net):
 - Real (kWh)
 - Reactive (kvarh)
 - Apparent (kVAh) — no reverse or Net
- Frequency, Time and Date.
- Demand:
 - System Current (amperes)
 - Systems Real Power (kW)
 - System Reactive Power (kvar)
 - System Apparent Power (kVA)
- Power Factor (Phases A, B, C and System):
 - Displacement
 - Apparent
- %THD Current:
 - Phases A, B, C, N
- %THD Voltage:
 - Phases A-B, B-C, C-A
 - Phases A-N, B-N, C-N
- K-Factor.
- CBEMA (ITIC) Derating Factor (Displayed as "Z").
- Crest Factor.
- Discrete Input and Output Status.
- Analog Input Reading.
- Custom — User may program four screens to show any combination of seven Meter Menu parameters per screen.

Harmonic Analysis Screens



Harmonic Spectrum Available with Model 6600

Minimum and Maximum Values

- Current:
 - Phases A, B, C, N, G
- Voltage:
 - Phases A-B, B-C, C-A
 - Phases A-N, B-N, C-N, N-G
- Power:
 - Real (Watts)
 - Reactive (Vars)
 - Apparent (VA)
 - Phases A, B, C and System
- Power Factor:
 - Apparent and
 - Displacement (3-Phase and System)
- Frequency.
- THD (Amperes, Volts, and %):
 - Current (Phases A, B, C, N)
 - Voltage (Phases A-B, B-C, C-A, A-N, B-N, C-N)

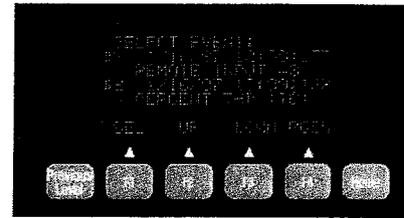
All minimum/maximum values may be reset via reset pushbutton on faceplate, discrete input or communications command. Values are updated at least once every 16 line cycles.

The F3 function key accesses the Harmonic Analysis screens. Two cycles of data sampled at 128 *samples/cycle* are *simultaneously* recorded for:

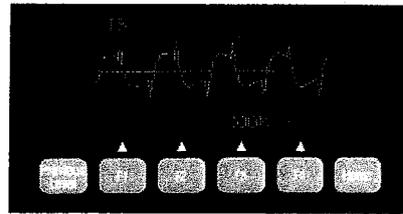
- Current:
 - Phases A, B, C, N, G
- Voltage:
 - Phases A-B, B-C, C-A
 - Phases A-N, B-N, C-N
 - Neutral to Ground

Magnitudes (or % of fundamental) of odd *and even* multiples of the fundamental from 2nd – 50th are displayed. The phase angle associated with each multiple of the fundamental is also displayed.

Event/Alarm Analysis Screens



Example of Event Analysis Screens



Waveform Screen Available with Model 6600

Pressing the F2 function key accesses the Event Analysis screens. These display the following data for up to ten event/alarm conditions:

- Description, date, and time of event/alarm with 10 millisecond resolution.
- Current, voltages, power readings, demand readings, frequency and % THD at time of event/alarm.
- Current and voltage distortion information available on Harmonic Analysis screens.

Event data is stored in non-volatile memory. If a reset threshold is programmed, the *duration* of the event (e.g., undervoltage) is also displayed. With Eaton's communications option and software, waveforms and harmonic profiles may be displayed on a PC.

Event Conditions

Events may be triggered by up to seven of any of the following conditions:

Voltage Disturbances

- Undervoltage/sag — any V_{L-L} , V_{L-N} (40 – 100%).

Note: 60% minimum for self-powered unit.

- Overvoltage/swell — any V_{L-L} , V_{L-N} (100 – 750%).

IQ Analyzer

If zero time delay is programmed, any disturbance lasting 2 cycles (less if magnitude is sufficient to effect rms readings) will trigger a voltage disturbance event/alarm.

- Sub-cycle transient capture/excess dv/dt on V_{A-N} , V_{B-N} , V_{C-N}

Note: 6600 series only.

- Sub-cycle voltage interruption on V_{A-N} , V_{B-N} , V_{C-N}

Note: 6600 series only.

Maximum Threshold Exceeded

- Currents — Phases A, B, C, Neutral, and Ground.
- Voltage — Neutral to Ground.
- System Power — Watts, VA, Vars.
- System Power Factor — Displacement and Apparent.
- Demand.
- Currents — Phase A, B, C and AVG.
- System Power — Watts, Vars, VA.
- Frequency.
- Percent Total Harmonic Distortion or Magnitude Total Harmonic Distortion:
 - Currents — Phases A, B, C, Neutral
 - Voltage — V_{A-N} , V_{B-N} , V_{C-N} , V_{A-B} , V_{B-C} , V_{C-A}

Minimum Threshold Exceeded

- Currents — Phases A, B, C.
- System Power — Watts, Vars, VA.
- System Power Factor — Displacement and Apparent.
- Frequency.

Voltage Phase Unbalance

- Voltage L-L, L-N.

Current Phase Unbalance

- Current — Phases A, B, C.

Discrete Input Energized

- Input 1, 2, 3.
- Remote command through communications port or front panel.

All trigger conditions have programmable time delays from 0.1–60 seconds in 0.1 second increments (except Voltage Disturbances — programmable from 2–3600 cycles in 2-cycle increments, and Eaton's Power Management Software commands — no programmable delay).

Demand Recording

Peak Demands are date and time stamped for:

- Current Phases A, B, C and Average.
- System Power:
 - Real (watts)
 - Reactive (Vars)
 - Apparent (VA)

Input/Output

Extensive input/output capability is standard on the IQ Analyzer. In addition to monitoring three-phase currents and voltages, separate inputs are provided for both ground and neutral currents. Voltage of neutral-to-ground is also monitored to indicate the presence of harmonics and potential downstream grounding problems. Analog and digital I/O provide interfaces for transducers, relays, PLCs and control systems.

Current Inputs

Five ampere secondary CT connections for:

- Phases A, B, C.
- Ground.
- Neutral.
- Separate ground and neutral CT inputs.
- CT range 5:5–10,000:5 (any integer).

Voltage Inputs

- Phases A, B, C (from 120 Vac–500 kV ac).
- 120/240 Vac control power input standard — not required with optional line power module.
- Separate ground-to-neutral voltage reference.
- PT range 120:120–500,000:120 (any integer).

External 120-volt secondary PTs are required above 600 Vac, optional from 120–600 Vac.

Discrete Contact Inputs

Three dry contact discrete inputs may be programmed by the user to:

- Trigger Event Analysis — the information described in "Event Analysis Screens," including Harmonic Analysis information, can be recorded when external devices trip or change state by wiring their auxiliary contacts into these inputs.
- Act as a synch.-pulse input to synchronize power demand windows with utility provided synch. pulse.

- Actuate a relay output.
- Reset relay output, peak demands, Trend Analysis records and Event Analysis records.
- With communications option, provide remote status indication on Eaton's communication network.
- Status of input contacts is displayed in the Meter Menu Custom screen.

Relay Output Contacts

Four Form-C (NO/NC) relay contacts may be independently programmed to:

- Act as a kWh, kVarh or kVAh pulse initiator output.
- Actuate on one or more event conditions — including discrete input and software commands (through communications port).
- Reverse sequence alarm.

Each Relay may be set for Auto or Manual Reset with 0–30 minute release delay (one second increments). Relays are Form-C NO/NC. Relay(s) programmed to actuate on undervoltage also have a programmable 0–30 minute delay on power-up for transfer applications.

Analog Input and Outputs

One analog input and four analog outputs may be configured as 0–20 or 4–20 mA. The analog input is displayed at the device as a percentage and is accessible through the communications port. The analog input provides an interface with gas flow meters, temperature transducers or other analog devices.

The analog outputs may be programmed to reflect any of the following:

- Current — Phases A, B, C, Average, N, G.
- Voltage — L-L, L-N, N-G.
- Power:
 - Real (watts)
 - Reactive (Vars)
 - Apparent (VA)
 - Phases A, B, C and System
- %THD:
 - Current (Phases A, B, C, N)
 - Voltage (L-L, L-N)
- Frequency — System.
- Power Factor:
 - System Displacement PF
 - System Apparent PF

IQ Analyzer
Listings and Certifications

- UL listed, File E62791, NKCR File E185559 (CE versions).
- cUL listed #1010.1 C22.2.
- CE mark EN61010-1 (1993) EN50082-2 (1994).
- Measurement Canada Electricity Meter AE-0782.
- CSA approved.

Options and Accessories
IQ Analyzer Auxiliary Power Supply

The optional IQ Analyzer Auxiliary Power Supply allows set point programming of the IQ meter while the monitored line power is turned off and locked out, thus eliminating the presence of dangerous line voltages. The Auxiliary Power Supply is easy to install and has been specifically designed to connect to the power supply connector on the IQ meter and then plug into a standard electrical wall outlet.

Product Specifications
IQ Analyzer 6400/6600 Series
Fuses

- Self-powered units with IQMSSPM have 3/4 ampere, 600 volts Bus Type KTK-R-3/4 fuses (3 required).
- Separate source dual-voltage units with IQMSSPM have a single 5 x 20 mm 1/4 ampere fuse.
- Separate source dc units with IQMDCPM do not have user replaceable fuses.

Environmental Conditions

- Operating temperature: -20° – 70°C.
- Storage temperature: -30° – 85°C.
- Operating humidity: 5 – 95% relative humidity.

Shipping Weight Lbs. (kg)

- 5.8 (3.6).

Current Inputs (Each Channel)

- Conversion: true rms, 32 sample/cycle (all samples used in all rms calculations).
- CT input: 5 ampere secondary (any integer 5:5 to 10,000:5).
- Burden: 0.05 VA.
- Overload withstand: 40 amperes ac continuous, 300 amperes ac 1 second.
- Range: 8 x CT continuous.
- Accuracy: 0.1% of CT primary rating, 0.2% of reading above 150% of rating, sinusoidal (see accuracy below for non-sinusoidal specifications).
- Input impedance: 0.002 ohm.

Voltage Inputs (Each Channel)

- Conversion: True rms, 32 sample/cycle (all samples used in all rms calculations).
- PT input: direct or any integer 120:120 – 500,000:120.
- Range: 30 – 660 Vac (separate source and dc source).
- Nominal full scale: 100 – 600 Vac.
- Burden: 21 VA (self-powered only).
- Overload withstand: 635 Vac, continuous 700 Vac, 1 second.
- Input impedance: 1 megohm.

Frequency Range

- 20 – 66 Hz fundamental (up to 50th harmonic).

Harmonic Response (Voltages, Currents)

- 50th harmonic.

Accuracy (in Percent Full Scale)

Accuracy from 3–300% of Full Scale and from -0.5. to 1.00 to 0.5 power factor.

- Current and voltage: ± 0.20%.
- Power, energy and demand: 0.40%.
- Frequency: 0.04%.
- Power factor: 0.80%.
- THD: 1.00%.

Specific Current Accuracies

- ± 0.20% of full scale to 200% of full scale and 150% crest factor.
- ± 0.20% of full scale to 150% of full scale and 200% crest factor.
- ± 0.20% of full scale to 100% of full scale and 300% crest factor.
- ± 0.40% of reading for currents to 800% of full scale.
- Power and Energy: Start recording with an average of 3 mA secondary current.

Discrete Inputs (Dry Contact)

- +30 Vdc differential across each discrete input pair of terminals. Minimum pulse width: 1.6 msec.
- Optically isolated inputs to protect IQ Analyzer circuitry.

Analog Outputs (4)

- 0 – 20 mA/4 – 20 mA into maximum 750 ohm load. Accuracy: 1%.

Analog Input (1)

- 0 – 20 mA/4 – 20 mA into 200 ohm load. Accuracy: 1%.

Relay Output Contacts (4)

- Form C Dry Contact: 10 amperes at 120/240 Vac (Resistive) 10 A at 30 Vdc (Resistive) 30 A make (50 mS) at 240 Vac/240 Vdc.
- Minimum pulse width: 4 cycles (68 mS).
- Withstand rating: 1000 Vac, 1 minute across contacts 5000 Vac (contacts to coil, 1 minute) 10,000 Vac (contacts to coil, surge voltage).

Relay Response Time

(Excluding programmed time delays):

- Two line cycles for Discrete Input, Eaton's software commands (communications port).
- Four to five line cycles for Voltage Disturbance, Voltage Unbalance.
- Nine to 10 line cycles for all others.

IQ Analyzer Auxiliary Power Supply

- Dimensions in inches (mm):
 - Height: 4.00 (101.6)
 - Width: 2.40 (61.0)
 - Depth: 1.11 (28.2)
- Input voltage: 100 – 250 Vac.
- Input frequency: 50/60 Hz.
- Output voltage/current: +24 Vdc at 0 – .45 A.
- Output ripple: 100 mV maximum (peak to peak).
- Rated output power: 10.8 watts.
- Turn on/turn off overshoot 5% maximum.
- Turn on delay: 0.5 second maximum.
- Operating temperature: 0° – 40°C.
- Storage temperature: -40° – 80°C.

Technical Data and Specifications

Wiring Diagram

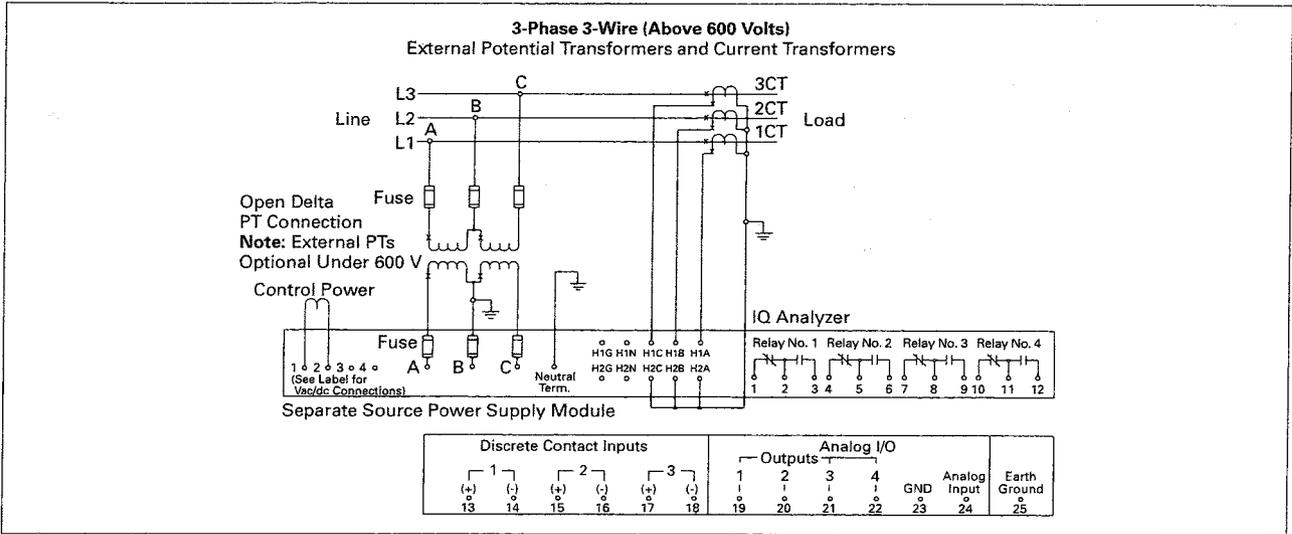


Figure 56-28. Field Wiring Connections — Separate Source Power Supply Shown Here (For 3-Phase Power Supply, No Separate Control Power is Required)

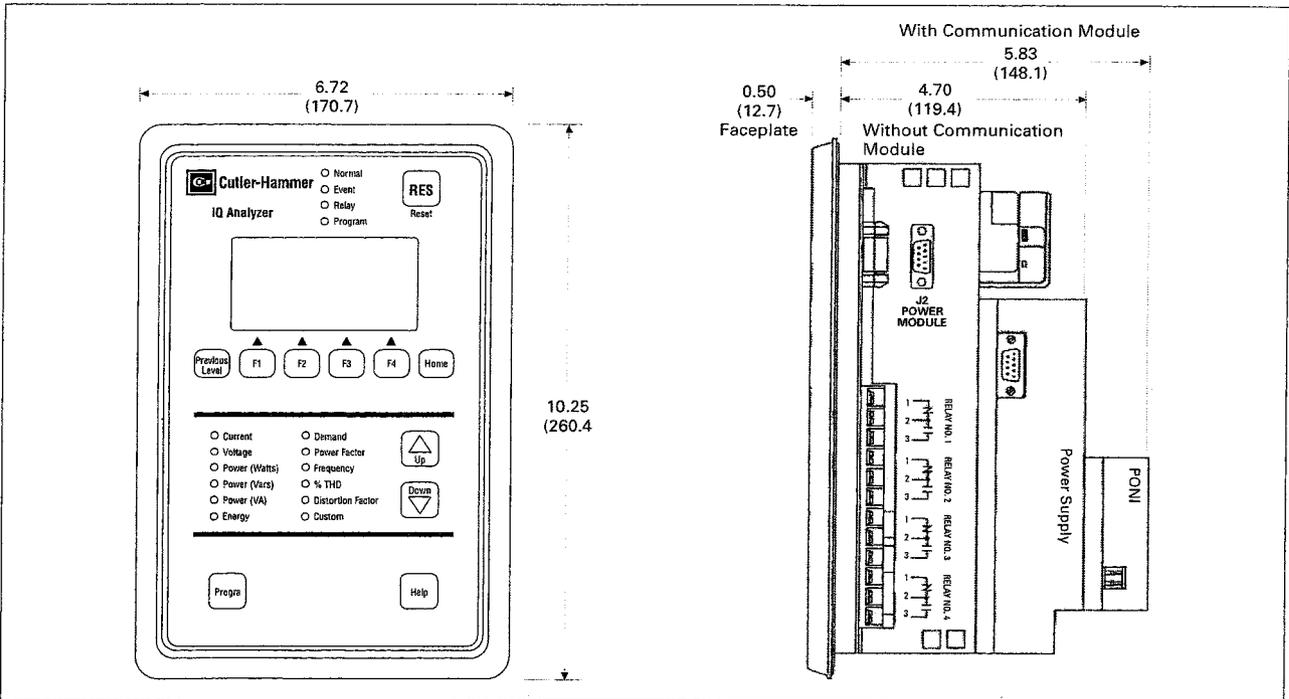


Figure 56-29. Dimensions and Cutout — Dimensions in Inches (mm)

IQ Analyzer

Table 56-13. Control Power Input

Description	Separate Source	Self Powered ①	dc Source
Input Range, ac	110 – 240 Vac \pm 10%	110 – 600 Vac \pm 10%	N/A
Frequency Range	45 – 66 Hz	45 – 66 Hz	N/A
Input Range, dc	110 – 250 Vdc \pm 10%	N/A	24 – 48 Vdc \pm 20%
Burden	21 VA	21 VA	21 VA

① When directly wired to 480 Vac, IQ Analyzer can ride through a continuous sag that is 20% of rated voltage.

Dimensions

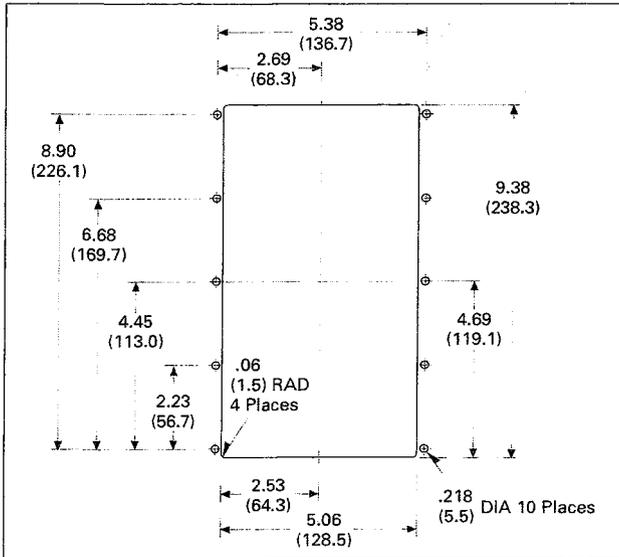


Figure 56-30. Drilling Pattern — Dimensions in Inches (mm)

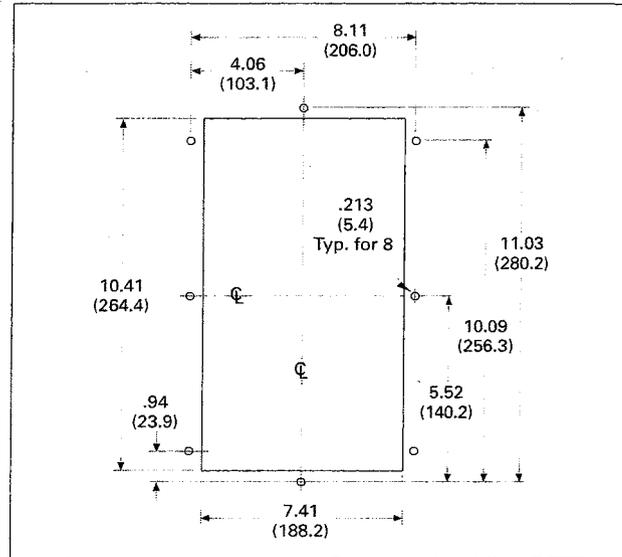


Figure 56-31. Drilling Pattern for Flange Mounting — Dimensions in Inches (mm)

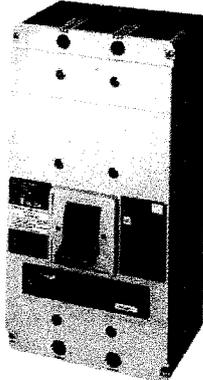
Product Selection

Table 56-14. IQ Analyzer

Description	Catalog Number	Price U.S. \$
IQ Analyzer, Separate Source Power Module	IQA6410	
IQ Analyzer, 24 – 48 Vdc Power Module	IQA6420	
IQ Analyzer, 3-Phase Power Module	IQA6430	
IQ Analyzer, Separate Source Power Module with Waveform Display and Sub-Cycle Voltage Disturbance Capture	IQA6610	
IQ Analyzer, 24 – 48 Vdc Power Module with Waveform Display and Sub-Cycle Voltage Disturbance Capture	IQA6620	
IQ Analyzer, 3-Phase Power Module with Waveform Display and Sub-Cycle Voltage Disturbance Capture	IQA6630	
IQ Flange, to Provide Extra Clearance when Mounting	IQFLANGE	
45-inch (1143.0 mm) Extension Cable for Remote Mounting of Power Module	IQA45CABLE	
24 – 48 Vdc Separate Source Power Module	IQMDCPM	
100 – 240 Vac and 100 – 250 Vdc Separate Source Power Module	IQMSSPM	
3-Phase, Self-Powered Power Module	IQM3PPM	
INCOM Communication Module	IPONI	
Ethernet Communications Module (10Base-T)	EPONI	
Ethernet Communications Module with Fiber Optic Port (10Base-T and 10Base-FL)	EPONIF	
Web Server Communications Module (10Base-T)	WEBPONI	
RS-485 Communication Module with Modbus Protocol	MPONI	

N-Frame

N-Frame



Typical N-Frame Circuit Breaker

Product Description

- All Cutler-Hammer N-Frame Circuit Breakers by Eaton Corporation are suitable for reverse feed use.
- All N-Frame circuit breakers are HACR rated.

12

Technical Data and Specifications

Table 12-243. UL 489 Interrupting Capacity Ratings ①

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts ac (50/60 Hz)			
		240	277	480	600
ND CND ②	2, 3, 4 2, 3, 4	65 65	— —	50 50	25 25
HND CHND ③	2, 3, 4 2, 3, 4	100 100	— —	65 65	35 35
NDC CNDC ④ NDU ⑤	2, 3, 4 2, 3, 4 3	200 200 300 ④	— — —	100 100 150	65 65 75 ⑤

① Utilization Category A circuit breakers.

② 100% rated breakers.

③ 800 amperes maximum rating.

④ Successfully tested at 300 kAIC, although UL recognizes maximum of 200 kAIC at 240 Vac.

⑤ Successfully tested at 75 kAIC, although UL recognizes maximum of 65 kAIC at 600 Vac.

Table 12-244. IEC 947-2 Interrupting Capacity Ratings ⑥

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)		
		Volts ac (50/60 Hz)		
		240	415	690
ND I_{cu} I_{cs}	2, 3, 4	85 85	50 50	20 10
CND ⑦ I_{cu} I_{cs}	2, 3, 4	85 85	50 50	20 10
HND I_{cu} I_{cs}	2, 3, 4	100 100	70 50	25 13
CHND ⑦ I_{cu} I_{cs}	2, 3, 4	100 100	70 50	25 13
NDC I_{cu} I_{cs}	2, 3, 4	200 100	100 50	35 18
CNDC ⑦ I_{cu} I_{cs}	2, 3, 4	200 100	100 50	35 18

⑥ Utilization Category A circuit breakers.

⑦ 100% rated breakers.

N-Frame
N-Frame Digitrip Specifications
Table 12-245. Specifications

Trip Unit Type	Digitrip RMS 310	Digitrip OPTIM 550	Digitrip OPTIM 1050	
rms Sensing	Yes	Yes	Yes	
Breaker Type				
Frame	N	N	N	
Ampere Range	400 A – 1200 A	400 A – 1200 A	400 A – 1200 A	
Interrupting Rating at 480 Volts	50, 65, 100 (kA)	50, 65, 100 (kA)	50, 65, 100 (kA)	
Protection				
Ordering Options	LS, LSG	LSI, LSIG	LSI, LSIG, LSI(A)	LSI(A), LISG
Fixed Rated Plug (I_N)	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes
Long Delay Protection (L)				
Adjustable Rating Plug (I_N)	Yes	Yes	No	No
Long Delay Pickup	0.5 – 1.0 (I_N) ^①	0.5 – 1.0 (I_N) ^①	0.4 – 1.0 (I_N)	0.4 – 1.0 (I_N)
Long Delay Time I^2t	12 Seconds	12 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I^4t	No	No	1 – 5 Seconds	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes
High Load Alarm	No	No	No	0.5 – 1.0 $\times I_r$
Short Delay Protection (S)				
Short Delay Pickup	200 – 800% $\times (I_N)$	200 – 800% $\times (I_N)$	150 – 800% $\times (I_r)$	150 – 800% $\times (I_r)$
Short Delay Time I^2t	100 ms	No	100 – 500 ms	100 – 500 ms
Short Delay Time Flat	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Zone Selective Interlocking	No	No	Yes	Yes
Instantaneous Protection (I)				
Instantaneous Pickup	No	200 – 800% $\times (I_N)$	200 – 800% $\times (I_N)$	200 – 800% $\times (I_N)$
Discriminator	No	No	Yes	Yes
Instantaneous Override	Yes	Yes	Yes	Yes
Ground Fault Protection (G)				
Ground Fault Alarm	No	No	20 – 100% $\times (I_S)$	20 – 100% $\times (I_S)$
Ground Fault Pickup	Varies by Frame ^②	Varies by Frame ^②	20 – 100% $\times (I_S)$	20 – 100% $\times (I_S)$
Ground Fault Delay I^2t	No	No	100 – 500 ms	100 – 500 ms
Ground Fault Delay Flat	Inst – 500 ms	Inst – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Zone Selective Interlocking	No	No	Yes ^③	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes
System Diagnostics				
Status LEDs	Yes	Yes	Yes	Yes
Cause of Trip LEDs	No	No	Yes	Yes
Magnitude of Trip Information	No	No	Yes	Yes
Remote Signal Contact – Ground Alarm	Yes ^④	Yes ^④	Yes ^③	Yes
Local Auxiliary and Bell Alarm Contact	Optional	Optional	Optional	Included
System Monitoring				
Digital Display	No	No	Yes ^②	Yes ^②
Current	No	No	Yes	Yes
Power and Energy	No	No	No	Yes
Power Quality – Harmonics	No	No	No	Yes
Power Factor	No	No	No	Yes
Communications				
Cutler-Hammer PowerNet	No	No	No ^⑤	Yes
Testing				
Testing Method	Test Set	OPTIMizer, BIM, Cutler-Hammer PowerNet	OPTIMizer, BIM, Cutler-Hammer PowerNet	

① Adjust by rating plug.

② By OPTIMizer/BIM.

③ Zone interlock kit.

④ With separate ground fault alarm unit (GFAU).

⑤ Eaton's Cutler-Hammer PowerNet kit.

Legend: BIM = Breaker Interface Module

(A) = GF Alarm

 I_S = Sensor Rating

 I_N = Rating Plug

 I_r = Long Delay Pickup Setting

N-Frame

Dimensions/Weights

Table 12-246. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	5.50 (139.7)
4	11.13 (282.6)	16.00 (406.4)	5.50 (139.7)

Table 12-247. Approximate Shipping Weight in Lbs. (kg)

Breaker Type	Complete Breaker		
	Number of Poles		
	2	3	4
ND, HND, NDC, NDU	37 (16.8)	45 (20.4)	58 (26.3)

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

Table 12-248. Circuit Breaker/Frame Catalog Numbering System

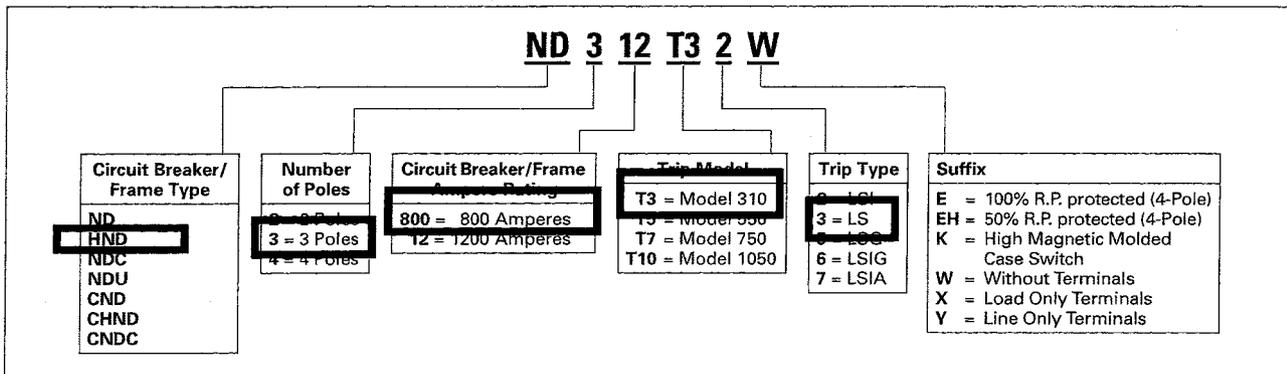


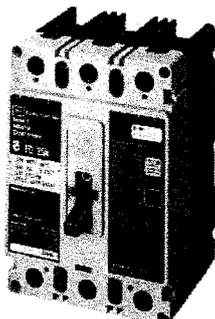
Table 28.1-102. Molded Case Digitrip Selection Guide

Trip Unit Type	Digitrip RMS 310	Digitrip RMS 310+	Digitrip RMS 510	Digitrip OPTIM 550	Digitrip RMS 610	Digitrip RMS 810	Digitrip RMS 910	Digitrip OPTIM 1050
rms Sensing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Breaker Type								
Frame	K, L, M, N, R	JG, LG, FDE ^①	R	K, L, N	R	R	R	K, L, N, R
Ampere Range	15 – 2500 A	20 – 600 A	800 – 5000 A	70 – 1200 A	800 – 5000 A	800 – 5000 A	800 – 5000 A	70 – 5000 A
Interrupting Rating at 480 V	35, 65, 100 (kA)	35, 65, 100 (kA)	65, 100 (kA)	35, 65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	65, 100 (kA)	35, 65, 100 (kA)
Protection								
Ordering Options	LS LSG	LSI LSIG	LS LSG	LSI LSIG	LI, LS, LSI, LIG, LSG, LSIG	LSI, LSI (A), LSIG	LI, LS, LSI, LIG, LSG, LSIG	LI, LS, LSI, LIG, LSG, LSIG
Fixed Rated Plug (I _n)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Overtemperature Trip	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Long Delay Protection (L)								
Adjustable Rating Plug (I _n)	Yes	No	No	No	No	No	No	No
Long Delay Pickup	0.5 – 1.0(I _n) ^②	40 – 100% Frame	0.5 – 1.0 x (I _n)	0.4 – 1.0 x (I _n)	0.5 – 1.0 x (I _n)	0.5 – 1.0 x (I _n)	0.5 – 1.0 x (I _n)	0.4 – 1.0 x (I _n)
Long Delay Time I ² t	10 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds	2 – 24 Seconds
Long Delay Time I ¹ t	No	No	No	1 – 5 Seconds	No	No	No	1 – 5 Seconds
Long Delay Thermal Memory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
High Load Alarm	No	Yes	No	0.5 – 1.0 x I _r	0.85 x I _r	0.85 x I _r	0.85 x I _r	0.5 – 1.0 x I _r
Short Delay Protection (S)								
Short Delay Pickup	200 – 800% x (I _n)	200 – 1000% x (I _r)	200 – 600% S1&S2 x (I _r)	150 – 800% x (I _r)	200 – 600% S1&S2 x (I _r)	200 – 600% S1&S2 x (I _r)	200 – 600% S1&S2 x (I _r)	150 – 800% x (I _r)
Short Delay Time I ² t	100 ms	No	Yes	100 – 500 ms	100 – 500 ms			
Short Delay Time Flat	No	Inst – 300 ms	No	Inst – 300 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Short Delay Time Z.S.I.	No	No	Yes	Optional	Yes	Yes	Yes	Yes
Instantaneous Protection (I)								
Instantaneous Pickup	No	200 – 800% x (I _n)	No	200 – 800% M1&M2 x (I _n)	200 – 800% x (I _n)	200 – 600% M1&M2 x (I _n)	200 – 600% M1&M2 x (I _n)	200 – 800% x (I _n)
Discriminator	No	No	Yes ^③	Yes	Yes ^③	Yes ^③	Yes ^③	Yes
Instantaneous Override	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ground Fault Protection (G)								
Ground Fault Alarm	Yes	No	No	20/25 – 100% ^④	No	No	No	20/25 – 100% ^{④⑤⑥}
Ground Fault Pickup	Var/Frame ^④	20 – 100% Frame	No	25 – 100% x I _n ^④	20/25 – 100% ^{④⑤⑥}			
Ground Fault Delay I ² t	No	No	No	100 – 500 ms	100 – 500 ms			
Ground Fault Delay Flat	Inst – 500 ms	Inst – 300 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms	100 – 500 ms
Ground Fault Z.S.I.	No	No	Yes	Optional	Yes	Yes	Yes	Yes
Ground Fault Thermal Memory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
System Diagnostics								
Cause of Trip LEDs	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Magnitude of Trip Information	No	No	No	Yes	Yes	Yes	Yes	Yes
Remote Signal Contacts	No	No	No	No	Yes	Yes	Yes	Yes
System Monitoring								
Digital Display	No	No	No	Yes ^⑥	Yes	Yes	Yes	Yes ^⑥
Current	No	No	No	Yes	Yes	Yes	Yes	Yes
Voltage	No	No	No	No	No	No	Yes	No
Power and Energy	No ^⑦	No	No	No	No	Yes	Yes	Yes
Power Quality-Harmonics	No	No	No	No	No	No	Yes	Yes
Power Factor	No	No	No	No	No	Yes (Over PowerNet Only)	Yes	Yes
Communications								
PowerNet	No	No	No	Optional	No	Yes	Yes	Yes
Testing								
Testing Method	Test Set	Test Kit	Integral	OPTIMizer, BIM, PowerNet (Optional)	Integral	Integral	Integral	OPTIMizer, BIM, PowerNet

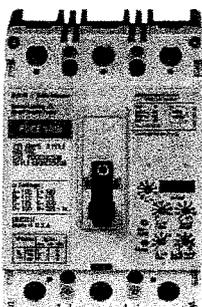
- ① Frame adjustments are not by rating plug.
- ② Adjust by rating plug.
- ③ LS/LSG only.
- ④ Not to exceed 1200 amperes.
- ⑤ L and N Frames *20 – 100% x I_S.
R-Frame *25 – 100% x I_n.
- ⑥ By OPTIMizer/BIM.
- ⑦ Yes with addition of Energy Sentinel.

BIM = Breaker Interface Module
I_S = Sensor Rating
I_n = Rating Plug
I_r = LDPU Setting x I_n

F-Frame



Typical F-Frame Breaker



F-Frame Breaker with Electronic Trip Unit

Product Description

- All Eaton's Cutler-Hammer F-Frame Circuit Breakers by are HACR rated.
- All circuit breakers 10 through 30 amperes are suitable for HID (high intensity discharge) use.
- All F-Frame circuit breakers are suitable for reverse feed use

Technical Data and Specifications

Table 12-148. UL 489 Interrupting Capacity Ratings

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc ①	
		240	277	480	600	125	250 ②③
EDB	2, 3	22	—	—	—	10	—
EDS	2, 3	42	—	—	—	10	—
ED	2, 3	65	—	—	—	10	—
EDH	2, 3	100	—	—	—	10	—
EDC	2, 3	200	—	—	—	10	—
EHD	1	—	4	—	—	10	—
	2, 3	18	—	14	—	—	10
FDB	2, 3, 4	18	—	14	14	—	10
FD,	1	—	35	—	—	10	—
FDE ④	2, 3, 4	65	—	35	18	—	10
HFD,	1	—	65	—	—	10	—
HFDE ④	2, 3, 4	100	—	65	25	—	22
FDC ⑤,	2, 3, 4	200	—	100	25	—	22
FDCE ④⑤⑥							

- ① dc ratings apply to substantially non-inductive circuits.
- ② 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ④ Electronics available on 3-pole only, no dc rating for FDE, HFDE, FDCE.
- ⑤ Current limiting.
- ⑥ Check with Eaton for availability.

Table 12-149. IEC 157-1 (P1) Interrupting Capacity Ratings (P1)

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)					
		Volts ac (50/60 Hz)				Volts dc ①	
		220, 240	380, 415	440	500	125	250 ②③
EDB	2, 3	22	—	—	—	10	—
EDS	2, 3	42	—	—	—	10	—
ED	2, 3	65	—	—	—	10	—
EDH	2, 3	100	—	—	—	10	—
EDC	2, 3	200	—	—	—	10	—
EHD	1	—	14	—	—	10	—
	2, 3	18	—	14	—	—	10
FDB	2, 3, 4	18	14	14	14	—	10
FD	1	35	—	—	—	10	—
	2, 3, 4	65	35	35	18	—	10
HFD	1	65	—	—	—	10	—
	2, 3, 4	100	65	65	25	—	22
FDC	2, 3, 4	200	100	100	35	—	22

- ① dc ratings apply to substantially non-inductive circuits.
- ② 2-pole circuit breaker, or two poles of 3-pole circuit breaker.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.

Table 12-150. Digitrip Electronic Trip Units

Circuit Breaker Type	Frame	Ratings
FDE, HFDE, FDCE	225	100, 110, 125, 150, 160, 175, 200, 225
FDE, HFDE, FDCE	160	60, 70, 80, 90, 100, 125, 150, 160
FDE, HFDE, FDCE	80	15, 20, 30, 40, 50, 60, 70, 80

F-Frame

Table 12-151. F-Frame Digitrip Specifications

Trip Unit Type	Digitrip RMS 310+	
rms Sensing	Yes	
Breaker Type		
Frame	FDE	
Ampere Range	15 – 225 A	
Interrupting Rating at 480 V	35, 65, 100 (kA)	
Protection		
Ordering Options	LS LSG	LSI LSIG
Fixed Rated Plug (I_n)	No	
Overtemperature Trip	Yes	
Long Delay Protection (L)		
Adjustable Rating Plug (I_n)	No	
Long Delay Pickup	40 – 100% Frame	
Long Delay Time I^2t	2 – 24 Seconds	
Long Delay Time I^4t	No	
Long Delay Thermal Memory	Yes	
High Load Alarm	Yes	
Short Delay Protection (S)		
Short Delay Pickup	200 – 1000% (I_r)	
Short Delay Time I^2t	Yes	No
Short Delay Time Flat	No	Inst – 300 ms
Short Delay Time Z.S.I.	Yes ^①	
Instantaneous Protection (I)		
Instantaneous Pickup	No	
Discriminator	No	
Instantaneous Override	Yes	
Ground Fault Protection (G)		
Ground Fault Alarm	No	
Ground Fault Pickup	20 – 100% Frame	
Ground Fault Delay I^2t	No	
Ground Fault Delay Flat	Inst – 300 ms	
Ground Fault Z.S.I.	Yes ^①	
Ground Fault Thermal Memory	Yes	
System Diagnostics		
Cause of Trip LEDs	No	
Magnitude of Trip Information	No	
Remote Signal Contacts	No	
System Monitoring		
Digital Display	No	
Current	No	
Voltage	No	
Power and Energy	No	
Power Quality Harmonics	No	
Power Factor	No	
Communications		
PowerNet	No	
Testing		
Testing Method	Test Kit	

^① ZSI (Zone Selective Interlocking) is optional. Must order with ZSI. Standard 310+ does not come with ZSI.

Legend: I_n = Rating Plug
 I_r = Long Delay Pickup Setting $\times I_n$

Dimensions/Weights

Table 12-152. Dimensions in Inches (mm)

Number of Poles	Width	Height	Depth
1	1.38 (35.1)	6.00 (152.4)	3.38 (86.0)
2	2.75 (70.0)	6.00 (152.4)	3.38 (86.0)
3	4.13 (105.0)	6.00 (152.4)	3.38 (86.0)
4	5.50 (139.7)	6.00 (152.4)	3.38 (86.0)

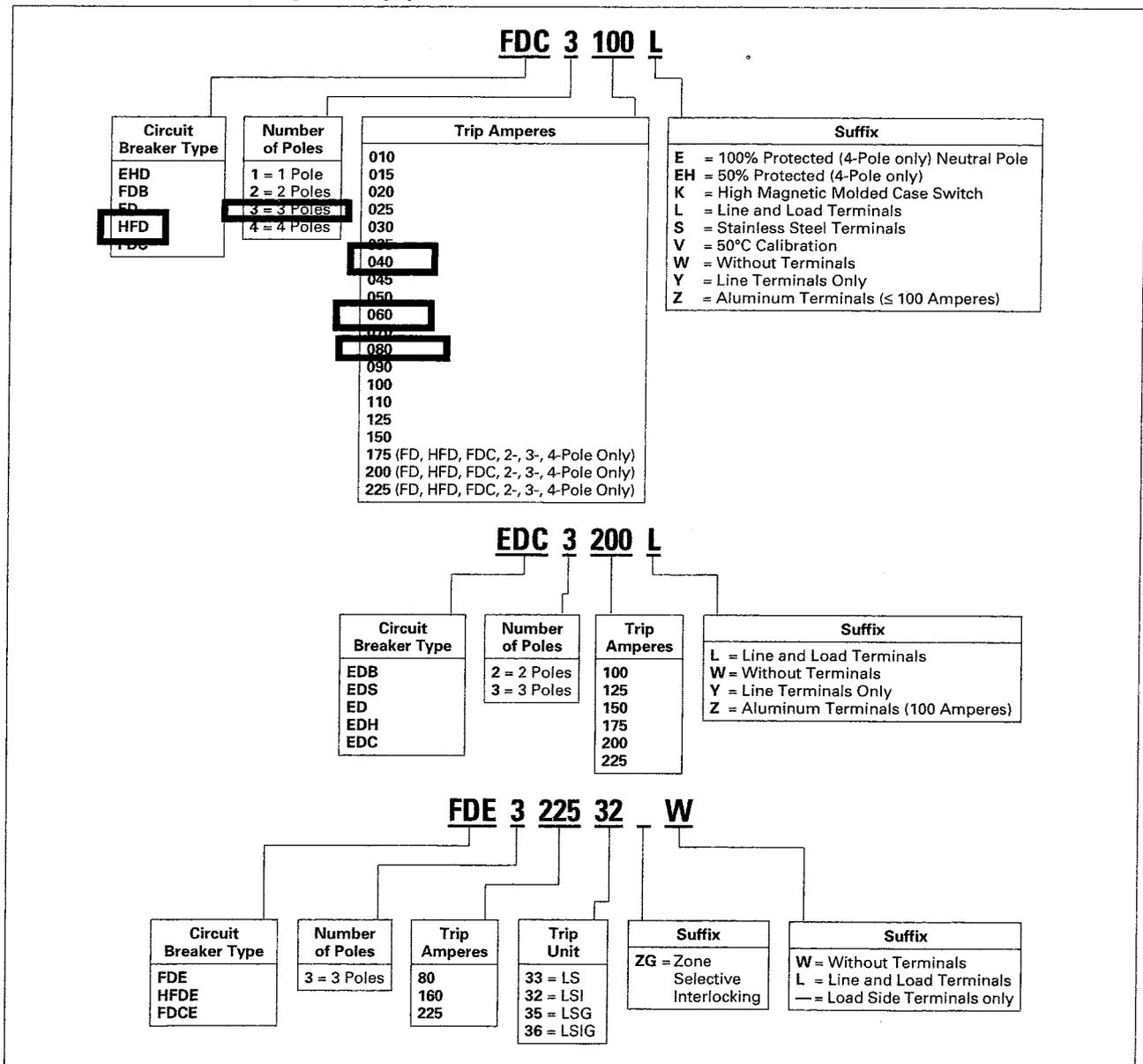
Table 12-153. Approximate Shipping Weight, Lbs. (kg)

Breaker Type	Number of Poles			
	1	2	3	4
ED, EDB, EDS, EDH, EDC	—	3 (1.4)	4.5 (2.0)	—
EHD, FDB, FD, HFD, FDC	2 (.9)	3 (1.4)	4.5 (2.0)	6 (2.7)
FDE, HFDE, FDCE	—	—	4.5 (2.0)	—

Product Selection

This information is presented only as an aid to understanding Catalog Numbers. It is not to be used to build Catalog Numbers for circuit breakers or trip units.

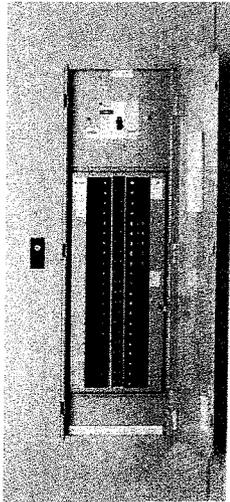
Table 12-154. Circuit Breaker Catalog Numbering System



PRL1a

Product Description

- 240 Vac maximum.
- 3-phase 4-wire, 3-phase 3-wire, 1-phase 3-wire, 1-phase 2-wire.
- 400 ampere maximum mains.
- 100 ampere maximum branch breakers.
- Bolt-on or plug-on branch breakers.
- Factory assembled.
- Refer to **Page 14-5** for additional information.



Type PRL1a

Application Description

- Lighting and appliance branch panelboard.
- Fully rated or series rated.
- Interrupting ratings up to 200 kA symmetrical.
- Suitable for use as Service Entrance Equipment, when specified on the order.
- See **Pages 14-5 through 14-18** for additional information.

Standards and Certifications

- UL 67, UL 50.
- Federal Specification W-P-115c.
- Refer to **Page 14-5** for additional information.

Options and Accessories

- Refer to **Page 14-46**.

Layout and Sizing

- Refer to **Page 14-22**.

Product Selection

Formula Pricing: Base Price + Branch Circuits + Modifications = Total Price U.S. \$

Table 14-19. Base Prices — PRL1a

Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac	Breaker Type	Price U.S. \$		
			3-Phase 4-Wire	1-Phase 3-Wire, 1-Phase 2-Wire	3-Phase 3-Wire
Main Lug Only					
100	—	—			
225	—	—			
400	—	—			
Main Breaker					
100	10	BAB			
100	18	EHD			
100	22	QBHW			
100	22	EDB			
100	42	EDS			
100	65	ED			
100	65	FD			
100	100	EDH			
100	100	HFD			
225	22	EDB			
225	42	EDS			
225	65	ED			
225	100	EDH			
250	65	JD			
250	100	HJD			
250	200	JDC			
400	65	DK			
400	65	KD			
400	100	HKD			
400	200	KDC			

Table 14-20. Branch Circuit Breakers — PRL1a

Bolt-on = BAB, QBHW, QBGF, QBHGF, QBGFEP, QBHGFEP, QBAF, QBAG, QBHAF, QBHAG Plug-on = HQP, QPHW, QPGF, QPHGF, QPGFEP, QPHGFEP						
Ampere Rating	Interrupting Rating (kA Sym.) 240 Vac ①	Breaker Type	Price U.S. \$			
			1-Pole 120 V	2-Pole 120/240 V	2-Pole 240 V ②	3-Pole 240 V
15 - 60	10	BAB, HQP				
70	10	BAB, HQP				
80 - 100	10	BAB, HQP				
15 - 50 ③	10	QBGF, QPGF ④				
15 - 50 ③	10	QBGFEP, QPGFEP ⑤				
15 - 20	10	QBAF ⑥				
15 - 20	10	QBAG ⑦				
15 - 60	10	BAB-D, HQP-D ⑧				
15 - 30	10	BAB-C, HQP-B ⑨				
15 - 30	10	BABRP ⑩				
15 - 30	10	BABRSP ⑪				
15 - 60	22	QBHW, QPHW				
70	22	QBHW, QPHW				
80 - 100	22	QBHW, QPHW				
15 - 30	22	QBHGF, QPHGF ④				
15 - 30	22	QBHGFEP, QPHGFEP ⑤				
15 - 20	22	QBHAF ⑥				
15 - 20	22	QBHAG ⑦				
Provision	—	—				

- ① 1-pole breakers are rated 120 Vac maximum.
- ② 240 volt breakers must be used on 3-phase, 3-wire, 240 volt delta systems or on the high leg of a midpoint delta grounded system.
- ③ 50 ampere devices are available as 2-pole only.
- ④ GFCI for 5 mA personnel protection.
- ⑤ GFF for 30 mA equipment protection.
- ⑥ Arc fault circuit breaker.
- ⑦ Arc fault circuit breaker with GFCI.
- ⑧ HID (High Intensity Discharge) rated breaker.
- ⑨ Switching Neutral Breaker. 1-pole device requires 2-pole space, 2-pole device requires 3-pole space.
- ⑩ Solenoid operated breaker.

Discount Symbol CE9

PRL1a

Box Sizing and Selection

Assembled Circuit Breaker Panelboards

Box size and box and trim catalog numbers for all standard panelboard types are found in **Table 14-21**.

Instructions

- Using description of the required panelboard, select the rating and type of main required.
- Count the total number of branch circuit poles, including provisions, required in the panelboard. Do not count main breaker poles. Convert 2- or 3-pole branch breaker to single-poles, i.e., 3-pole breaker, count as 3 poles.

Determine sub-feed breaker or through-feed lug requirements.

- Select the main ampere rating section from **Table 14-21**.
- Select panelboard type from first column, main breaker frame, if applicable, from second column, and sub-feed breaker frame, if applicable, from the third column.
- From Step #2, determine the number of branch circuits in Column 4.
- Read box size, box and trim catalog numbers across columns to the right. Specify surface or flush mounting on the order.

Cabinets

Fronts are code-gauge steel, ANSI-61 light gray painted finish.

Boxes are code-gauge galvanized steel without knockouts. Standard depth is 5-3/4 inches (146.1 mm). Standard width is 20 inches (508.0 mm). An optional 28-inch (711.2 mm) wide box is available.

Top and Bottom Gutters

5-1/2 inches (139.7 mm) minimum.

Table 14-21. PRL1a Panelboard Sizing

Panelboard Types	Main Breaker Types & Mounting Position (H) = Horiz. (V) = Vert.	Sub-Feed Breaker Types & Mounting Position (H) = Horiz. (V) = Vert.	Maximum No. of Branch Circuits Including Provisions	Box Dimensions Inches ②			YS Box Catalog Number	LT Trim Catalog Number	EZ Box Catalog Number	EZ Trim Catalog Number
				H	W	D				
100 Ampere Maximum										
Main Breaker	BAB, QBHW (H)	—	15	36.00	20.00	5.75	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	27	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	39	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main Lugs or Main Breaker	EHD, HFD (V)	—	30	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
Main Lugs or Main Breaker with 100 A Thru-Feed Lugs or Sub-Feed Breaker	EHD, FD, HFD (V)	EHD	18	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		FD	30	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		HFD	42	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		(V)	42	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
225 Ampere Maximum										
Main Lugs or Main Breaker	EDB, EDS, ED, EDH, FD, HFD (V)	—	18	36.00	20.00	5.75	YS2036	LT2036S or F	EZB2036R	EZT2036S or F
		—	30	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
Main Lugs or Main Breaker with 225 A Thru-Feed Lugs or Sub-Feed Breaker	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	—	18	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	30	48.00	20.00	5.75	YS2048	LT2048S or F	EZB2048R	EZT2048S or F
		—	42	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	42	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main Lugs or Main Breaker with 400 A Thru-Feed Lugs or Sub-Feed Breaker	DK, KD, HKD, KDC (V)	—	18	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	42	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main Lugs or Main Breaker with 225 A Thru-Feed Lugs or Sub-Feed Breaker	DK, KD, HKD, KDC (V)	EHD, FD, HFD, EDB, EDS, ED, EDH (V)	18	60.00	20.00	5.75	YS2060	LT2060S or F	EZB2060R	EZT2060S or F
		—	30	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	42	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
Main Lugs or Main Breaker with 400 A Thru-Feed Lugs or Sub-Feed Breaker	DK, KD, HKD, KDC (V)	JD, HJD, JDC, DK, KD, HKD, KDC (V)	18	72.00	20.00	5.75	YS2072	LT2072S or F	EZB2072R	EZT2072S or F
		—	30	90.00	20.00	5.75	YS2090	LT2090S or F	EZB2090R	EZT2090S or F
		—	42	90.00	20.00	5.75	YS2090	LT2090S or F	EZB2090R	EZT2090S or F
		—	42	90.00	20.00	5.75	YS2090	LT2090S or F	EZB2090R	EZT2090S or F

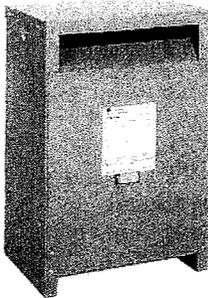
① Metric box dimensions:

Catalog Number		Dimensions in mm		
YS Box	EZ Box	Height	Width	Depth
YS2036	EZB2036R	914.4	508.0	146.1
YS2048	EZB2048R	1219.2	508.0	146.1
YS2060	EZB2060R	1524.0	508.0	146.1
YS2072	EZB2072R	1828.8	508.0	146.1
YS2090	EZB2090R	2286.0	508.0	146.1

② Smaller panelboard box sizes are available if required. Contact Eaton for application information.

Single- and Three-Phase, Types DS-3 & DT-3, 60 Hz

Single- and Three-Phase, Types DS-3, DT-3, 60 Hz



Type DT-3

9

Product Description

Types DS-3, DT-3

- Ventilated, NEMA 2 enclosure standard.
- Suitable for indoor applications, outdoors when weathershields are also installed.
- Upright mounting only.
- 220°C insulation system.
- 150°C rise standard; 115°C or 80°C rise optional.
- Available in single-phase ratings 15 – 167 kVA, 600 volts primary (DS-3).
- Available in three-phase ratings 15 – 1500 kVA and up to 600 volts primary (DT-3).

Application Description

NEMA TP-1-2002 compliant Energy Efficient Transformers are specifically designed to meet the energy efficiency standards set forth in NEMA Standards publication, TP-1-2002, "Guide for Determining Energy Efficiency for Distribution Transformers." Surveys have shown that the average loading of low voltage dry-type distribution transformers, over a 24 hour period, is approximately 35%. NEMA TP-1 compliant transformers are optimized to offer maximum efficiency at 35% of nameplate rating.

The range of products covered by NEMA TP-1-2002 are:

Table 9-1. NEMA TP-1-2002 Product Range

Voltage Class	Primary Voltage	34.5 kV and below
	Secondary Voltage	600 V and below
Dry-Type Rating	Single-Phase	10 – 833 kVA
	Three-Phase	15 – 2500 kVA
Liquid Rating	Single-Phase	10 – 833 kVA
	Three-Phase	15 – 2500 kVA

Transformers that are currently specifically excluded from the scope of NEMA Standard TP-1-2002 include:

- Liquid-filled transformers below 10 kVA.
- Dry-type transformers below 15 kVA.
- ac and dc drives transformers.
- Rectifier transformers designed for high harmonics.
- Autotransformers.
- Non-distribution transformers, such as UPS transformers.
- Special impedance or regulation transformers.
- Regulating transformers.
- Sealed and non-ventilated transformers.
- Machine tool transformers.
- Welding transformers.
- Transformers with tap ranges greater than 15%.
- Transformers with a frequency other than 60 Hz.
- Grounding transformers.
- Testing transformers.

Efficiency levels set forth in NEMA TP-1-2002.

Table 9-2. NEMA TP-1-2002 Efficiency Levels

Tables of Energy Efficiency NEMA Class 1 Efficiency Levels Dry-Type Distribution Transformers — Low Voltage (600 V and below)			
Single-Phase		Three-Phase	
kVA	Efficiency	kVA	Efficiency
15	97.7	15	97.0
25	98.0	30	97.5
37.5	98.2	45	97.7
50	98.3	75	98.0
75	98.5	112.5	98.2
100	98.6	150	98.3
167	98.7	225	98.5
250	98.8	300	98.6
333	98.9	500	98.7
—	—	750	98.8
—	—	1000	98.9

Features, Benefits and Functions

- UL listed.
- 60 Hz operation (except as noted).
- Short-term overload capability as required by ANSI.
- Meet NEMA ST-20 sound levels.
- Meet Federal Energy Efficiency requirements for low voltage dry-type distribution transformers that is effective January 1, 2007.

The following pages provide listings for most standard transformer ratings and styles.

For other ratings or styles not shown, or for special enclosure types (including stainless steel) refer to Eaton.

Standards and Certifications

Industry Standards

All Eaton dry-type distribution and control transformers are built and tested in accordance with applicable NEMA, ANSI and IEEE Standards. All 600 volt class transformers are UL listed unless otherwise noted.

Seismically Qualified

Eaton manufactured dry-type distribution transformers are seismically qualified, and exceed requirements of the Uniform Building Code (UBC), International Building Code (IBC) and California Code Title 24.

Options and Accessories

Please refer to **Page 9-146**.

Product Specifications

Frequency

Eaton standard dry-type distribution transformers are designed for 60 Hertz operation. Transformers required for other frequencies are available and must be specifically designed.

Overload Capability

Short-term overload is designed into transformers as required by ANSI. Dry-type distribution transformers will deliver 200% nameplate load for one half hour; 150% load for one hour; and 125% load for four hours without being damaged provided that a constant 50% load precedes and follows the overload. See ANSI C57.96-01.250 for additional limitations.

Continuous overload capacity is not deliberately designed into a transformer because the design objective is to be within the allowed winding temperature rise with nameplate loading.

Insulation System and Temperature Rise

Industry standards classify insulation systems and rise as shown below:

Table 9-3. Insulation System Classification

Ambient	+ Winding Rise	+ Hot Spot	= Temp. Class
40°C	55°C	10°C	105°C
40°C	80°C	30°C	150°C
40°C	115°C	30°C	185°C
40°C	150°C	30°C	220°C

The design life of transformers having different insulation systems is the same — the lower temperature systems are designed for the same life as the higher temperature systems.

Enclosures

Eaton's ventilated transformers, Types DS-3 and DT-3, utilize a NEMA 2 rated (drip-proof) enclosure as standard, and are rated NEMA 3R with the addition of weathershields.

Sound Levels

All Eaton 600 volt class general purpose dry-type distribution transformers are designed to meet NEMA ST-20 sound levels listed here. These are the sound levels measured in a sound-proof environment. Actual sound levels measured at an installation will likely be higher due to electrical connections and environmental conditions. Lower sound levels are available and should be specified when the transformer is going to be installed in an area where sound may be a concern.

Table 9-4. Average Sound Levels ①

kVA	NEMA ST-20 Average Sound Level in dB		
	Up to 1.2 kV		Above 1.2 kV
	Ventilated	Encapsulated	Ventilated
0 - 9	40	45	45
10 - 50	45	50	50
51 - 150	50	55	55
151 - 300	55	57	58
301 - 500	60	59	60
501 - 700	62	61	62
701 - 1000	64	63	64
1001 - 1500	65	64	65

① Currently being reviewed and revised by NEMA.

Winding Terminations

Primary and secondary windings are terminated in the wiring compartment. Encapsulated units have copper leads or stabs brought out for connections. Ventilated transformers have leads brought out to aluminum pads that are pre-drilled to accept Cu/Al lugs. **Lugs are not supplied with these transformers.** Eaton recommends external cables be rated 90°C (sized at 75°C ampacity) for encapsulated designs and 75°C for ventilated designs.

Series-Multiple Windings

Series-multiple windings consist of two similar coils in each winding which can be connected in series or parallel (multiple). Transformers with series-multiple windings are designated with an "X" or "/" between the voltage ratings, such as voltages of "120/240" or "240 X 480." If the series-multiple winding is designated by an "X," the winding can be connected only for a series or parallel. With the "/" designation, a mid-point also becomes available in addition to the series or parallel connection. As an example, a 120 X 240 winding can be connected for either 120 (parallel) or 240 (series), but a 120/240 winding can be connected for 120 (parallel), or 240 (series), or 240 with a 120 mid-point.

Technical Data and Specifications

Please refer **Page 9-149**.

For other ratings or styles not shown, or for special enclosure types (including stainless steel) refer to Eaton.

Single-Phase, Type DS-3

Product Selection ①

Additional Product Selection information begins on Page 9-164.

Table 9-5. Single-Phase Selection Information — Type DS-3 60 Hz NEMA TP-1 Compliant ①

kVA	Full Cap. Taps		Type	°C Temp. Rise	Dimensions (Inches)			Wt. Lbs.	Dimensions (mm)			Wt. Kg	Frame	Wiring Diagram Number	Weathershield	Style Number
	FCAN	FCBN			H	W	D		H	W	D					

240 X 480 Volts to 120/240 Volts, Aluminum Windings

15	②	②	DS-3	150	31.25	22.59	17.50	246	794	574	445	112	816	3XA	WS11	T20P11S15EE
25	②	②	DS-3	150	37.53	22.59	19.50	374	953	574	495	170	818	3XA	WS11	T20P11S25EE
37.5	②	②	DS-3	150	42.03	24.00	23.38	555	1068	610	594	252	819	3XA	WS16	T20P11S37EE
50	②	②	DS-3	150	42.03	24.00	23.38	740	1068	610	594	336	820	3XA	WS16	T20P11S50EE
75	②	②	DS-3	150	62.89	29.68	33.68	841	1597	754	855	382	821	3XA	WS13	T20P11S75EE
100	②	②	DS-3	150	62.89	29.68	33.68	1294	1597	754	855	587	814	288A	WS13	T20P11S99EE
167	2@+2.5%	4@-2.5%	DS-3	150	62.89	29.69	33.68	1294	1597	754	855	587	814	288A	WS13	T48M11S67EE ③
15	②	②	DS-3	115	31.25	22.59	17.50	246	794	574	445	112	816	3XA	WS11	T20P11F15EE
25	②	②	DS-3	115	37.53	22.59	19.50	373	953	574	495	169	818	3XA	WS11	T20P11F25EE
37.5	②	②	DS-3	115	37.53	22.59	19.50	380	953	574	495	173	818	3XA	WS11	T20P11F37EE
50	②	②	DS-3	115	42.03	24.00	23.38	590	1068	610	594	268	819	3XA	WS16	T20P11F50EE
75	②	②	DS-3	115	42.03	24.00	23.38	691	1068	610	594	314	820	3XA	WS16	T20P11F75EE
100	②	②	DS-3	115	62.89	29.68	33.68	844	1597	754	855	383	821	3XA	WS13	T20P11F99EE
15	②	②	DS-3	80	37.53	22.59	19.50	360	953	574	495	163	818	3XA	WS11	T20P11B15EE
25	②	②	DS-3	80	37.53	22.59	19.50	370	953	574	495	168	818	3XA	WS11	T20P11B25EE
37.5	②	②	DS-3	80	42.03	24.00	23.38	565	1068	610	594	257	819	3XA	WS16	T20P11B37EE
50	②	②	DS-3	80	42.03	24.00	23.38	680	1068	610	594	309	820	3XA	WS16	T20P11B50EE
75	②	②	DS-3	80	62.89	29.68	33.68	900	1597	754	855	409	821	3XA	WS13	T20P11B75EE

240 X 480 Volts to 120/240 Volts, Copper Windings

15	②	②	DS-3	150	31.25	22.59	17.50	270	794	574	445	123	816	3XA	WS11	T20P11S15CUUE
25	②	②	DS-3	150	37.53	22.59	19.50	406	953	574	495	184	818	3XA	WS11	T20P11S25CUUE
37.5	②	②	DS-3	150	37.53	22.59	19.50	453	953	574	495	206	818	3XA	WS11	T20P11S37CUUE
50	②	②	DS-3	150	42.03	24.00	23.38	657	1068	610	594	298	819	3XA	WS16	T20P11S50CUUE
75	②	②	DS-3	150	42.03	24.00	23.38	803	1068	610	594	365	820	3XA	WS16	T20P11S75CUUE
100	②	②	DS-3	150	62.89	29.68	33.68	960	1597	754	855	436	821	3XA	WS13	T20P11S99CUUE
167	2@+2.5%	4@-2.5%	DS-3	150	62.89	29.69	33.68	1665	1597	754	855	756	814	288A	WS13	T48M11S67CUUE ③
15	②	②	DS-3	115	31.25	22.59	17.50	264	794	574	445	120	816	3XA	WS11	T20P11F15CUUE
25	②	②	DS-3	115	37.53	22.59	19.50	420	953	574	495	191	818	3XA	WS11	T20P11F25CUUE
37.5	②	②	DS-3	115	37.53	22.59	19.50	450	953	574	495	204	818	3XA	WS11	T20P11F37CUUE
50	②	②	DS-3	115	42.03	24.00	23.38	703	1068	610	594	319	819	3XA	WS16	T20P11F50CUUE
75	②	②	DS-3	115	42.03	24.00	23.38	793	1068	610	594	360	820	3XA	WS16	T20P11F75CUUE
100	②	②	DS-3	115	62.89	29.68	33.68	1085	1597	754	855	493	821	3XA	WS13	T20P11F99CUUE
15	②	②	DS-3	80	37.53	22.59	19.50	407	953	574	495	185	818	3XA	WS11	T20P11B15CUUE
25	②	②	DS-3	80	37.53	22.59	19.50	430	953	574	495	195	818	3XA	WS11	T20P11B25CUUE
37.5	②	②	DS-3	80	42.03	24.00	23.38	685	1068	610	594	311	819	3XA	WS16	T20P11B37CUUE
50	②	②	DS-3	80	42.03	24.00	23.38	799	1068	610	594	363	820	3XA	WS16	T20P11B50CUUE
75	②	②	DS-3	80	62.89	29.68	33.68	1056	1597	754	855	479	821	3XA	WS13	T20P11B75CUUE

208 Volts to 120/240 Volts, Aluminum Windings

15	2@+2.5%	4@-2.5%	DS-3	150	31.25	22.59	17.50	226	794	574	445	103	816	260A	WS11	T29M11S15EE
25	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	346	953	574	495	157	818	260A	WS11	T29M11S25EE
37.5	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	374	953	574	495	170	818	260A	WS11	T29M11S37EE
50	2@+2.5%	4@-2.5%	DS-3	150	42.03	24.00	23.38	545	1068	610	594	247	819	260A	WS16	T29M11S50EE
75	1@+5%	2@-5%	DS-3	150	42.03	24.00	23.38	568	1068	610	594	258	819	551A	WS16	T29R11S75EE
100	1@+5%	2@-5%	DS-3	150	62.89	29.69	33.68	1178	1597	754	855	535	814	449A	WS13	T29R11S99EE

277 Volts to 120/240 Volts, Aluminum Windings

15	2@+2.5%	4@-2.5%	DS-3	150	31.25	22.59	17.50	220	794	574	445	100	816	262C	WS11	T27M11S15EE
25	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	346	953	574	495	157	818	262C	WS11	T27M11S25EE
37.5	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	391	953	574	495	178	818	262C	WS11	T27M11S37EE
50	2@+2.5%	4@-2.5%	DS-3	150	42.03	24.00	23.38	555	1068	610	594	252	819	262C	WS16	T27M11S50EE
75	1@+5%	2@-5%	DS-3	150	42.03	24.00	23.38	568	1068	610	594	258	819	④	WS16	T27R11S75EE
100	1@+5%	2@-5%	DS-3	150	62.89	29.69	33.68	1178	1597	754	855	535	814	④	WS13	T27R11S99EE

① Dimensions and weights subject to change.
 ② 1@+5%, 2@-5% at 240 volts primary; 2@+2.5%, 4@-2.5% at 480 volts primary.
 ③ 480 volt primary only.
 ④ Contact your local Eaton sales office for these details.

For other ratings or styles not shown, or for special enclosure types (including stainless steel) refer to Eaton.

Discount Symbol DT-1

Single-Phase, Type DS-3

Table 9-6. Single-Phase Selection Information — Type DS-3 60 Hz NEMA TP-1 Compliant ①

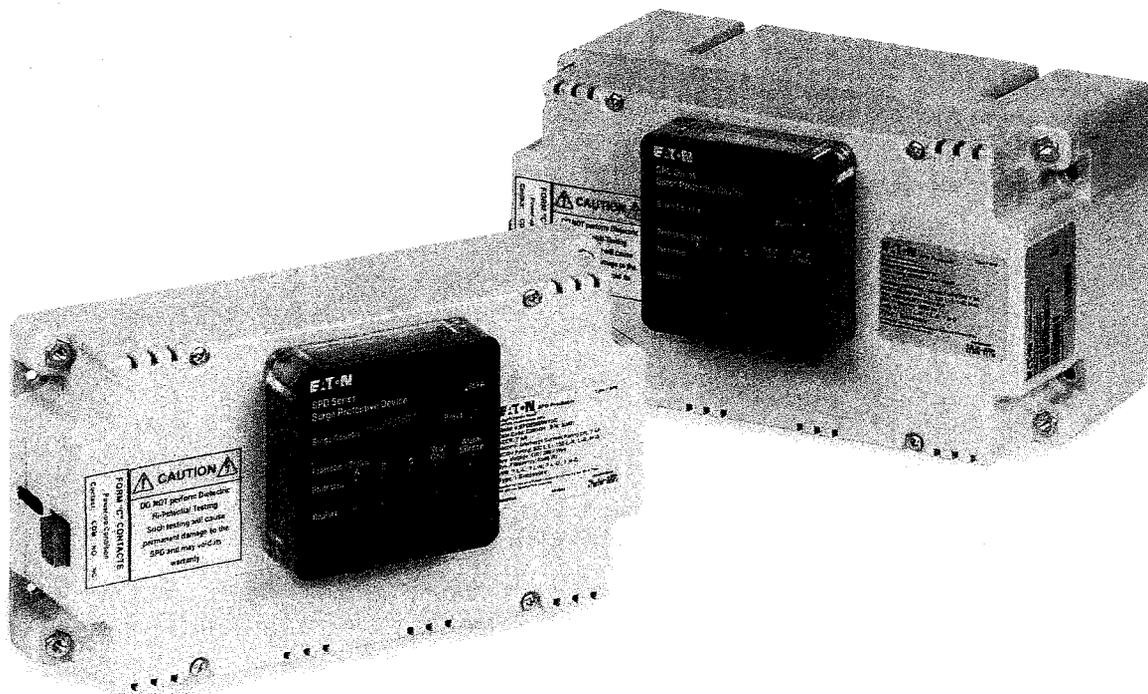
kVA	Full Cap. Taps		Type	°C Temp. Rise	Dimensions (Inches)			Wt. Lbs.	Dimensions (mm)			Wt. Kg	Frame	Wiring Diagram Number	Weathershield	Style Number
	FCAN	FCBN			H	W	D		H	W	D					
600 Volts to 120/240 Volts, Aluminum Windings																
15	2@+2.5%	4@-2.5%	DS-3	150	31.25	22.59	17.50	243	794	574	445	110	816	262B	WS11	T60M11S15EE
25	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	355	953	574	495	161	818	262B	WS11	T60M11S25EE
37.5	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	375	953	574	495	170	818	262B	WS11	T60M11S37EE
50	2@+2.5%	4@-2.5%	DS-3	150	42.03	24.00	23.38	594	1068	610	594	270	819	262B	WS16	T60M11S50EE
75	2@+2.5%	4@-2.5%	DS-3	150	42.03	24.00	23.38	755	1068	610	594	343	820	262B	WS16	T60M11S75EE
100	2@+2.5%	4@-2.5%	DS-3	150	62.89	29.68	33.68	865	1597	754	855	393	821	262B	WS13	T60M11S99EE
600 Volts to 120/240 Volts, Copper Windings																
15	2@+2.5%	4@-2.5%	DS-3	150	31.25	22.59	17.50	290	794	574	445	132	816	262B	WS11	T60M11S15CUEE
25	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	465	953	574	495	211	818	262B	WS11	T60M11S25CUEE
37.5	2@+2.5%	4@-2.5%	DS-3	150	37.53	22.59	19.50	495	953	574	495	225	818	262B	WS11	T60M11S37CUEE
50	2@+2.5%	4@-2.5%	DS-3	150	42.03	24.00	23.38	775	1068	610	594	352	819	262B	WS16	T60M11S50CUEE
75	2@+2.5%	4@-2.5%	DS-3	150	42.03	24.00	23.38	900	1068	610	594	409	820	262B	WS16	T60M11S75CUEE
100	2@+2.5%	4@-2.5%	DS-3	150	62.89	29.68	33.68	1195	1597	754	855	543	821	262B	WS13	T60M11S99CUEE

① Dimensions and weights subject to change.

For other ratings or styles not shown, or for special enclosure types (including stainless steel) refer to Eaton.

Discount Symbol DT-1

Eaton's SPD Series for integration into electrical distribution equipment



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Powering Business Worldwide

Introduction

Eaton's SPD Series surge protective devices

Eaton's SPD Series surge protective devices are the latest and most advanced UL® 1449 3rd Edition certified surge protectors. Units are available integrated within Eaton electrical assemblies, including panelboards, switchboards, motor control centers, switchgear, and bus plugs. Side-mount versions of the SPD Series are also available for installation external to an electrical assembly. Application of SPD Series units throughout a facility will ensure that equipment is protected with the safest and most reliable surge protective devices available.

SPD Series units are available in all common voltages and configurations and also in a variety of surge current capacity ratings from 50 through 400 kA. Three feature package options are also available to choose from. The breadth of the SPD Series' features, options, and configurations ensures that the correct unit is available for all electrical applications, including service entrances, distribution switchboards, panelboards, and point-of-use applications.

Applications

The SPD Series is available as an integrated device within the following Eaton electrical assemblies:

- Panelboards
- Switchboards
- Motor control centers
- Switchgear
- Automatic transfer switches
- Bus plugs

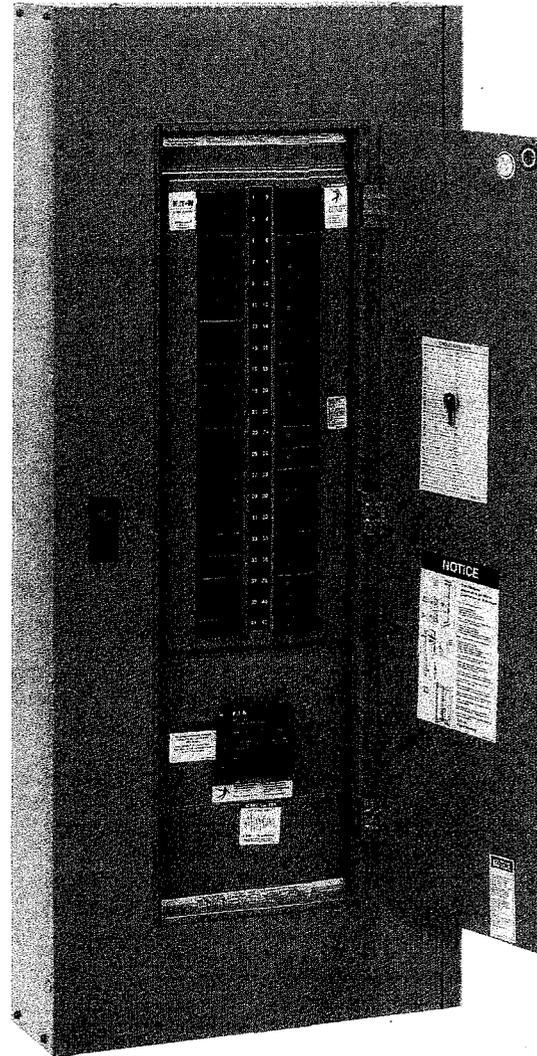
Features

- Uses thermally protected metal oxide varistor (MOV) technology
- 20 kA nominal discharge current (I_n) rating (maximum rating assigned by UL)
- 50 through 400 kA surge current capacity ratings
- Three feature package options
- 200 kA short circuit current rating (SCCR)
- 10-year warranty

Standards and certifications



- UL 1449 3rd Edition recognized component for the United States and Canada, covered by Underwriters Laboratories certification and follow-up service



SPD Series Unit Integrated Within an Eaton Panelboard

Feature package options

The SPD Series provides users with the option of selecting between three feature packages. These feature packages are the basic, standard, and standard with surge counter. The proper feature package can be selected based on the requirements of the application or specification.

Table 1. Feature Package Comparison

Feature	Basic	Standard	Standard with Surge Counter
Surge protection using thermally protected MOV technology	✓	✓	✓
Dual-colored protection status indicators for each phase	✓	✓	✓
Dual-colored protection status indicators for the neutral-ground protection mode	✓	✓	✓
Audible alarm with silence button		✓	✓
Form C relay contact		✓	✓
EMI/RFI filtering, providing up to 50 dB of noise attenuation from 10 kHz to 100 MHz		✓	✓
Surge counter with reset button			✓

Remote display mounting option

The SPD Series offers the option of mounting its display remotely from the device. This is useful for applications where OEMs or other integrators would like to embed the unit within a piece of equipment and still be able to view its display.

SPD Series unit catalog numbers ending with 'B' (refer to catalog number configuration on **Page 7**) should be ordered for applications where the display is to be mounted remotely. These units include the SPD Series unit and the remote display panel.

In addition to the unit itself, a remote display cable will have to be purchased. Remote display cables are available in 4, 8, and 12 foot lengths.

Table 2. Remote Display Cables

Description	Catalog Number
4 ft remote display cable	SPDRDCAB04
8 ft remote display cable	SPDRDCAB08
12 ft remote display cable	SPDRDCAB12

Note: Integrated units factory-installed with Eaton switchgear assemblies do not require the purchase of a remote display cable. The cable is provided and all required mounting is performed at the factory.

Existing SPD Series units previously installed without a remote display also have the capability of mounting their displays remotely from the device. Complete remote display kits are available that contain all items required to mount the display remotely, including the remote display cable. Remote display kits are available in 4, 8, and 12 foot cable length options.

Table 3. Remote Display Kits

Description	Catalog Number
Remote display kit with 4 ft remote display cable	SPDRDKIT04
Remote display kit with 8 ft remote display cable	SPDRDKIT08
Remote display kit with 12 ft remote display cable	SPDRDKIT12

For the dimensions of the cutout required to accommodate the remote display panel, see **Figure 1** below.

Dimensions

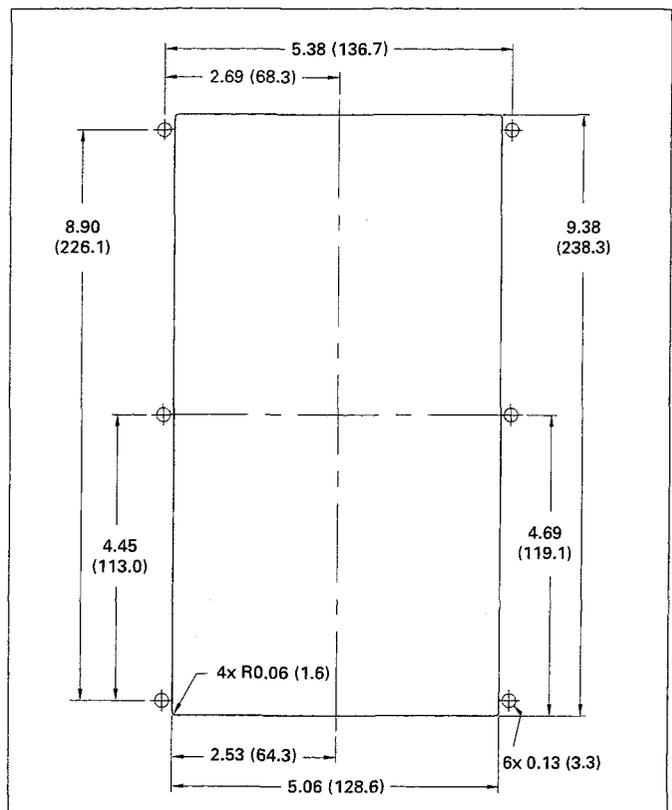


Figure 1. Dimensions of the Cutout Required to Accommodate the Optional Remote Display Panel

Dimensions (continued)

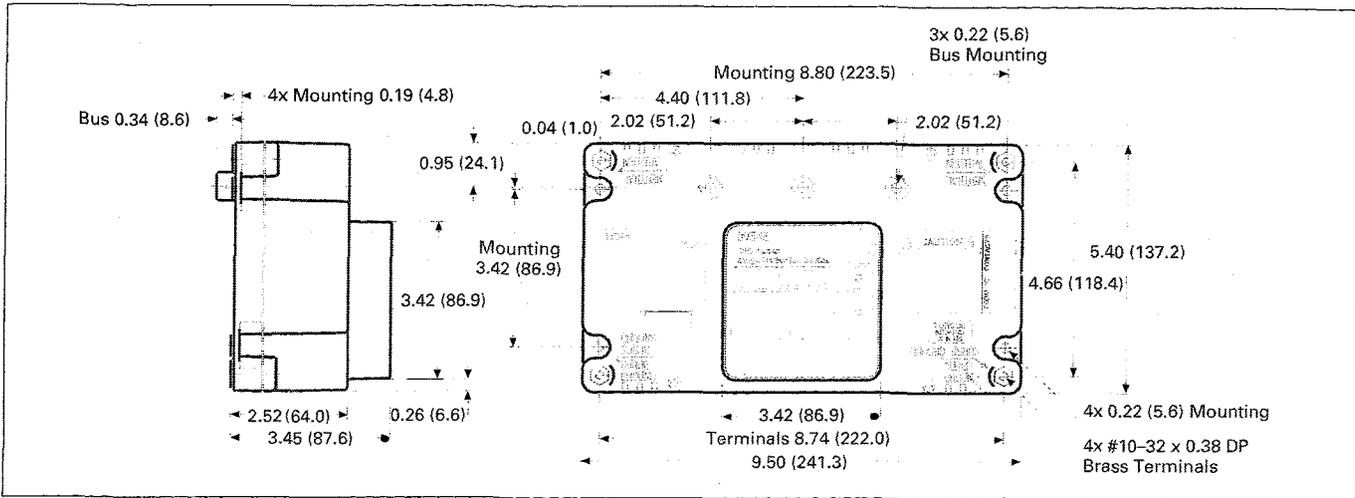


Figure 2. Dimensions of 50 through 200 kA Integrated Units

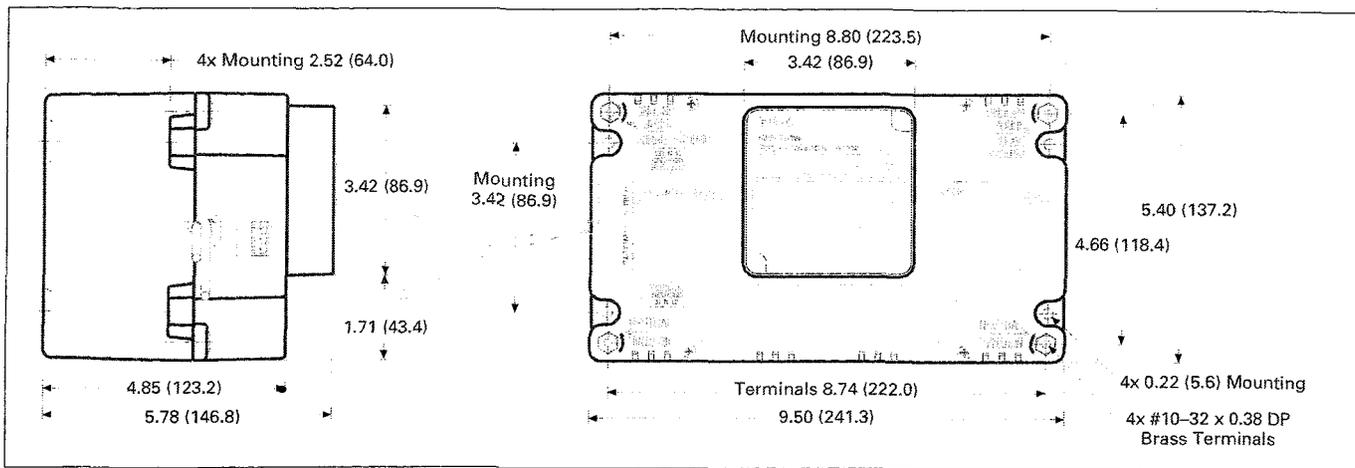


Figure 3. Dimensions of 250 through 400 kA Integrated Units

Performance data

ANSI/UL 1449 3rd Edition voltage protection ratings

Voltage protection rating (VPR) data is included for both direct bus mounted units (catalog number ending with 'A') and units interfaced to the electrical assembly via a circuit breaker (catalog number ending with 'B,' 'C,' or 'J'). Direct bus mounted units are available for installation within Eaton PRL1a, 2a, 3a, and 3E panelboards only.

Table 4. 50 kA Direct Bus Mounted Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	500	1000	500	1000
208Y and 220Y	500	1000	500	1000
400Y and 480Y	1000	2000	1000	2000
600Y	1200	2500	1200	2500
240D	N/A	1000	N/A	900
480D	N/A	2000	N/A	2000
600D	N/A	2500	N/A	2500
240H	500	1000	500	1000

Table 5. 80–100 kA Direct Bus Mounted Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	500	600	500	900
208Y and 220Y	500	600	500	900
400Y and 480Y	1000	1200	1000	1800
600Y	1200	1500	1200	2500
240D	N/A	1000	N/A	900
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	500	600	500	900

Table 6. 120–200 kA Direct Bus Mounted Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	500	600	500	800
208Y and 220Y	500	600	500	800
400Y and 480Y	900	1000	900	1800
600Y	1200	1200	1200	2500
240D	N/A	900	N/A	900
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	500	600	500	800

Table 7. 250–300 kA Circuit Breaker Interfaced Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	600⊙	700	600	1000
208Y and 220Y	600⊙	700	600	1000
400Y and 480Y	1000	1200	900	1800
600Y	1500	1500	1200	2500
240D	N/A	1000	N/A	1000
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	600⊙	700	600	1000

⊙ L-N VPR for 250–300 kA units containing the standard and standard with surge counter feature packages is 600V. L-N VPR for units containing the basic feature package is 700V. All other VPR numbers reported in all tables represent the VPR for all feature packages.

Table 8. 50 kA Circuit Breaker Interfaced Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	700	1200	700	1200
208Y and 220Y	700	1200	700	1200
400Y and 480Y	1200	2000	1200	2000
600Y	1500	2500	1500	2500
240D	N/A	1200	N/A	1200
480D	N/A	2000	N/A	2000
600D	N/A	2500	N/A	2500
240H	700	1200	700	1200

Table 9. 80–100 kA Circuit Breaker Interfaced Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	700	700	700	1000
208Y and 220Y	700	700	700	1000
400Y and 480Y	1200	1200	1200	1800
600Y	1500	1500	1500	2500
240D	N/A	1200	N/A	1200
480D	N/A	2000	N/A	2000
600D	N/A	2500	N/A	2500
240H	700	700	700	1000

Table 10. 120–200 kA Circuit Breaker Interfaced Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	700	700	600	1000
208Y and 220Y	700	700	600	1000
400Y and 480Y	1000	1200	1000	1800
600Y	1500	1500	1200	2500
240D	N/A	1000	N/A	1000
480D	N/A	2000	N/A	1800
600D	N/A	2500	N/A	2500
240H	700	700	600	1000

Table 11. 400 kA Circuit Breaker Interfaced Integrated Unit VPR

Voltage Code	Protection Mode			
	L-N	L-G	N-G	L-L
240S	700	700	600	1000
208Y and 220Y	700	700	600	1000
400Y and 480Y	1000	1200	900	1800
600Y	1500	1500	1200	2500
240D	N/A	1000	N/A	1000
480D	N/A	1800	N/A	1800
600D	N/A	2500	N/A	2500
240H	700	700	600	1000

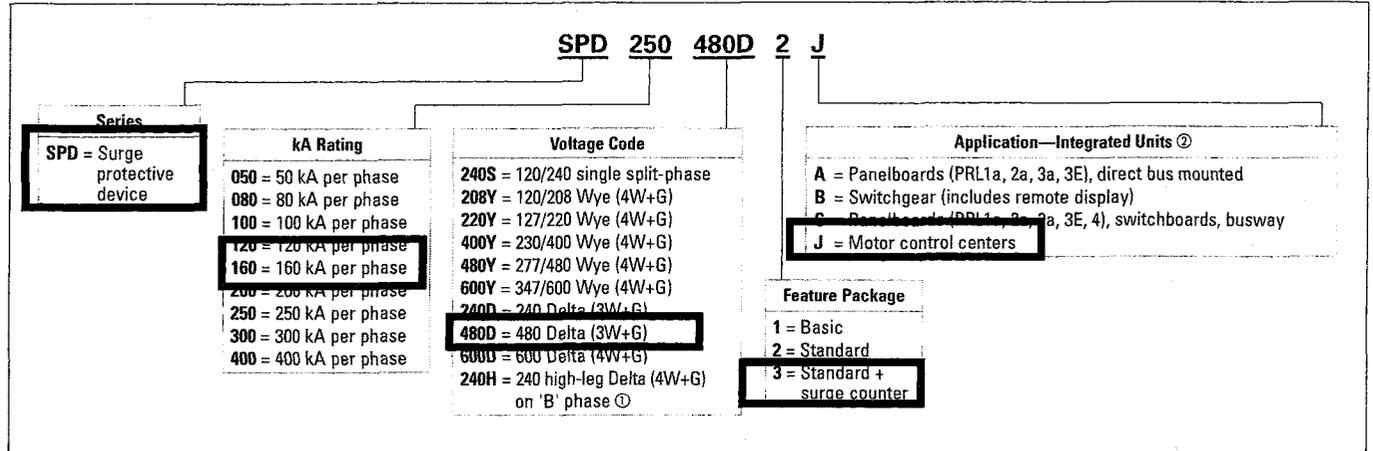
Specifications

Table 12. SPD Series Specifications

Description	Specification
Surge capacity ratings available	50, 80, 100, 120, 160, 200, 250, 300, 400 kA per phase
Nominal discharge current (I _n)	20 kA
Short circuit current rating (SCCR)	200 kA
SPD type	Basic feature package = Type 1 (can also be used in Type 2 applications) Standard and Standard with Surge Counter feature packages = Type 2
Single split phase voltages available	120/240
Three-phase Wye system voltages available	120/208, 127/220, 230/400, 277/480, 347/600
Three-phase Delta system voltages available	240, 480, 600
Input power frequency	50/60 Hz
Power consumption (basic units): 208Y, 220Y, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D voltage codes 600Y and 600D voltage codes	0.5W 1.1W 1.3W
Power consumption (standard and standard with surge counter units): 208Y, 220Y, 240S, 240D, and 240H voltage codes 400Y, 480Y, and 480D basic voltage codes 600Y and 600D voltage codes	0.6W 1.7W 2.1W
Protection modes	Single split phase L-N, L-G, N-G, L-L Three-phase Wye L-N, L-G, N-G, L-L Three-phase Delta L-G, L-L Three-phase high-leg Delta L-N, L-G, N-G, L-L
Maximum continuous operating voltage (MCOV): 240S, 208Y, 220Y, and 240H MCOV 400Y and 480Y MCOV 600Y MCOV 240D MCOV 480D MCOV 600D MCOV	150 L-N, 150 L-G, 150 N-G, 300 L-L 320 L-N, 320 L-G, 320 N-G, 640 L-L 420 L-N, 420 L-G, 420 N-G, 840 L-L 320 L-G, 320 L-L 640 L-G, 640 L-L 840 L-G, 840 L-L
Ports	1
Operating temperature	-4°F through 122°F (-20°C through 50°C)
Operating humidity	5% through 95%, noncondensing
Operating altitude	Up to 16,000 ft (5000m)
Seismic withstand capability	Meets or exceeds the requirements specified in IBC® 2006, CBC 2007, and UBC® Zone 4
Weight	50–200 kA units approximately 3.5 lbs (1.6 kg) 250–400 kA units approximately 7.0 lbs (3.2 kg)
Form C relay contact ratings	150 Vdc or 125 Vac, 1A maximum
Form C relay contact logic	Power ON, normal state—NO contact = open, NC contact = closed Power OFF or fault state—NO contact = closed, NC contact = open
EMI/RFI filtering attenuation	Up to 50 dB from 10 kHz to 100 MHz
Agency certifications and approvals	UL 1449 3rd Edition recognized component for the U.S. and Canada UL 1283 (Type 2 SPDs only)
Warranty	10 years

Catalog number selection

Table 13. SPD Series Catalog Number Configuration for Units Integrated into Electrical Distribution Equipment

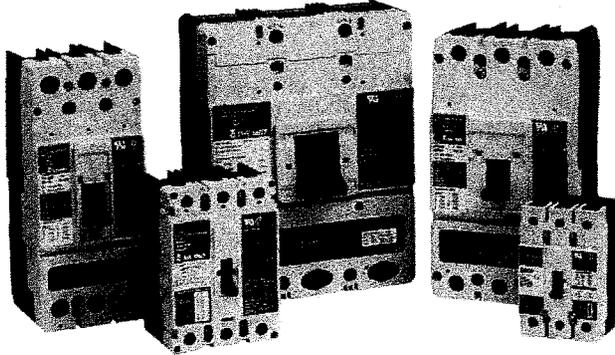


Example: SPD250480D2J = SPD Series, 250 kA per phase, 480D voltage, standard feature package, motor control center application

① Please consult the factory for 240 high-leg Delta (4W+G) applications with high leg on 'C' phase.
② Units used in PRL1a, 2a, 3a, and 3E panelboard applications are available in 50–200 kA ratings only.
Use the 'C' option for PRL1a, 2a, 3a, and 3E panelboard applications when unit is connected through a circuit breaker.

Technical support information

If you have any questions or need additional information, please contact the Eaton Technical Resource Center at 800-809-2772, option 4, option 2. You may also submit inquiries via e-mail: surgeprotection@eaton.com.

Product Description**Motor Circuit Protectors***Motor Circuit Protectors***Product Description**

Designated as Eaton's Cutler-Hammer Types GMCP and HMCP, the instantaneous-only Motor Circuit Protector (MCP) is available in ratings from 3 A to 1200 A for motor starter sizes 0 through 8. The MCP is designed to comply with the applicable requirements of Underwriters Laboratories Standard UL 489, Canadian Standards Association Standard C22.2 No. 5.1, and International Electrotechnical Commission Recommendations IEC 157-1.

An innovative design of internal components allows higher MCP-starter combination interrupting ratings. The MCP is marked to permit proper electrical application within the assigned equipment ratings.

The MCP is a recognized component (UL File E7819) and complies with the applicable requirements of Underwriters Laboratories Standard UL 489. It is also designed to comply with the applicable requirements of Canadian Standards Association Standard C22.2 No. 5.1, International Electrotechnical Commission Recommendations IEC 157-1, and nameplates bear the CE marking.

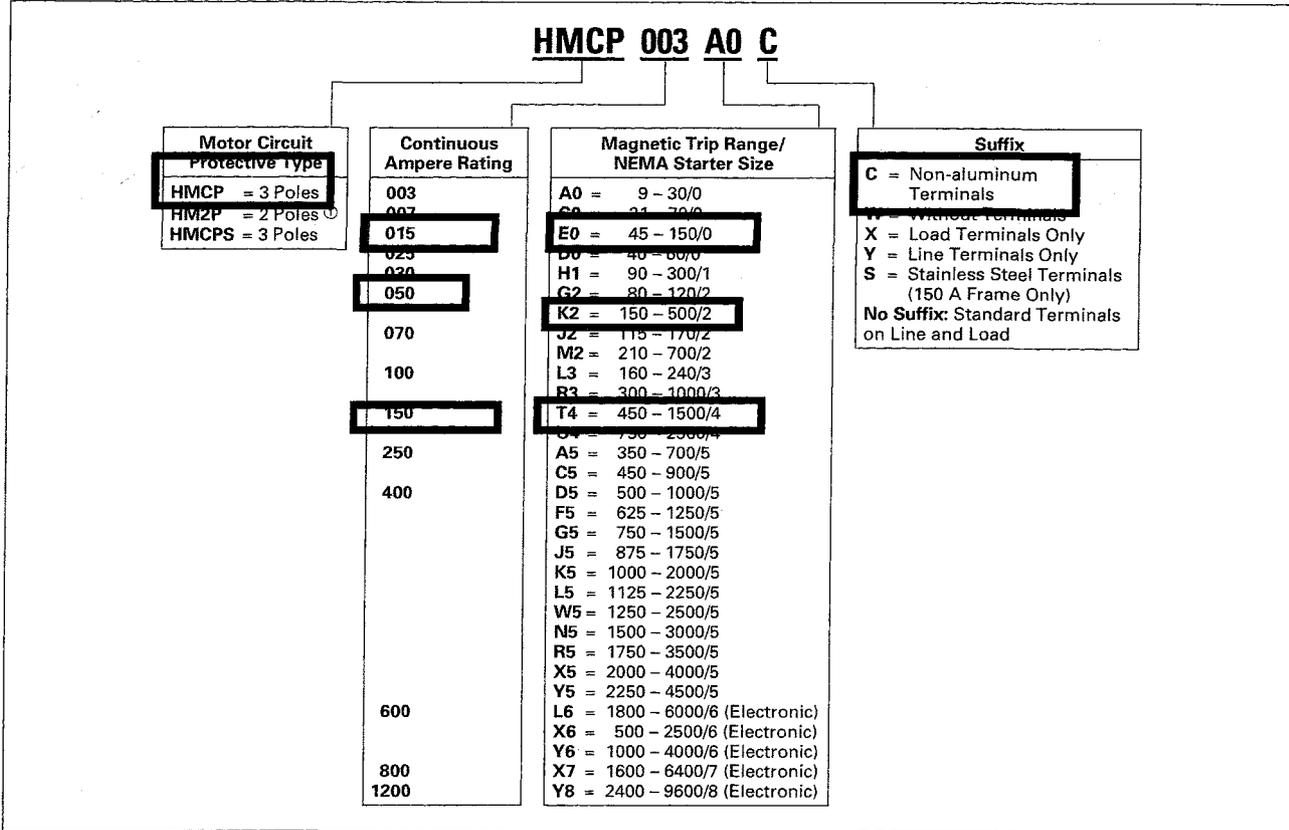
Note: Interrupting ratings are dependent on starter it is used with.

Product Selection

Product Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

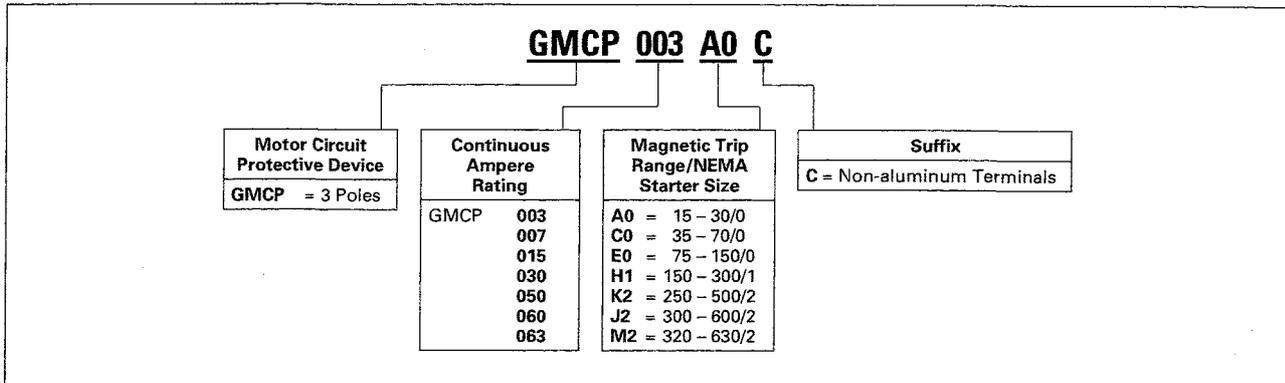
Table 12-302. Motor Circuit Protector Catalog Numbering System



12

① On J- and K-Frame HMCPs only.

Table 12-303. Motor Circuit Protector Catalog Numbering System



Technical Data TD01005006E
Effective August 2009

Eaton's SPD Series for integration into
electrical distribution equipment

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United States
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August 2009

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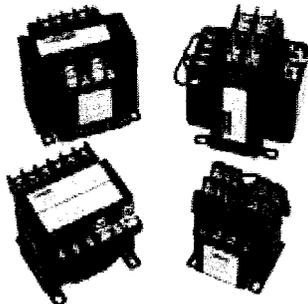
**PowerChain
Management**

PowerChain Management is a registered
trademark of Eaton Corporation.

All other trademarks are property of their
respective owners.

Type MTE

Type MTE



Type MTE Transformers

Product Description

- Epoxy-encapsulated coils.

Application Description

Transformers provide stepped down voltages to machine tool control devices enabling control circuits to be isolated from all power and lighting circuits. This allows the use of grounded or ungrounded circuits that are independent of the power or lighting grounds; greater safety is afforded the operator. The control transformer line is particularly adaptable on applications where compact construction is demanded.

Note: The MTG, "open core-coil design" has been superseded by the epoxy-encapsulated core-coil design MTE with no change to dimensions or functionality.

Features, Benefits and Functions

- UL listed.
- CSA certified.
- Epoxy encapsulated.
- Laminations of high quality silicon steel to minimize core losses and optimize performance.
- Copper magnet wire for high quality, efficient operation.
- Secondary fuse clips where applicable.
- Optional primary fusing.
- Molded in terminals.
- 50/60 Hz operation.
- 55°C rise, 105°C insulation system.
- Performance meets/exceeds requirements of ANSI/NEMA ST-1.
- Regulation exceeds ANSI/NEMA requirements for all ratings.
- 25 - 1500 VA ratings.
- Molded-in terminals for maximum durability.

Standards and Certifications

Industry Standards

All Cutler-Hammer dry-type distribution and control transformers by Eaton Corporation are built and tested in accordance with applicable NEMA, ANSI, and IEEE Standards. All 600 volt class transformers are UL listed unless otherwise noted.

Options and Accessories

Primary Fuse Kit

The primary fuse kit includes a 2-pole class CC fuse block, instructions, and all associated mounting and wiring hardware. Fuses are not included. When installed, the primary fuse kit will add a maximum of 11/16 inch to the transformer depth and 1-15/16 inches to the transformer height.

Table 44-47. Primary Fuse Kit

Description	Catalog Number	Price U.S. \$
Primary Fuse Kit	PFK1	

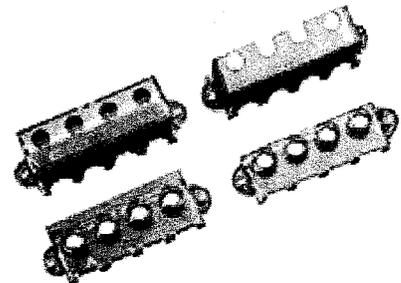
Note: 1000 VA and larger are Class 130°C Insulation System.

Finger-Safe Terminal Covers (Optional)

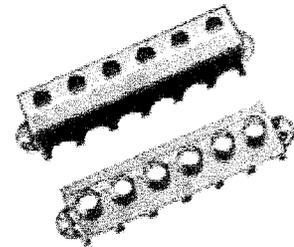
- Fits CE marked designs 50 - 750 VA.
- Fits MTE designs 25 - 750 VA.

Table 44-48. Finger-Safe Terminal Covers

Description	Catalog Number	Price U.S. \$
4 Terminal Transformers	FSK4	
6 Terminal Transformers	FSK6	



Finger-Safe Terminal Covers — FSK4



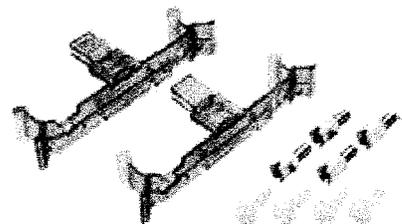
Finger-Safe Terminal Covers — FSK6

Finger-Safe Primary Fuse Block Covers

- Fits 2-pole primary fuse blocks on MTE designs.

Table 44-49. Finger-Safe Primary Fuse Block Covers

Description	Catalog Number	Price U.S. \$
Primary Fuse Block Covers	FSKFB	



Finger-Safe Primary Fuse Block Covers

Type MTE

Product Specifications

Insulation System and Temperature Rise
Industry standards classify insulation systems and rise as shown below:

Table 44-50. Insulation System Classification

Ambient	+ Winding Rise	+ Hot Spot	= Temp. Class
40°C	55°C	10°C	105°C
40°C	80°C	30°C	150°C
40°C	115°C	30°C	185°C
40°C	150°C	30°C	220°C

The design life of transformers having different insulation systems is the same — the lower temperature systems are designed for the same life as the higher temperature systems.

Series-Multiple Windings

Series-multiple windings consist of 2 similar coils in each winding which can be connected in series or parallel (multiple). Transformers with series-multiple windings are designated with an "X" or "/" between the voltage ratings, such as voltages of "120/240" or "240 X 480." If the series-multiple winding is designated by an "X," the winding can be connected only for a series or parallel. With the "/" designation, a mid-point also becomes available in addition to the series or parallel connection. As an example, a 120 X 240 winding can be connected for either 120 (parallel) or 240 (series), but a 120/240 winding can be connected for 120 (parallel), or 240 (series), or 240 with a 120 mid-point.

Wiring Diagrams

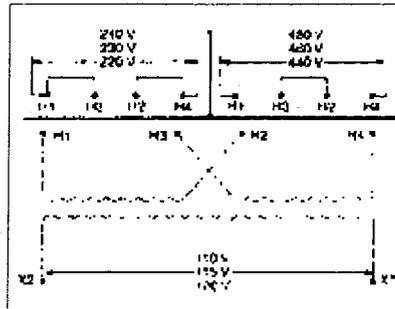


Figure 44-7. Diagram 1

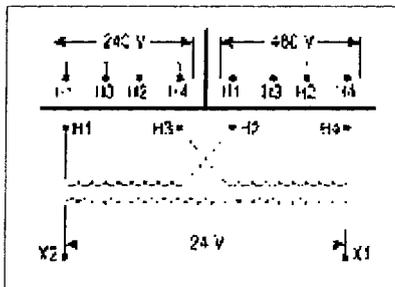


Figure 44-8. Diagram 2

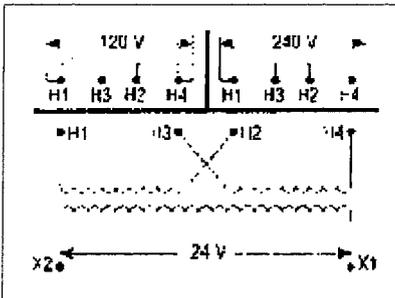


Figure 44-9. Diagram 3

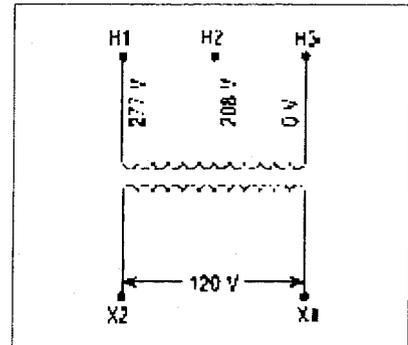


Figure 44-10. Diagram 4

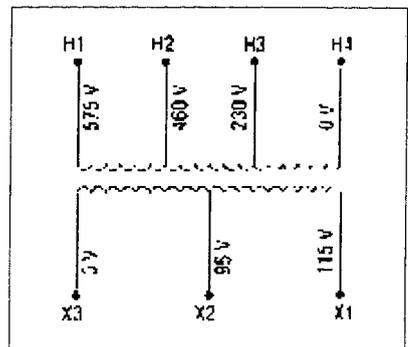


Figure 44-11. Diagram 5

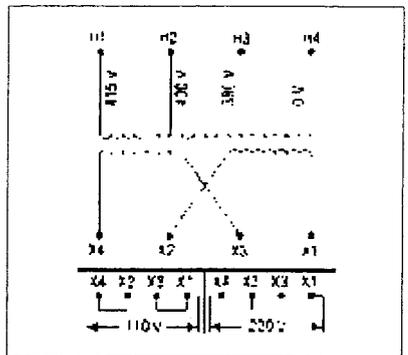


Figure 44-12. Diagram 6

Wiring Diagrams

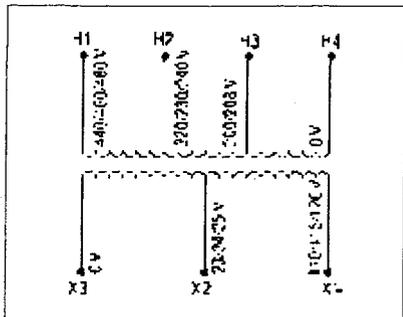


Figure 44-13. Diagram 7

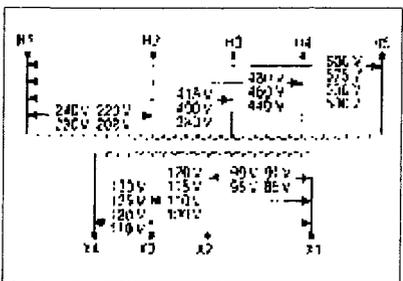


Figure 44-14. Diagram 8

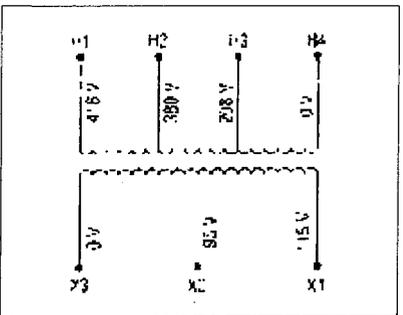


Figure 44-15. Diagram 9

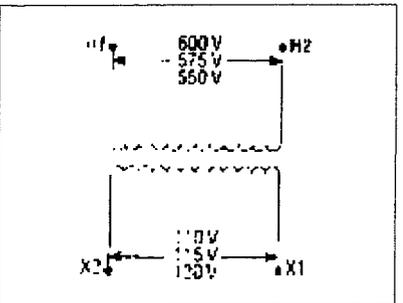


Figure 44-16. Diagram 10

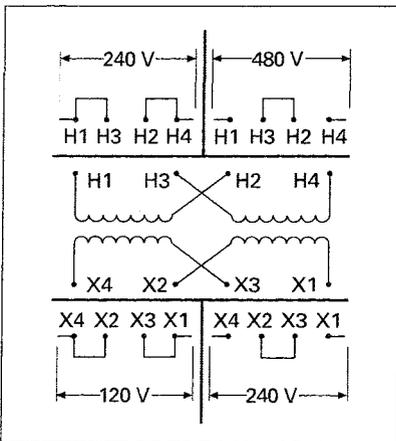


Figure 44-17. Diagram 11

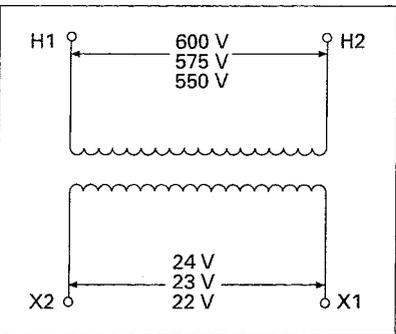


Figure 44-18. Diagram 12

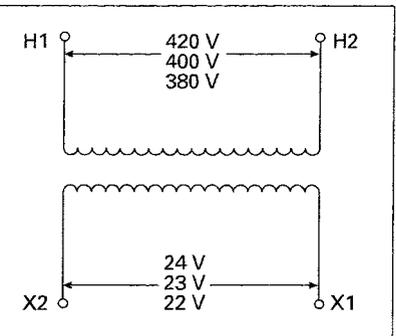


Figure 44-19. Diagram 13

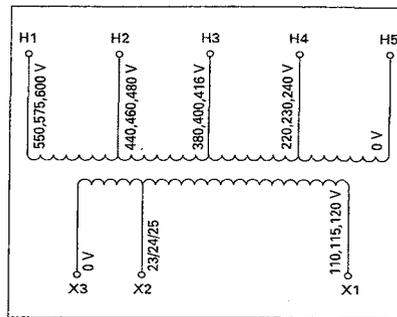


Figure 44-20. Diagram 14

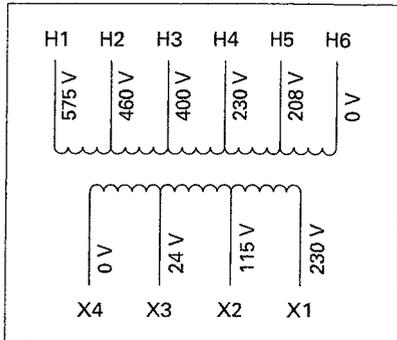


Figure 44-21. Diagram 15

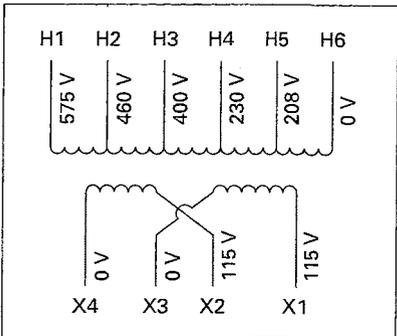


Figure 44-22. Diagram 16

Type MTE

Product Selection

Additional Product Selection information begins on Page 44-63.

Table 44-51. Type MTE — Product Selection

VA	Dimensions (Inches)			Weight Lbs.	Dimensions (mm)			Weight kg	Wiring Diagram ①	Style Number	Price U.S. \$
	Height	Width	Depth		Height	Width	Depth				

Primary: 240 x 480, 230 x 460, 220 x 440 with Jumpers
Secondary: 120/115/110 with Fuse Clips for 13/32 x 1-1/2 Fuses

25	2-9/16	3	2-1/2	1.7	65	76	64	.8	1	C0025E2A	
50	2-9/16	3	3	2.6	65	76	76	1.2	1	C0050E2A	
75	2-9/16	3	3-1/2	3.5	65	76	89	1.6	1	C0075E2A	
100	2-7/8	3-3/8	3-3/8	4.2	73	86	86	1.9	1	C0100E2A	
150	3-3/16	3-3/4	4	6.7	81	95	102	3.0	1	C0150E2A	
200	3-13/16	4-1/2	4	8.5	97	114	102	3.9	1	C0200E2A	
250	3-13/16	4-1/2	4-3/8	10.0	97	114	111	4.5	1	C0250E2A	
300	3-13/16	4-1/2	4-3/4	11.3	97	114	121	5.1	1	C0300E2A	
350	3-13/16	4-1/2	5-1/4	13.6	97	114	133	6.2	1	C0350E2A	
500	4-3/4	5-1/4	5-1/2	19.2	121	133	140	8.7	1	C0500E2A	
750	4-3/4	5-1/4	7	28.1	121	133	178	12.8	1	C0750E2A	
1000	5-11/16	6-3/4	6-7/16	29.5	144	171	164	13.4	1	C1000E2A	
1500	6-3/8	7-1/2	7-3/8	40.0	162	191	187	18.1	1	C1500E2A	

Primary: 240 x 480 with Jumpers
Secondary: 24 with Fuse Clips for 13/32 x 1-1/2 Fuses (through 500 VA)

50	2-9/16	3	3	2.7	65	76	76	1.2	2	C0050E2B	
75	2-9/16	3	3-1/2	3.5	65	76	89	1.6	2	C0075E2B	
100	2-7/8	3-3/8	3-3/8	4.2	73	86	86	1.9	2	C0100E2B	
150	3-3/16	3-3/4	4	6.7	81	95	102	3.0	2	C0150E2B	
200	3-13/16	4-1/2	4	8.5	97	114	102	3.9	2	C0200E2B	
250	3-13/16	4-1/2	4-3/8	10.1	97	114	111	4.6	2	C0250E2B	
300	3-13/16	4-1/2	4-3/4	11.4	97	114	121	5.2	2	C0300E2B	
350	3-13/16	4-1/2	5-1/4	13.4	97	114	133	6.1	2	C0350E2B	
500	4-3/4	5-1/4	5-5/8	17.5	121	133	143	7.9	2	C0500E2B	
750	4-3/4	5-1/4	7	28.1	121	133	178	12.8	2	C0750E2B	

Primary: 120 x 240 with Jumpers
Secondary: 24 with Fuse Clips for 13/32 x 1-1/2 Fuses

50	2-9/16	3	3	2.6	65	76	76	1.2	3	C0050E1B	
75	2-9/16	3	3-1/2	3.6	65	76	89	1.6	3	C0075E1B	
100	2-7/8	3-3/8	3-3/8	4.4	73	86	56	2.0	3	C0100E1B	
150	3-3/16	3-3/4	4	6.7	81	95	102	3.0	3	C0150E1B	
200	3-13/16	4-1/2	4	8.3	97	114	102	3.8	3	C0200E1B	
250	3-13/16	4-1/2	4-3/8	10.1	97	114	111	4.6	3	C0250E1B	
300	3-13/16	4-1/2	4-3/4	11.2	97	114	121	5.1	3	C0300E1B	
350	3-13/16	4-1/2	5-1/4	13.2	97	114	133	6.0	3	C0350E1B	
500	4-3/4	5-1/4	5-5/8	17.5	121	133	143	7.9	3	C0500E1B	

Primary: 208/277
Secondary: 120 with Fuse Clips for 13/32 x 1-1/2 Fuses

50	2-9/16	3	3	2.9	65	76	76	1.3	4	C0050E3A	
75	2-9/16	3	3-1/2	3.8	65	76	89	1.7	4	C0075E3A	
100	2-7/8	3-3/8	3-3/8	4.5	73	86	86	2.0	4	C0100E3A	
150	3-3/16	3-3/4	4	6.9	81	95	102	3.1	4	C0150E3A	
200	3-13/16	4-1/2	4	8.7	97	114	102	3.9	4	C0200E3A	
250	3-13/16	4-1/2	4-3/8	10.2	97	114	111	4.6	4	C0250E3A	
300	3-13/16	4-1/2	4-3/4	11.4	97	114	121	5.2	4	C0300E3A	
350	3-13/16	4-1/2	5-1/4	13.7	97	114	133	6.2	4	C0350E3A	
500	4-3/4	5-1/4	5-3/8	17.2	121	133	136	7.8	4	C0500E3A	
750	4-3/4	5-1/4	7	25.7	121	133	178	11.7	4	C0750E3A	

① See Page 44-40 for Wiring Diagrams.

Note: For additional information, refer to the Cutler-Hammer Industrial Control Transformer Binder B1228A.

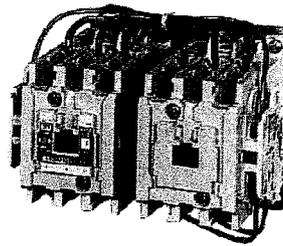
For other ratings or styles not shown, refer to Eaton.

Discount Symbol DT-1

Contactors — Non-reversing and Reversing

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**NEMA Size 1
Cat. No. CN55DN3AB**

Reversing

Reversing contactors are used primarily for reversing single- or three-phase motors in applications where running overcurrent protection is either not required or is provided separately. They consist of two contactors mechanically and electrically interlocked to prevent line shorts and energization of both contactors simultaneously.

Features

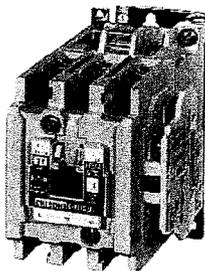
- Designed specifically for use in applications requiring NEMA ratings. Contactors meet or exceed NEMA standards ICS 2-1993.
- Long life twin break, silver cadmium oxide contacts — provide excellent conductivity and superior resistance to welding and arc erosion.
- Designed to 3,000,000 electrical operations at maximum hp ratings up through 25 hp at 600V.
- Steel mounting plate standard on all open type contactors.

Non-reversing

- Holding circuit contact(s) supplied as standard:
 - Sizes 00 – 3 have NO auxiliary contact block mounted on right hand side (on Size 00, contact occupies 4th power pole position — no increase in width).
 - Sizes 4 – 5 have a NO contact block mounted on left side.
 - Sizes 6 – 7 have a 2NO/2NC contact block on top left.
 - Size 8 has a NO/NC contact block on top left back and a NO contact block on top right back.

Reversing

- One NO-NC side mounted interlock supplied as standard on each contactor for Sizes 00 – 8.



NEMA Size 1 — Cat. No. CN15DN3AB

Product Description

Non-reversing

Contactors are most commonly used to switch motor loads in applications where running overcurrent protection is either not required or is provided separately. Contactors consist of a magnetically actuated switch which can be remotely operated by a push-button station or pilot device such as a proximity switch, limit switch, float switch, auxiliary contacts, etc.

Technical Data

Table 33-90. Wire (75°C) Sizes — AWG or kcmil — Open and Enclosed

NEMA Size	Power Terminals Line or Load	Control Terminals Cu Only
00	12 – 16 stranded; 12 – 14 solid Cu	12 – 16 stranded 12 – 14 solid
0	8 – 16 stranded; 10 – 14 solid Cu	
1	8 – 14 stranded or solid Cu	
2	3 – 14 (upper) and/or 6 – 14 (lower) stranded or solid [Ⓛ] Cu	
3	1/0 – 14 Cu/Al	
4	250 mcm – 6	
5	750 kcmil – 2, or (2) 250 kcmil – 3/0 Cu/Al	
6	(2) 750 kcmil – 3/0 Cu/Al	
7	(3) 750 kcmil – 3/0 Cu/Al	
8	(4) 750 kcmil – 4/0 Cu/Al	

[Ⓛ] Two compartment box lug.

Table 33-91. Plugging and Jogging Service Horsepower Ratings [Ⓛ]

NEMA Size	200V	230V	460V	575V
00	—	1/2	1/2	1/2
0	1-1/2	1-1/2	2	2
1	3	3	5	5
2	7-1/2	10	15	15
3	15	20	30	30
4	25	30	60	60
5	60	75	150	150
6	125	150	300	300

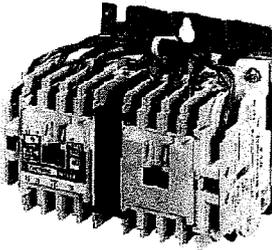
[Ⓛ] Maximum horsepower where operation is interrupted more than 5 times per minute or more than 10 times in a 10 minute period. NEMA standard ICS 2-1993 table 2-4-3.

Kits and Accessories

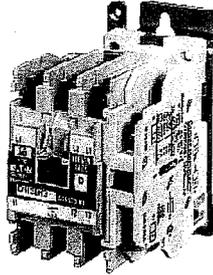
- Auxiliary Contacts, contactor mounted — **Pages 33-86 and 33-87.**
- Transient Suppressor, for magnet coil — **Pages 33-84.**
- Timers — Solid-State and Pneumatic, mount on contactor — **Page 33-83.**

Renewal Parts Publication Numbers

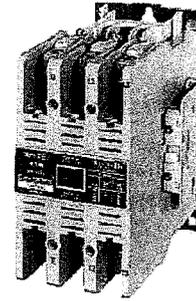
- See **Page 33-91.**



**NEMA Size 00
3-Pole Contactor**
Cat. No. CN55AN3AB



**NEMA Size 0
3-Pole Contactor**
Cat. No. CN15BN3AB



**NEMA Size 3
3-Pole Contactor**
Cat. No. CN15KN3A

Product Selection — 3-Pole Contactors

Table 33-92. Type CN15/CN55 NEMA Contactors — 3-Pole Non-reversing and Reversing

NEMA Size	Continuous Ampere Rating	Maximum UL Horsepower ①						3-Pole Non-reversing		3-Pole Reversing	
		1-Phase		3-Phase				Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
		115V	230V	208V	240V	480V	600V				
00	9	1/3	1	1-1/2	1-1/2	2	2	CN15AN3_B		CN55AN3_B	
0	18	1	2	3	3	5	5	CN15BN3_B		CN55BN3_B	
1	27	2	3	7-1/2	7-1/2	10	10	CN15DN3_B		CN55DN3_B	
2	45	3	7-1/2	10	15	25	25	CN15GN3_B		CN55GN3_B	
3	90			25	30	50	50	CN15KN3_		CN55KN3_	
4	135			40	50	100	100	CN15NN3_		CN55NN3_	
5	270			75	100	200	200	CN15SN3_		CN55SN3_	
6	540			150	200	400	400	CN15TN3_B		CN55TN3_B	
7	810			200	300	600	600	CN15UN3_		CN55UN3_	
8 ②	1215			400	450	900	900	CN15VN3_		CN55VN3_	

① Maximum horsepower rating of starters for 380V 50 Hz applications:

NEMA Size	00	0	1	2	3	4	5	6	7	8
Horsepower	1-1/2	5	10	25	50	75	150	300	600	900

② Common control. For separate 120V control, insert letter **D** in 7th position of listed Catalog Number. EXAMPLE: CN15VND3C.

Magnet Coils — AC and DC

Contactors listed in this section also have a 50 Hz rating as shown in the adjacent table. Select required contactor by Catalog Number and replace the magnet coil alpha designation in the Catalog Number () with the proper Code Suffix from the adjacent table.

For Sizes 00 – 2, the magnet coil alpha designation will be the next to the last digit of the listed Catalog Number. EXAMPLE: For a 380V, 50 Hz coil, change CN15AN3_B to CN15AN3LB. For all other sizes, the magnet coil alpha designation will be the last digit of the listed Catalog Number.

For **DC Magnet Coils**, see Accessories, Pages 33-88 – 33-89.

Table 33-93. AC Suffix Code

Coil Volts and Hertz	Code Suffix
120/60 or 110/50	A
240/60 or 220/50	B
480/60 or 440/50	C
600/60 or 550/50	D
208/60	E
277/60	H
208 – 240/60 ③	J
240/50	K
380 – 415/50	L
550/50	N
24/60, 24/50 ④	T
24/50	U
32/50	V
48/60	W
48/50	Y

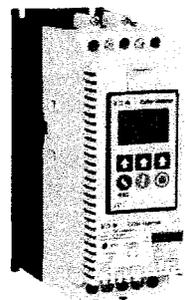
③ NEMA Sizes 00 and 0 only.

④ NEMA Sizes 00 and 0 only. Sizes 1 – 8 are 24/60 only.

Technical Data Pages 33-79 – 33-81
 Dimensions Pages 33-94 – 33-95
 Special Modifications . . . Page 33-90
 Accessories Pages 33-82 – 33-90
 Discount Symbol 1CD1

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S811 Open Soft Starter

Product Description

Eaton's Cutler-Hammer® *IT.* S801 revolutionized the reduced voltage control marketplace with its advanced feature set and small size. In fact, readers of an industry leading control publication rated Cutler-Hammer Soft Starters best in customer satisfaction in March 2004 and April 2006. The new *IT.* S811 from Eaton's electrical business offers all the popular features of the S801, but adds enhanced functionality with the new DIM (Digital Interface Module), communications, metering, monitoring and diagnostics capabilities.

The Cutler-Hammer Intelligent Technologies (*IT.*) Line of S811 Reduced Voltage Soft Starters is very compact, multi-functional, easy to install and easy to program. Designed to control the acceleration and deceleration of three-phase motors up to 690V, the line is available from 11 amps through 1,000 amps.

The S811 is designed to be a complete package combining the SCRs, bypass contactor and overload in one, very compact unit. The S811 is available as a component for panel mounting, in motor control centers or in enclosed control (NEMA Type 1, 3R, 4, 4X, 7/9 and 12).

Application Description

Designed to control the acceleration and deceleration of three-phase motors, the *IT.* S811 soft starter uses Silicon Controlled Rectifiers (SCRs) to control the voltage to soft start and soft stop the motor. After the motor is started, internal run bypass contactors close, resulting in the motor running directly across-the-line. The built-in solid-state overload protects the motor from overload conditions with sophisticated algorithms that model true motor heating, resulting in better motor protection and fewer nuisance trips. Advanced protective and diagnostic features reduce downtime.

A voltage ramp start or current limit start is available. Kick start is available in either starting mode. The soft stop option allows for a ramp stop time that is longer than the coast to stop time. The pump control option provides a smooth transition for starting and stopping a motor and eliminating the "water-hammer" effect that can damage pipes, valves and pumps.

The S811 offers an impressive array of advanced protective features. Not only are the protective features selectable, but many offer variable settings allowing the user to fine tune the starter to meet specific system requirements.

The S811 has an easy to use Digital Interface Module (DIM) that allows the user to configure the device and to read system parameters. The DIM includes an LCD display and keypad to scroll through the various menus. The DIM allows the user to modify control parameters, enable or disable protections, set communication variables, monitor system parameters such as line voltages and currents, and access the fault queue.

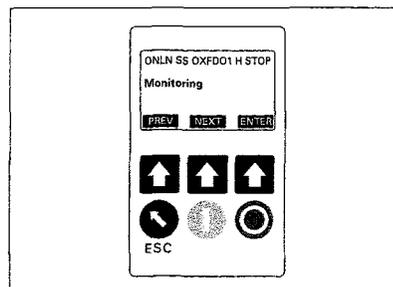


Figure 39-17. Digital Interface Module (DIM)

The DIM can be removed from the S811 and remote mounted. Kits are available to door mount the DIM, enabling users to safely configure, commission, monitor and troubleshoot the system at the electrical panel without opening the enclosure door. This will help eliminate the possibility of an arc flash incident.

Type S811, Intelligent Technologies (IT.) Soft Starters with DIM

Communications

The S811 has built-in communication capabilities through Cutler-Hammer QC (Quick Connect) Port. QCPort enables the soft starter to be connected to a variety of networks, including DeviceNet™, EtherNet/Modbus, EtherNet/IP and PROFIBUS. The advantage of QCPort is that multiple control components can be connected to one Cutler-Hammer IT. D77D gateway. The gateway concentrates data from the devices into a single node. Configuration is simple — a single press of the gateway's Auto Configuration button sets the system up for default operation. This automatically configures the I/O assemblies to the QCPort system devices. The data from these devices are then assembled into single input and output messages.

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The S811 communication parameters can be configured with the DIM or through the fieldbus using CH Studio Component Manager. Advanced communication configuration settings provide the system integrator with powerful tools to facilitate system optimization.

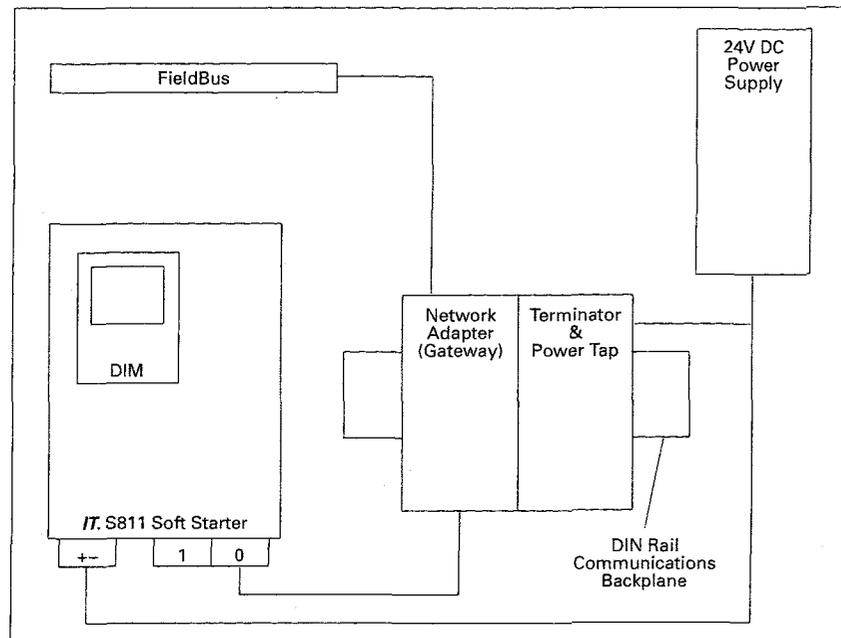


Figure 39-18. S811 Connection Diagram

Table 39-55. Communications Reference

Description	Part Number	Catalog Page
DeviceNet Network Adapter	D77D-DNA	50-40
EtherNet Modbus Network Adapter	D77D-EMA	50-42
EtherNet/IP Network Adapter	D77D-EIP	50-44
PROFIBUS Network Adapter	D77D-PNA	50-46
Terminator and Power Tap	D77E-QPLR	50-35
DIN Rail Communications Backplane, 7-position	D77E-BP7	50-35
DIN Rail Communications Backplane, 12-position	D77E-BP12	50-35
24V DC Power Supply (120V AC Input)	PSS55A	44-65
24V DC Power Supply (240V AC Input)	PSS55B	44-65
24V DC Power Supply (480V AC Input)	PSS55C	44-65

Features and Benefits

- The DIM (Digital Interface Module) provides an intuitive, easy-to-use human interface with powerful configuration capabilities to maximize system performance.
- Door or device mounted DIM enables users to safely configure, commission, monitor and troubleshoot the system at the electrical panel without opening the enclosure door, eliminating the possibility of an arc flash incident.
- System operating parameters can be monitored enterprise-wide through a communications network. Increase uptime by providing data for process management and preventive diagnostics.
- Run bypass mode greatly reduces internal heating created by the greater power dissipation in the SCRs. Bypass contactor directly connects the motor to the line and improves system efficiency by reducing internal power losses.
- Internal solid-state overload protection provides accurate current measurement and trip settings. Sophisticated algorithms solve a series of differential equations that model true motor heating and cooling, resulting in superior motor overload protection while minimizing nuisance trips. Advanced selectable protective features safeguard the motor and system against a variety of system faults.
- Internal run bypass contactors and overload protection eliminate the need for additional devices, reducing enclosure sizes, minimizing installation and wiring time and reducing overall assembly size and cost.
- Wide range of overload FLA settings (31 – 100% of rated current) and a selectable trip class (5 – 30) offers users the flexibility to fine tune the starter to match specific application requirements.
- Variable ramp times and torque control settings provide unlimited starting configurations, allowing for maximum application flexibility.
- Kick-start feature enables soft starting of high friction loads.
- Soft stop control for applications where an abrupt stop of the load is not acceptable.

- Pump control option with sophisticated pump algorithms on both starting and stopping that minimize the pressure surges that cause water hammer. The pump control option will maximize the life of the pump and piping systems while minimizing the downtime caused by system failure.
- Six SCRs control all three motor phases, providing smooth acceleration and deceleration performance.
- Soft acceleration and deceleration reduces wear on belts, gears, chains, clutches, shafts and bearings.
- Reduce the peak inrush current's stress on the power system.
- Minimize peak starting torque to diminish mechanical system wear and damage.
- 24V DC control module enhances personnel and equipment safety.
- Removable, lockable control terminal block reduces maintenance costs. Also provides the opportunity for OEMs to reduce assembly and test costs by utilizing pre-assembled wire harnesses.

Protective Features

All protective features can be configured, enabled or disabled with the DIM or through the communications network.

Motor Overload

The S811 includes electronic overload protection as standard. The overload meets applicable requirements for a motor overload protective device. The overload protects the motor from over heat conditions with the use of sophisticated algorithms that model true motor heating, resulting in superior motor protection and fewer nuisance trips.

The S811 calculates a thermal memory value. A 100% value represents the maximum safe temperature of the motor. When the thermal memory value reaches 100%, an overload trip will occur removing power to the motor. Upon trip, the S811 stores the calculated motor heating value and will not allow a motor re-start until the motor has sufficiently cooled. This feature ensures the motor will not be damaged by repeated overload trip, reset and re-start cycles.

The thermal memory value can be monitored through the DIM or the communications network. The thermal memory value can be of great use in determining an impending overload trip condition. Alarms can be implemented in the process monitoring system warning of an impending trip before a trip occurs halting the process. Costly system downtime can be avoided.

The trip current is adjusted to match the specific application requirements by entering the motor nameplate full load current rating and trip class. The FLA adjustment includes a 3 to 1 adjustment range. The overload trip class is adjustable from class 5 through class 30. The overload is ambient temperature compensated — meaning its trip characteristics will not vary with changes in ambient temperature. The overload protection can be enabled, disabled, or disabled on start.

Short Circuit

The use of a short circuit protective device in coordination with the S811 is required in branch motor circuits by most electrical codes. Short circuit coordination ratings with both fuses and Cutler-Hammer molded case circuit breakers are available providing customers with design flexibility. The S811 has short circuit coordination ratings as an open component, an enclosed starter, and in a motor control center.

Jam

Excessive current and torque up to locked rotor levels can occur in a jam condition. The condition can result in stress and damage to the motor, load, mechanical system, and the electrical distribution system. Jam protection prevents the stress and damage from a jam during normal run. After the motor is started, a current greater than 300% FLA setting will cause the starter to trip on a jam fault.

Type S811, Intelligent Technologies (IT) Soft Starters with DIM

Stall

Excessive current and torque up to locked rotor levels can occur in a stall condition. The condition can lead to an overload trip and result in stress and damage to the motor, load, mechanical system, and the electrical distribution system. Stall protection prevents stress and damage to a motor that has not come up to speed, or stalled after the soft start time. The S811 will trip to protect the system in the event that the motor did not get to the rated speed in the defined soft start period. A current greater than 200% FLA at the end of the soft start period will cause the starter to trip on a stall fault.

Pole Over Temperature

High ambient temperatures, extended ramp times and high duty cycle conditions may cause the S811 power pole conductors to reach a temperature that exceeds their thermal rating. The S811 is equipped with sensors that monitor the temperature of the power poles. Over temperature protection occurs if the device's thermal capacity is exceeded. The soft starter will trip in over temperature conditions, preventing device failure.

The device pole temperature value can be monitored through the DIM or the communications network. This feature can be of use in determining an impending over temperature trip condition. Alarms can be implemented in the process monitoring system warning of an impending trip before a trip occurs, halting the process. Costly system shutdown can be avoided.

Phase Loss

Loss of a phase can cause a significant increase in the current drawn in the remaining two phases. Phase loss can lead to motor damage before an eventual overload trip occurs. Phase loss is typically an indication of a failure in the electrical distribution system. The S811 will detect a phase loss and trip if any phase current drops below a preset value. The phase loss trip level is adjustable from 0% to 100% of the average of the other two phase levels with an adjustable trip delay of 0.1 to 60 seconds.

Phase Imbalance

Phase current or voltage imbalance can cause a significant increase in the current drawn in the remaining two phases. Phase imbalance can lead to motor damage before an eventual overload trip. Phase imbalance is typically an indication of a failure in the electrical distribution system or the motor. The S811 will detect both current and voltage phase imbalances and trip if any phase becomes imbalanced as compared to the average of the other two phases.

The phase current imbalance trip level is adjustable from 0% to 100% of the average of the current in the other two phases with an adjustable trip delay of 0.1 to 60 seconds.

The phase voltage imbalance trip level is adjustable from 0% to 100% of the average of the voltage in the other two phases with an adjustable trip delay of 0.1 to 60 seconds.

Reset Mode

The S811 can be set up for automatic or manual reset on trip. The manual reset mode requires the operator to physically press the RESET button located on the soft starter. The overload can be manually reset through the DIM or through the communications network. The overload can also be electrically reset by energizing a 24V DC input on the control terminal block.

The automatic reset mode allows the soft starter to be automatically reset as soon as the trip condition is no longer present. With the automatic reset mode, after the fault is no longer present, the motor will be restarted as soon as a valid start signal is present.

Phase Reversal

The S811 can determine if the proper line phase sequence is present by default. The device will trip if the line phase sequence is something other than A-B-C. The S811 can be configured to operate under reversed phase conditions (A-C-B).

Shorted SCR Detection

The S811 monitors the operation of the power poles and will trip under a shorted SCR condition.

Open SCR Detection

The S811 monitors the operation of the power poles and will trip under an open SCR condition.

Low Current

Low current conditions can be a result of a loss of load or a failure in the mechanical system. The S811 has low current protection that will trip if the average RMS current falls below a preset value. The low current protection can be programmed as a percent of motor FLA from 0% to 100%.

Low Voltage

Low voltage conditions can result from disturbances in the electrical power distribution system. Low voltage conditions can cause a malfunction and damage to electrical equipment. The S811 has low voltage protection that will trip if the average RMS voltage falls below a preset value. The low voltage protection can be programmed as a percent of nominal voltage from 1% to 99% with a trip delay of 0.1 to 60 seconds.

High Voltage

High voltage conditions can result from disturbances in the electrical power distribution system. High voltage conditions can cause malfunctions or failures of electrical equipment. The S811 has high voltage protection that will trip if the average RMS voltage is greater than a preset value. The high voltage protection can be programmed as a percent of nominal voltage from 101% to 120% with a trip delay of 0.1 to 60 seconds.

Monitoring Capabilities

The S811 has an impressive array of system monitoring capabilities that allow users to access real time process and diagnostic data. This data can be viewed at the device with the DIM or through a communications network. Data over a communications network can provide valuable insight into the condition of the equipment and processes. Maintenance and production personnel can monitor critical operational and maintenance data from a central control station that can be located far away from the production facility. Process data can be monitored to determine system anomalies that may indicate a need for preventive maintenance or an impending failure. Adjustments made through the communications network can reduce costs by minimizing the time traveling to the location where the motor controls are located. When faults do occur, real time fault data can assist maintenance in troubleshooting and planning repair resources. Remote reset signals can be given to tripped devices without the need for manual intervention by maintenance personnel.

Average Line Current

Provides the average of the three-phase RMS line currents in amps, accurate to within 2%. Current data can be used to indicate a need for maintenance. Increased currents in a fixed load application can indicate a reduction in system efficiencies and performance, signifying system maintenance is due.

Average Pole Current

Provides the average of the three-phase RMS pole currents in amps, accurate to within 2%. The pole current is the current through the soft starter. The line and pole current will be identical in in-line applications, and will differ in inside-the-delta applications.

Average line current as a % FLA

Provides the average RMS line current as a percentage of the S811 FLA setting.

Three-Phase Line Currents

Provides three RMS phase line currents in amps, accurate to within 2%. Imbalances or changes in the relative phase current to one another can indicate anomalies in the motor or electrical distribution system.

Three-Phase Pole Currents

Provides three RMS phase pole currents in amps, accurate to within 2%. The pole current is the current through the soft starter. The line and pole current will be identical in in-line applications, and will differ in inside-the-delta applications.

Three-Phase Line Voltages

Provides the individual RMS three-phase line voltages. Imbalances or changes in the relative phase voltage to one another can indicate anomalies in the motor or electrical distribution system. Voltage can be used to monitor electrical distribution system performance. Warnings, alarms and system actions to low or high voltage conditions can be implemented.

Percent Thermal Memory

Provides the real time calculated thermal memory value. The S811 calculates thermal memory value. A 100% value represents the maximum safe temperature of the motor. When the thermal memory value reaches 100%, an overload trip will occur, removing power to the motor.

The thermal memory value can be of great use in determining an impending overload trip condition. Alarms can be implemented in the process monitoring system warning of an impending trip before a trip occurs, halting the process. Costly system downtime can be avoided.

DC Control Voltage

Monitors level of the 24V DC control voltage. Fluctuations in control voltage can cause component malfunction and failure. System control voltage data can be used to implement warnings, alarms and system actions to low or high voltage conditions.

Pole Temperature

Increases in pole temperature are caused by increases in ambient temperature, start/stop times and start duty cycles. Changes in pole temperatures represent a change in system operating conditions. Identifying unexpected operating conditions or changes can prompt maintenance and aid in process evaluation activities.

Device Temperature

An increase in device temperature is a strong indication of an increase in ambient temperature. High ambient temperature operation can be identified with the Device Temperature data. Ambient temperature increases can be due to loss of enclosure cooling fans or blocked venting. High ambient temperatures will reduce the life of all electrical equipment in the enclosure.

Start Count

Start count data can be used to monitor system output, schedule preventative maintenance, identify system anomalies and identify changes in system operation.

Diagnostics

Fault Queue

Current fault and a fault queue containing the last nine system faults can be read through the DIM or communications network. Fault identification can minimize troubleshooting time and cost and prevent arc flash incidents. The fault queue can be remotely accessed through a communications network to assist in planning maintenance resources. 30 different faults can be identified by the S811.

Control Status

The S811 provides data that represents system conditions that can be read through the DIM or the communications network. This data identifies the status of the system and the control commands the system is requesting of the S811. This can be used for advanced troubleshooting and system integration activities.

Breaker Status

The S811 has provisions to read and display circuit breaker status. Cutler-Hammer communicating Cover Control or other communicating protective device is required to take advantage of this feature.

Type S811, Intelligent Technologies (IT.) Soft Starters with DIM

Operation

Starting and Stopping Modes

The S811 has a variety of starting and stopping methods to provide superior performance in the most demanding applications. The motor can be started in either Voltage Ramp Start or Current Limit Start mode. Kick Start and Soft Stop are available within both starting modes.

Voltage Ramp Start

Provides a voltage ramp to the motor resulting in a constant torque increase. The most commonly used form of soft start, this start mode allows you to set the initial torque value and the duration of the ramp to full voltage conditions. Bypass contactors close after ramp time.

- Adjustable initial torque 0 – 85% of locked rotor torque.
- Adjustable ramp time 0.5 – 180 seconds (can be extended with factory modification).

Current Limit Start

Limits the maximum current available to the motor during the start phase. This mode of soft starting is used when it becomes necessary to limit the maximum starting current due to long start times or to protect the motor. This start mode allows you to set the maximum starting current as a percentage of locked rotor current and the duration of the current limit. Bypass contactors close after current limit time.

- Maximum current of 0 – 85% locked rotor current.
- Adjustable ramp time 0.5 – 180 seconds (can be extended with factory modification).

Kick Start

Selectable feature in both Voltage Ramp Start and Current Limit Start modes. Provides a current and torque “kick” for 0 to 2.0 seconds. This provides greater initial current to develop additional torque to breakaway a high friction load.

- 0 – 85% of locked rotor torque
- 0 – 2.0 seconds duration

Soft Stop

Allows for a controlled stopping of a load. Used when a stop-time that is greater than the coast-to-stop time is desired. Often used with high friction loads where a sudden stop may cause system or load damage.

- Stop time = 0 – 60 seconds.

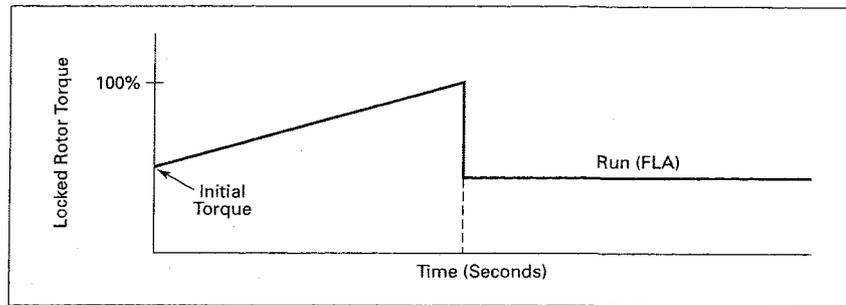


Figure 39-19. Starting Characteristics — Ramp Start

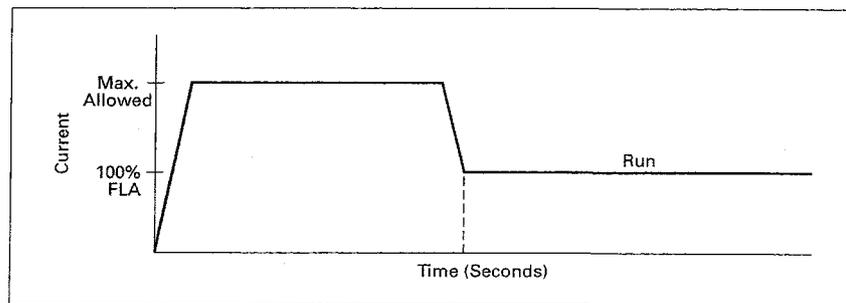


Figure 39-20. Starting Characteristics — Current Limit Start

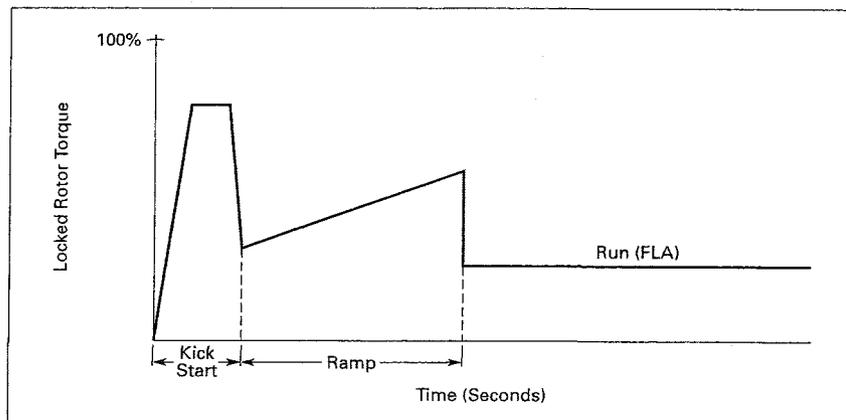


Figure 39-21. Starting Characteristics — Kick Start

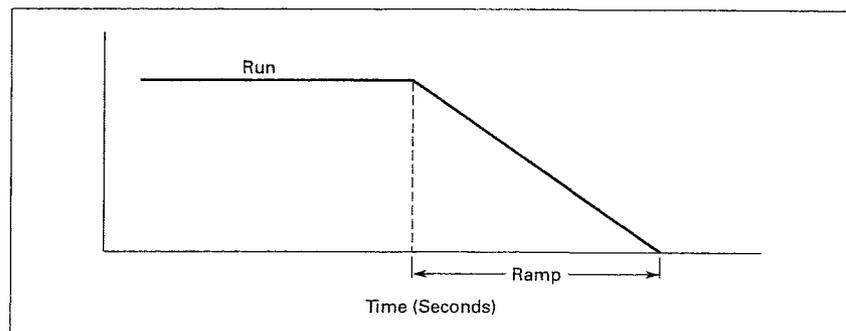
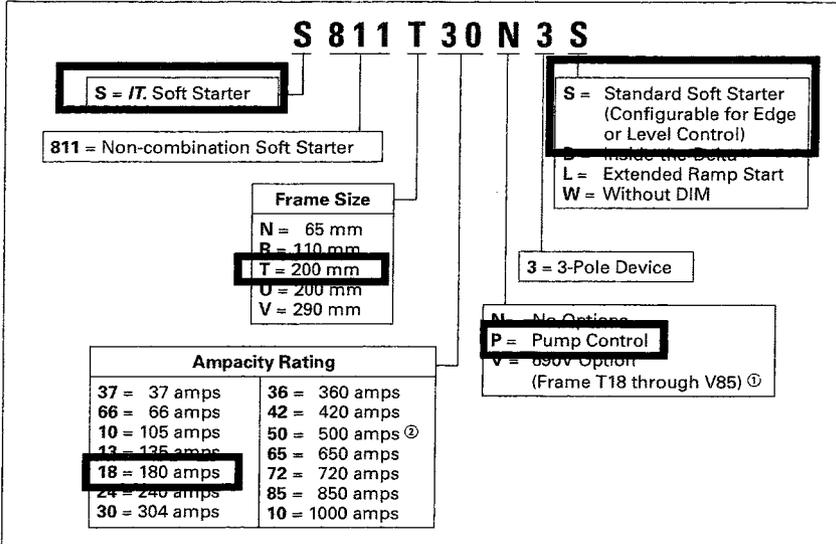


Figure 39-22. Starting Characteristics — Soft Stop

Catalog Number Selection

Table 39-56. S811 Open Soft Starters Catalog Numbering System



① Not available in U-Frame.
② U-Frame 500 Amp unit does not have IEC Certification.

Edge and Level Sensing Control

Edge Sensing

Edge sensing requires +24V DC power be momentarily applied to pin 1 (with terminal P at +24V DC) to initiate a start under all conditions. After a stop or fault occurs, the +24V DC must be removed, then reapplied to pin 1 before another start can occur. This control configuration should be used when restarting of the motor after a fault or stop must be supervised manually or as a part of a control scheme. The cycling of +24V DC power to terminal 1 before starting is required regardless of the position of the auto reset switch on the DIM.

Level Sensing

Level sensing will enable a motor to restart after a fault is cleared without cycling +24V DC power to terminal 1 as long as:

- Terminal P is supplied with +24V DC (to start from Terminal Block, Input #3 must also be enabled),
- The auto reset switch on the DIM is set to enabled,
- All faults have been reset.

This control configuration should be used where it is desirable to restart a motor after a fault without additional manual or automatic control. An example of this condition would be on a remote pumping station where it is desirable to automatically restart a pump after a power outage without operator intervention.

If the auto reset feature is used, CAUTION must be exercised to assure that any restart occurs in a safe manner.

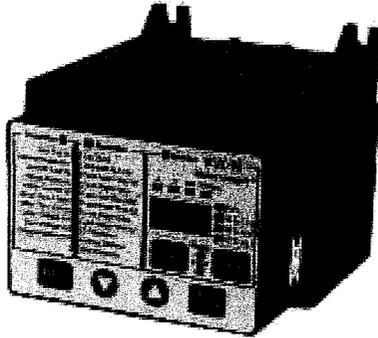
Motor Protection & Monitoring

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Overload and Monitoring Relay

Motor Insight: An Intelligent Power Control Solution



Product Description

Motor Insight™, the first product in the Intelligent Power Control Solutions family, is a highly configurable motor, load and line protection device with power monitoring, diagnostics and flexible communications allowing the customer to save energy, optimize their maintenance schedules, and configure greater system protection, thus reducing overall costs and down time.

Motor Insight is available in 240V, 480V and 600V base units. The add-on communication adapters allow customers the choice of protocols (Modbus®, DeviceNet™ and PROFIBUS®) and I/O options. The product offering also includes a remote display for improved operator safety and ease of use.

Features and Benefits

Features

Size/Range

- Broad FLA range of 1 – 540A
- Selectable trip class (5 – 30)
- Three operating voltage options 240V, 480V, 600V

Motor Control

- 2 output relays
 - 1 Form C SPDT (Fault Relay)
 - 1 Form A SPST (Ground Fault Relay)
- 1 External remote reset terminal
- Trip status indicator

Motor Protection

- Thermal overload
- Jam protection
- Current unbalance
- Current phase loss
- Ground fault
- Phase reversal

Load Protection

- Under-current
- Low power (kW)
- High power (kW)

Line Protection

- Overvoltage
- Undervoltage
- Voltage unbalance
- Voltage phase loss

Monitoring Capabilities

- Current — Average and Phase RMS
- Voltage — Average and Phase RMS
- Power — Motor kW
- Power Factor
- Frequency
- Thermal capacity
- Run hours
- Ground fault current
- Current unbalance %
- Voltage unbalance %

Options

- Type 1, 12 remote display
- Type 3R remote display kit
- Communication modules
 - Modbus
 - Modbus with I/O
 - DeviceNet with I/O
 - PROFIBUS with I/O
 - Ethernet IP with I/O (Q4 2009)

Benefits

Reliability and Improved Uptime

- Enhanced surge and sag withstand and ride through capacity
- Robust design suited for applications with high line conditions and poor power quality
- Adjustments to overload configuration can be made at any time

Safety

- IP20 rated terminal blocks
- Terminal blocks are set back from the display to reduce operator shock hazard
- Remote display (optional) does not require that the operator open the panel to configure the device

Flexibility

- Communications Modules
 - Offered in a variety of configurations
 - External snap-on modules provide support for multiple communications protocols
- Advanced power, voltage and current monitoring capabilities
- Communications modules and remote display can be used together
- Highly configurable fault and reset characteristics for numerous applications

Ease of Use

- Bright LED display with easy-to-understand setting and references
- Powered from line voltage
- Remote display powered from base unit

Standards and Certifications

- cULus Listed NKCR, NKCR7, 508
- UL 1053 applicable sections for ground fault detection
- CSA Certified (Class 3211-02)
- CE
- NEMA
- IEC EN 60947-4-1
- RoHS



Overload and Monitoring Relay

Table 42-1. Advanced Overload Education

Description	Definition	Source	Result	Motor Insight's Protection
Motor Protection				
Thermal overload	Overload is a condition in which current draw to a motor exceeds 115% of the full load amperage rating for an inductive motor.	<ul style="list-style-type: none"> ■ An increase in the load or torque that is being driven by the motor. ■ A low voltage supply to the motor would cause the current to go high to maintain the power needed. ■ A poor power factor would cause above normal current draw. 	Increase in current draw. Current leads to heat and insulation breakdown, which can cause system failure. Additionally, an increase in current can increase power consumption and waste valuable energy.	<ul style="list-style-type: none"> ■ Motor Insight's thermal trip behavior is defined by UL, CSA, and IEC standards. ■ Trip class is settable from 5-30 by 1. ■ The Motor Insight also provides Power Factor monitoring and low voltage protection features.
Jam	Jam is similar to thermal overload in that it is a current draw on the motor above normal operating conditions.	Mechanical stall, interference, jam, or seizure of the motor or motor load.	The motor attempts to drive the load, which has more resistive force due to the mechanical interference. In order to drive the load the motor draws an abnormal amount of current, which can lead to insulation breakdown and system failure.	<ul style="list-style-type: none"> ■ Motor Insight provides a configurable Jam setting that is active during "motor run state," to avoid nuisance trips. ■ Trip Threshold 150 – 400% of FLA ■ Trip Delay 1 – 20 seconds
Ground fault	A line to ground fault.	A current leakage path to ground.	An undetected ground fault can burn through multiple insulation windings ultimately leading to motor failure.	Motor Insight has ground fault protection capability down to 0.15 amps estimated from the existing 3-phase CTs using the residual current method. That is, the three phase current signals should sum to zero unless a ground fault condition is present. In the case of a GF, Motor Insight can alarm, trip the starter, or trip an alternative relay that can be used to shunt trip a breaker or light up a warning light. GF current can also be monitored in real-time through the Motor Insight's advanced monitoring capabilities. (Note: GF settable thresholds vary with motor FLA. 0.15 amps may not be available in all cases).
Unbalanced phases (voltage and current)	Uneven voltage or current between phases in a three-phase system.	When a three-phase load is powered with a poor quality line, the voltage per phase may be unbalanced.	Unbalanced voltage causes large unbalanced currents and as a result this can lead to motor stator windings being overloaded, causing excessive heating, reduced motor efficiency and reduced insulation life.	Motor Insight provides two protection settings that address this problem. The user can choose to set current unbalance thresholds or voltage unbalance thresholds, each of which can trip the starter. Additionally, both of these may be monitored through Motor Insight's advanced monitoring capabilities, allowing the customer to notice in real-time when a condition is present.
Phase loss — current (single-phasing)	One of the three-phase voltages is not present.	Multiple causes, loose wire, improper wiring, grounded phase, open fuse, etc.	Single-phasing can lead to unwanted motor vibrations in addition to the results of unbalanced phases as listed above.	Motor Insight has a fixed protective setting that takes the starter offline if a phase drops below 60% of the other two phases.
Phase rotation (phase-reversal)	Improper wiring, leading to phases being connected to the motor improperly.	A miswired motor. Inadvertent phase-reversal by the utility.	Phase-reversal can cause unwanted directional rotation of a motor. In the event that the load attached to motor can only be driven in one direction the result could be significant mechanical failure and/or injury to an operator.	Motor Insight has configurable phase protection allowing the user to define the phase sequencing intended for that application. If no phase sequence is required the user has the ability to disable this feature.

Overload and Monitoring Relay

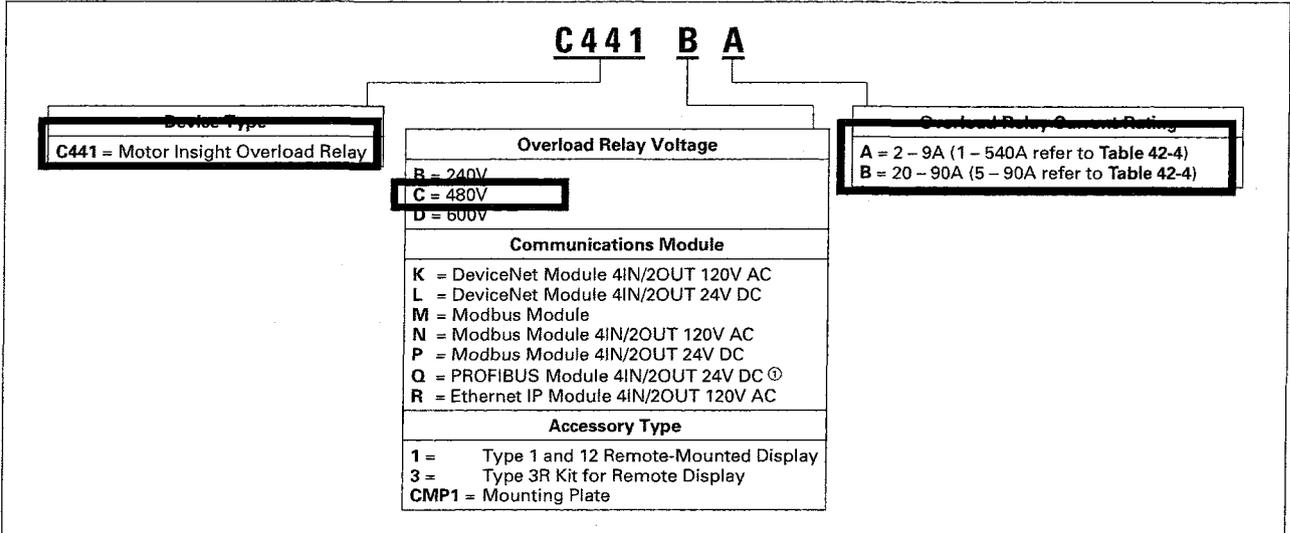
Table 42-1. Advanced Overload Education (Continued)

Description	Definition	Source	Result	Motor Insight's Protection
Motor Protection (Continued)				
Frequency variance	When line frequency is inconsistent.	Malfunctioning alternator speed regulator, or poor line quality caused by an overload of a supply powered by individual sources.	Variations in frequency can cause increases in losses decreasing the efficiency of the motor. In addition this can result in interference with synchronous devices.	Motor Insight advanced monitoring capabilities allow the user to monitor frequency in real-time.
Load Protection				
Under-current or low power	Average RMS current provided to the motor falls below normal operating conditions.	Under-current is usually associated with a portion of the user's load disappearing. Examples of this would be a broken belt, a dry-pump (low suction head), or a dead-headed centrifugal pump.	If under-current goes undetected a mechanical failure can or has occurred. In the case of a pump, running a pump dry or running a pump in a dead-headed condition can cause excessive heating, damaging expensive seals and breaking down desired fluid properties.	Motor Insight has two protection settings to detect this: Under-current and low power. Low power is a more consistent way of ensuring detection as power is linear with motor load, whereas current is not. An unloaded pump may draw 50% of its rated current, but the power draw will be less than 10% of rated power due to a low power factor.
High power	The motor load is drawing more power than it should at normal operating conditions.	This is typical of batch processing applications where several ingredients flow into a mixer. When a substance's consistency changes and viscosity increases from what is expected, the motor may use more power to blend the mixture. Out-of-tolerance conditions can be detected using the High Power and Low Power settings.	If a high-power fault goes undetected the result may be a batch of material that does not meet specification.	Motor Insight monitors the three-phase real power. If the real power value is estimated above the set threshold for the set length of time, a fault is detected and the overload will trip the starter. Additionally, power can be monitored in real-time.
Line Protection				
Over-voltage	When the line voltage to the motor exceeds the specified rating.	Poor line quality.	An over-voltage condition leads to a lower than rated current draw and a poor power factor. A trip limit of 110% of rated voltage is recommended.	Motor Insight monitors the maximum rms value of the three-phase voltages. If the RMS value rises above the set threshold for the set length of time, a fault is detected and the overload can trip the starter or send and display an alarm of the condition. All line-related faults have an "alarm-no-trip" mode.
Under-voltage	When the line voltage to the motor is below the specified rating.	Poor line quality.	An under-voltage condition leads to excessive current draw. This increases the heating of the motor windings and can shorten insulation life. A trip limit set to 90% of rated voltage is recommended.	Motor Insight monitors the minimum rms value of the three-phase voltages. If the rms value drops below the set threshold for the set length of time, a fault is detected and the overload can trip the starter or send and display an alarm of the condition. All line-related faults have an "alarm-no-trip" mode.
Power-up delay	Allows for starting motors and loads in a deliberate fashion.	When there is a power failure, or power cycle, multiple loads come on line simultaneously.	<ul style="list-style-type: none"> ■ Multiple loads starting simultaneously can cause sags affecting the operation of devices that may prevent successful start-up. ■ If power is lost to a motor driving a pump, it may be necessary to delay a restart to allow the pump to come to a complete stop to prevent backspin. 	Motor Insight can be configured to delay closing the fault relay on power-up. For each Motor Insight controlling a motor, a different setting can be programmed, helping to maintain the integrity of your line power.

Overload and Monitoring Relay

Catalog Number Selection

Table 42-2. Catalog Numbering System



① PROFIBUS module will be available in 2nd Quarter 2009.

Product Selection

Table 42-3. Motor Insight Product Selection

Voltage	Current Range	Catalog Number	U.S. Price
240V AC (170 – 264)	2 – 9 Amps	C441BA	
240V AC (170 – 264)	20 – 90 Amps	C441BB	
480V AC (323 – 528)	2 – 9 Amps	C441CA	
480V AC (323 – 528)	20 – 90 Amps	C441CB	
600V AC (489 – 660)	2 – 9 Amps	C441DA	
600V AC (489 – 660)	20 – 90 Amps	C441DB	

Table 42-4. Motor Insight CT Multiplier and Wire Wrap Schedule

Catalog Number ②	Motor FLA	Number of Loops	Number of Conductors Through CT Primary	CT Multiplier Setting	External CT
Current Range: 20 – 90A					
C441_B	5 – 22.5	3	4	4	—
	6.67 – 30	2	3	3	—
	10 – 45	1	2	2	—
	20 – 90	0	1	1	—
Current Range: 2 – 9A					
C441_A	1 – 5	1	2	2	—
	2 – 9	0	1	1	—
	60 – 135	0	1	150 – (150:5)	S060 – 151 M030 – 151 M040 – 151
	120 – 270	0	1	300 – (300:5)	S050 – 301 M030 – 301 M040 – 301 M060 – 301
240 – 540	0	1	600 – (600:5)	S050 – 601 S080 – 601 S090 – 601 S025 – 601 M000 – 601 M050 – 601 M060 – 601 M080 – 601	

② Underscore indicates operating voltage code required.
Operating Voltage Codes:

Code	Voltage
B	240V AC
C	480V AC
D	600V AC

Overload and Monitoring Relay

Technical Data and Specifications

Table 42-5. Motor Insight Technical Data and Specifications

Description	Specification			
Electrical Ratings				
Operating Voltage (3-Phase) and Frequency	C441B_ 170 – 264V AC 50/60 Hz	C441C_ 323 – 528V AC 50/60 Hz	C441D_ 489 – 660V AC 50/60 Hz	
Trip Class				
5 – 30	Selectable			
FLA Range				
C441_A	2 – 9A	Up to 540 A with external CTs Refer to Table 42-4 for CT Multiplier and Wire Wrap Schedule		
C441_B	20 – 90A			
Monitoring Capabilities				
Feature	Value			
Current	Per Phase RMS (1A, 1B, 1C), 2% accuracy Average RMS, 2% accuracy Unbalance Percent (0 – 100%) Ground Fault Current, 10% accuracy			
Voltage	Per Phase RMS (1A, 1B, 1C), 2% accuracy Average RMS, 2% accuracy Unbalance Percent (0 – 100%)			
Power	Motor kW, 5% accuracy Motor Power Factor, Inductive 0 – 1.0, 1% accuracy			
Thermal Capacity	0% cold, 100% trip			
Motor Run Hours	0 – 65535 hours			
Frequency	47 – 63 Hz, 1% accuracy			
Motor Protection				
Thermal Overload Setting	1.05 x FLA: Does not trip 1.15 x FLA: Overload trip			
Feature	Range	Fault Delay Setting		
Jam	150 – 400% of motor FLA, OFF	1 – 20 seconds		
Current Unbalance	1 – 30%, OFF	1 – 20 seconds		
Current Phase Loss	Fixed Threshold 60%	1 – 20 seconds		
Ground Fault Current C441_A 2 – 9 A C441_B 20 – 90 A	0.3 – 2.0 A with 1 pass through the CTs ① 3.0 – 20 A with 1 pass through the CTs ①	<150%, 1 – 60 seconds >150%, 2 seconds >250%, 1 second		
Phase Reversal	OFF = Ignore, 1 = ABC, 2 = ACB			
Fault Reset Delay	2 – 500 minutes, Auto ②			
Fault Reset Attempts	0 – 4 restarts allowed or automatic reset ②			
Load Protection				
Feature	Range	Fault Delay Setting		
Under-Current	50 – 90% of motor FLA	1 – 60 seconds		
Low Power (kW)	20 – 80% of rated kW	1 – 60 seconds		
High Power (kW)	50 – 110% of rated kW	1 – 60 seconds		
Load Reset Delay	2 – 500 minutes, Auto			
Load Reset Attempts	0 – 4, Auto			
Supply Protection				
Feature	Range			Fault Delay Setting
	C441B_	C441C_	C441D_	
Overvoltage	170 – 264V AC	323 – 528V AC	489 – 660V AC	1 – 20 seconds
Undervoltage	170 – 264V AC	323 – 528V AC	489 – 660V AC	1 – 20 seconds
Voltage Unbalance	1 – 20% Unbalance			1 – 20 seconds
Restart Delay Setting	1 – 500 seconds			

① Lower levels are achievable with multiple passes.

② Motor fault reset characteristics can be programmed as a group or for motor overloads only. Reference the user manual for more detailed information.

Overload and Monitoring Relay
Table 42-5. Motor Insight Technical Data and Specifications (Continued)

Description	Specification
Electrical/EMC	
Radiated Emissions IEC 60947-4-1 - Table 15, EN 55011 (CISPR 11) Group 1, Class A	30 MHz to 1000 MHz
Conducted Emissions IEC 60947-4-1 - Table 14, EN 55011 (CISPR 11) Group 1, Class A	0.15 MHz to 30 MHz
ESD Immunity IEC 60947-4-1 (Table 13)	+/-8 kV air, +/-4 kV contact
Radiated Immunity IEC 60947-4-1	10V/m 80 MHz-1000 MHz 80% Amplitude Modulated 1 kHz sine wave
Conducted Immunity IEC 60947-4-1	140 dBuV (10V RMS) 150 kHz - 80 MHz
Fast Transient Immunity IEC 60947-4-1 (Table 13) IEC 6100-4-4	+/-2 kV using direct method
Surge Immunity IEC 60947-4-1 (Table 13) IEC 61000-4-5 Class 4	3-Phase Power Inputs: +/-2 kV line-to-line (DM) +/-4 kV line-to-ground (CM) IEC 61000-4-5 Class 3 User IO and Communication Lines: +/-1 kV line-to-line (DM) +/-2 kV line-to-ground (CM)
Voltage Variations Immunity IEC 60947-4-1	30% dip, @10 ms 60% dip @ 100 ms >95% interrupt @ 5 ms
Electromagnetic Field IEC60947-4-1 Table 13, IEC 61000-4-3	10V/m
Ground Fault	UL 508, UL 1053 sections 21 and 27
Environmental	
Ambient Temperature (Operating)	-4 to 122°F (-20 to 50°C)
Ambient Temperature (Storage)	-40 to 85°C
Operating Humidity	5% to 95% non-condensing
Altitude (No Derating)	2000 m
Shock (IEC 60068-2-27)	15G any direction
Vibration (IEC 60068-2-6)	3G any direction
Pollution Degree per IEC 60947-1	3
Ingress Protection	IP20
Capacity	
Input, Auxiliary Contact and External Reset Terminals Terminal Capacity Tightening Torque	18 - 12 AWG 5.3 lb-in (0.6 Nm)
Voltages	
Monitoring Voltage	240 - 600V AC, 50/60 Hz
Insulation Voltage U_i (Line Voltage)	600V AC
Insulation Voltage U_i (Control)	240V AC
Impulse Withstand U_{imp} (Main/Control)	6000V AC
Expected Life	
Mechanical/Electrical	10 years
Output Contact Ratings	
2 Output Relays 1 Form C SPDT (Fault Relay) 1 Form A SPST (Ground Fault Relay)	B300 Pilot Duty 5A Thermal continuous current 30A Make 3.00A Break @ 120V AC and 15A Make 1.50A Break @ 240V AC
External Remote Reset Terminal	Isolated 120V AC Digital Input IEC 61131-2 Section 5 Type 1
Indications	
Trip	Fault
Reset	Ready
Autoreset	Trip Faulted Ready Flashing
PCBA	
Power Consumption	5W
Options	
Remote Display Communications Modules	Type 1, 12 and Type 3R kit Modbus, DeviceNet and PROFIBUS with I/O

Overload and Monitoring Relay

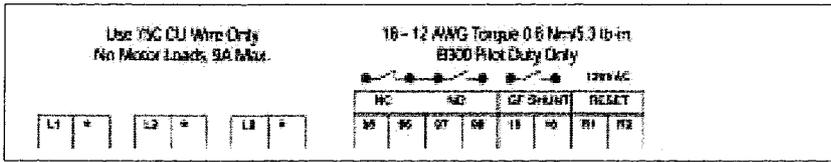


Figure 42-1. Terminal Connection Diagram

Table 42-6. Terminal Connection Specifications

Name	Designation	Input	Description
Line Voltage	L1, L2, L3	Line Voltage	Three-phase line voltage input - L1, L2, L3 connections must correspond to the respective CT1, CT2, CT3 current leads. - * Terminal provided for wiring control power transformer (9A maximum capacity).
Fault Relay	95/96 97/98 96 & 97 (Common)	B300 UL® 508	Form C contact: - 95/96 Contact opens when the unit is faulted or unpowered. - 97/98 Contact closes when the unit is faulted or unpowered. - 96 & 97 are common.
GF Shunt	15 16	B300 UL 508	Form A contact: Contact closes when a ground fault is active.
Reset Input	R1 R2	120V AC	Fault Reset Input. IEC 61131-2 Type 1.

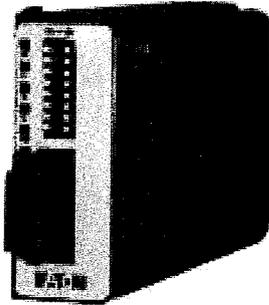
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Table 42-7. Motor Insight Short Circuit Ratings (North America CSA -UL)

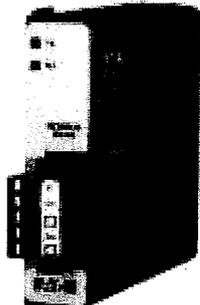
Overload FLA Range	Max. Operating Voltage	Standard-Fault Short Circuit Data			Maximum Withstand Rating	Max. Fuse (RK5)	Eaton T/M Circuit Breaker	Catalog Number
		Withstand Rating	Max. Fuse (RK5)	Max. T/M Circuit Breaker				
2 to 9	240V AC	5000A @ 240V AC	35A	35A	100 kA @ 240V AC 100 kA @ 240V AC	35A —	— FDC3035L	C441BA
2 to 9	480V AC	5000A @ 480V AC	35A	35A	100 kA @ 480V AC 100 kA @ 480V AC	35A —	— FDC3035L	C441CA
2 to 9	600V AC	5000A @ 600V AC	35A	35A	100 kA @ 600V AC 35kA @ 600V AC	35A —	— FDC3035L	C441DA
20 to 90	240V AC	10,000A @ 240V AC	350A	350A	100 kA @ 240V AC 100 kA @ 240V AC	350A —	— KDC3350	C441BB
20 to 90	480V AC	10,000A @ 480V AC	350A	350A	100 kA @ 480V AC 100 kA @ 480V AC	350A —	— KDC3350	C441CB
20 to 90	600V AC	10,000A @ 600V AC	350A	350A	100 kA @ 600V AC 65kA @ 600V AC	350A —	— KDC3350	C441DB

Communication Modules

Modbus Communication Module



Modbus with I/O Module



Modbus Module

Product Description

The Motor Insight Modbus Communication Module is a side mounted device providing Modbus Communication capability to the Motor Insight overload relay.

The Modbus Communication Module with I/O provides communication, monitoring and control for the Motor Insight overload relay.

Features and Benefits

- The Modbus communication module is capable of baud rates up to 115K
- The Modbus address and baud rate configuration can be easily changed using the Motor Insight user interface (C441M only)
- Modbus address and baud rate are set via convenient DIP switches (C441N and C441P); LEDs are provided to display Modbus traffic
- Configuration with common Modbus configuration tools

- Terminals
 - Unique locking mechanism provides for easy removal of the terminal block with the field wiring installed
 - Each terminal is marked for ease of wiring and troubleshooting
- Selectable I/O assemblies
 - 4IN/2OUT
 - Signal types include 24V DC I/O and 120V AC I/O
 - Each I/O module is optically isolated between the field I/O and the network adapter to protect the I/O and communication circuits from possible damage due to transients and ground loops
- Input Module features a user definable input debounce, which limits the effects of transients and electrical noise
- Output Module supports a user definable safe state for loss of communication; hold last state, ON or OFF

Product Selection

Table 42-8. Modbus Communication Module

Description	I/O	Catalog Number	U.S. Price
Modbus Communication Module	None	C441M	
Modbus Communication Module 4IN/2OUT	120V AC	C441N	
Modbus Communication Module 4IN/2OUT	240V DC	C441P	

Technical Data

Table 42-9. Approvals/Certifications

Description	Specification
Electrical/EMC	
Radiated Emissions IEC 60947-4-1 -Table 15, EN 55011 (CISPIR 11) Group 1, Class A	30 – 1000 MHz
Conducted Emissions IEC 60947-4-1 – Table 14, EN 55011 (CISPIR 11) Group 1, Class A	0.15 – 30 MHz
ESD Immunity IEC 60947-4-1 (Table 13)	+/-8 kV air, +/-4 kV contact
Radiated Immunity IEC 60947-4-1	10V/m 80 – 1000 MHz 80% Amplitude Modulated 1 kHz sine wave
Conducted Immunity IEC 60947-4-1	140 dBuV (10V RMS) 150 kHz – 80 MHz
Fast Transient Immunity IEC 60947-4-1 (Table 13) IEC 6100-4-4	+/-2 kV using direct method
Surge Immunity IEC 60947-4-1 (Table 13) IEC 61000-4-5 Class 3	User IO and Communication Lines ①: +/-1 kV line-to-line (DM) +/-2 kV line-to-ground (CM)
Electromagnetic Field ① IEC60947-4-1 Table 13, IEC 61000-4-3	10V/m
Environmental Ratings	
Ambient Temperature (Operating)	-20°C – 50°C
Ambient Temperature (Storage)	-40 – 85°C
Operating Humidity	5 – 95% non-condensing
Altitude (No Derating)	2000m
Shock (IEC 60068-2-27)	15G any direction
Vibration (IEC 60068-2-6)	3G any direction
Pollution Degree per IEC 60947-1	3
Degree of Protection	IP20
Overvoltage Category per UL508	III

① Relates to C441M only.

Communication Modules

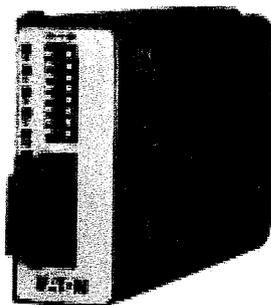
Table 42-9. Approvals/Certifications (Continued)

Description	Specification	
C441P 24V DC Input		
Nominal Input Voltage	24V DC	
Operating Voltage	18 – 30V DC	
Number of Inputs	4	
Signal Delay	5 ms (Programmable to 65 sec)	
OFF-State Voltage	<6V DC	
ON-State Voltage	>18V DC	
Nominal Input Current	5 mA	
Isolation	1500V	
Terminal Screw Torque	7-9 in-lb	
24 Volt Source Current	50 mA	
Operating Voltage Range — DC Input Modules		
OFF State	Transition Region	ON State
0 – 6V DC	6 – 18V DC	18 – 30V DC
C441N 120V AC Input		
Nominal Input Voltage	120V AC	
Operating Voltage	80 – 140V AC	
Number of Inputs	4	
OFF-State Voltage	<30V AC	
ON-State Voltage	>80V AC	
Nominal Input Current	15 mA	
Signal Delay	1/2 cycle	
Isolation	1500V	
Terminal Screw Torque	7 – 9 in-lb	
Operating Voltage Range — AC Input Modules		
OFF State	Transition Region	ON State
0 – 30V AC	30 – 80V AC	80 – 140V AC
Output Modules		
Nominal Voltage	120V AC 24V DC	
Number of Outputs	2 1NO Form A 1 NO/NC Form C	
Relay OFF Time	3 ms	
Relay ON Time	7 ms	
Max. Current per Point ①	5A (B300 Rated)	
Electrical Life	100,000 cycles	
Mechanical Life	1,000,000 cycles	

① Resistive current at 55°C ambient.

Communication Modules

DeviceNet Communication Modules



DeviceNet Module

Product Description

The DeviceNet Communication Module provides monitoring and control for the Motor Insight overload relay from a single DeviceNet node. These modules also offer convenient I/O in two voltage options, 24V DC and 120V AC.

Features and Benefits

- Communication to DeviceNet uses only one DeviceNet MAC ID
- Configuration
 - DeviceNet MAC ID and Baud rate are set via convenient DIP switches with an option to set from the network
 - Advanced configuration available using common DeviceNet tools
- Terminals
 - Unique locking mechanism provides for easy removal of the terminal block with the field wiring installed
 - Each terminal is marked for ease of wiring and troubleshooting

- Selectable I/O assemblies
 - 4IN/2OUT
 - Signal types include 24V DC I/O and 120V AC I/O
 - Each I/O module is optically isolated between the field I/O and the network adapter to protect the I/O and communication circuits from possible damage due to transients and ground loops
- Input Module features a user definable input debounce, which limits the effects of transients and electrical noise
- Output Module supports a user definable safe state for loss of communication; hold last state, ON or OFF
- Combined status LED

Product Selection

Table 42-10. DeviceNet Modules

Description	I/O	Catalog Number	U.S. Price
DeviceNet Communication Module	120V AC	C441K	
DeviceNet Communication Module	24V DC	C441L	

Technical Data and Specifications

Table 42-11. Approvals/Certifications

Description	Specification
Electrical/EMC	
Radiated Emissions IEC 60947-4-1 - Table 15, EN 55011 (CISPR 11) Group 1, Class A	30 – 1000 MHz
Conducted Emissions IEC 60947-4-1 – Table 14, EN 55011 (CISPR 11) Group 1, Class A	0.15 – 30 MHz
ESD Immunity IEC 60947-4-1 (Table 13)	+/- 8 kV air, +/- 4 kV contact
Radiated Immunity IEC 60947-4-1	10V/m 80 – 1000 MHz 80% Amplitude Modulated 1 kHz sine wave
Conducted Immunity IEC 60947-4-1	140 dBuV (10V RMS) 150 kHz – 80 MHz
Fast Transient Immunity IEC 60947-4-1 (Table 13) IEC 6100-4-4	+/- kV supply and control, +/- 1 kV communication
Surge Immunity IEC 60947-4-1 (Table 13) IEC 61000-4-5 Class 2	User IO and Communication Lines: +/- 0.5 kV line-to-line (DM) +/- 1 kV line-to-ground (CM)
Electromagnetic Field IEC60947-4-1 Table 13, IEC 61000-4-3	10V/m

Environmental Ratings

Ambient Temperature (Operating)	-25°C – 50°C
Ambient Temperature (Storage)	-40°C – 85°C
Operating Humidity	5 – 95% non-condensing
Altitude (No Derating)	2000 m
Shock (IEC 60068-2-27)	15G any direction
Vibration (IEC 60068-2-6)	3G any direction
Pollution Degree per IEC 60947-1	3
Degree of Protection	IP20

DeviceNet

DeviceNet Connections	Group 2, Polling, Bit Strobe, Explicit, No UCMM
DeviceNet Baud Rate	125K, 250K, 500K

Communication Modules

Table 42-11. Approvals/Certifications (Continued)

Description	Specification
C441L 24V DC Input	
Nominal Input Voltage	24V DC
Operating Voltage	18 – 30V DC
Number of Inputs	4
Signal Delay	5 ms (Programmable to 65 sec)
OFF-State Voltage	<6V DC
ON-State Voltage	>18V DC
Nominal Input Current	5 mA
Isolation	1500V
Terminal Screw Torque	7-9 in-lb
24 Volt Source Current	50 mA

Operating Voltage Range — DC Input Modules

OFF State	Transition Region	ON State
0 – 6V DC	6 – 18V DC	18 – 30V DC

C441K 120V AC Input

Nominal Input Voltage	120V AC
Operating Voltage	80 – 140V AC
Number of Inputs	4
OFF-State Voltage	<30V AC
ON-State Voltage	>80V AC
Nominal Input Current	15 mA
Signal Delay	1/2 cycle
Isolation	1500V
Terminal Screw Torque	7 – 9 in-lb

Operating Voltage Range — AC Input Modules

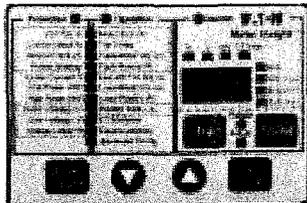
OFF State	Transition Region	ON State
0 – 30V AC	30 – 80V AC	80 – 140V AC

Output Modules

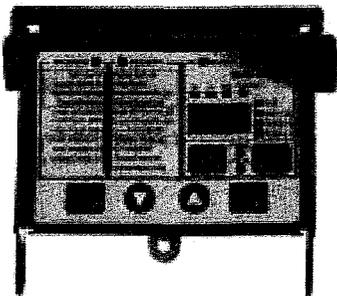
Nominal Voltage	120V AC 24V DC
Number of Outputs	2 1NO Form A 1 NO/NC Form C
Relay OFF Time	3 ms
Relay ON Time	7 ms
Max. Current per Point ①	5A (B300 Rated)
Electrical Life	100,000 cycles
Mechanical Life	1,000,000 cycles

① Resistive current at 55°C ambient.

Accessories



Remote Display C4441



Type 3R Kit with Remote Display Mounted Inside

Description

The Motor Insight offers several accessories for the customer's ease of use and safety:

- Types 1 and 12 Remote Display
- Type 3R Remote Display kit
- Mounting Plate Adapter

Features and Benefits

- Remote Display Unit:
 - Same user interface as the overload relay
 - Enhanced operator safety — operator can configure the overload without opening the enclosure door
- Type 3R kit mounts with standard 30 mm holes
- Mounting plate for retrofit in existing installations

Product Selection

Table 42-12. Accessories

Description	Catalog Number	U.S. Price
Remote Display Types 1 and 12	C4411	
Type 3R Kit for Remote Display	C4413	
Conversion Plate	C441CMP1	

The Remote Display requires a communication cable to connect to the Motor Insight overload relay:

Table 42-13. Communication Cable Lengths

Length in Inches (meters)	Catalog Number	U.S. Price
9.8 (0.25)	D77E-QPIP25	
39.4 (1.0)	D77E-QPIP100	
78.7 (2.0)	D77E-QPIP200	
118.1 (3.0)	D77E-QPIP300	

Technical Specifications

Table 42-14. UL Specifications

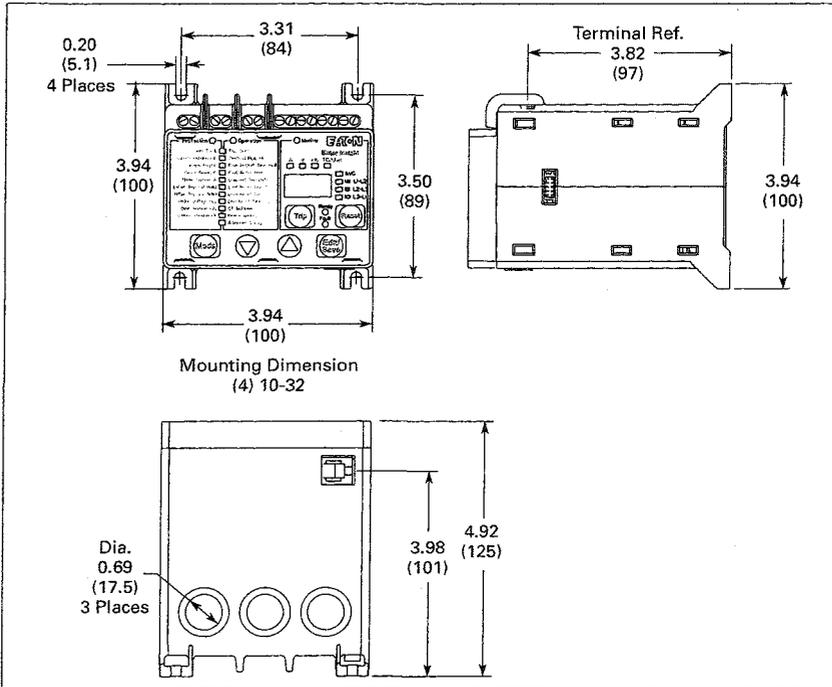
Description	Catalog Number
Remote Display UL 508 Type 1 and 12	C4411
Remote Display Kit UL 508 Type 3	C4413

Table 42-15. Current Transformers

Reference **Section 56-53, Table 56-29** for CT selection.

Dimensions

Dimensions



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Figure 42-2. Motor Insight Overload Relay — Approximate Dimensions in Inches (mm)

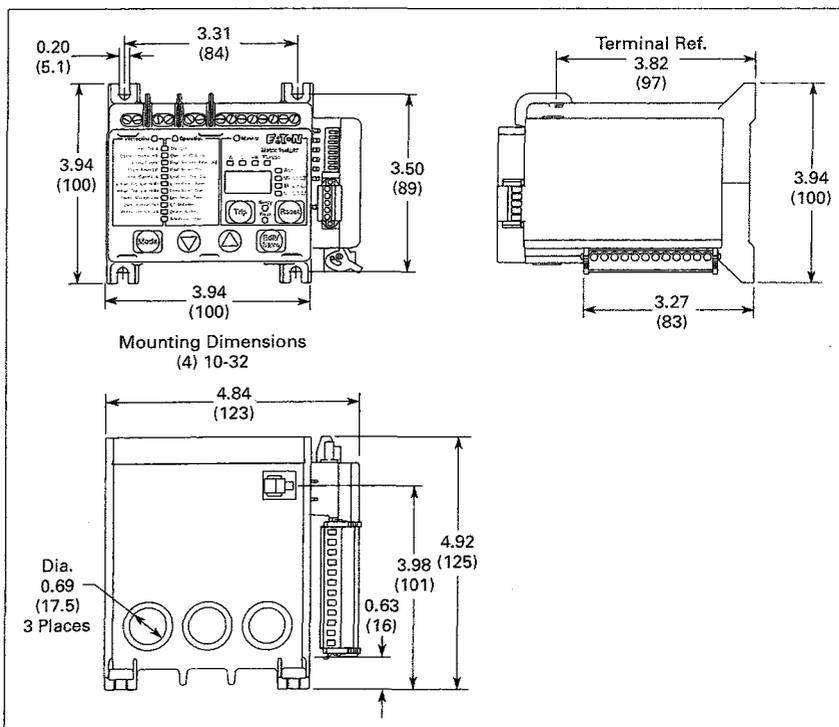


Figure 42-3. Motor Insight with Mounted DeviceNet or Modbus with I/O Communication Module — Approximate Dimensions in Inches (mm)

Dimensions

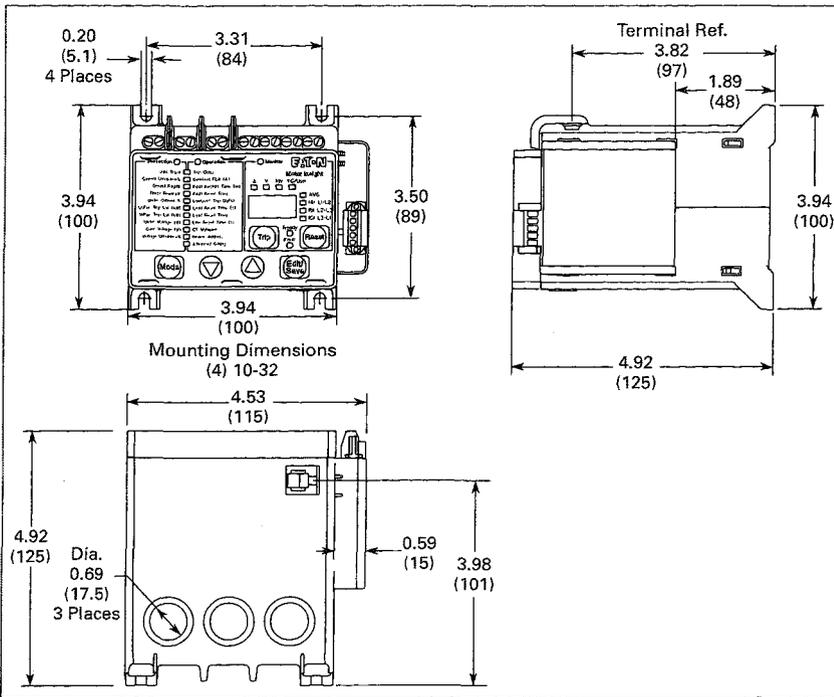


Figure 42-4. Motor Insight with Mounted Modbus Communication Module — Approximate Dimensions in Inches (mm)

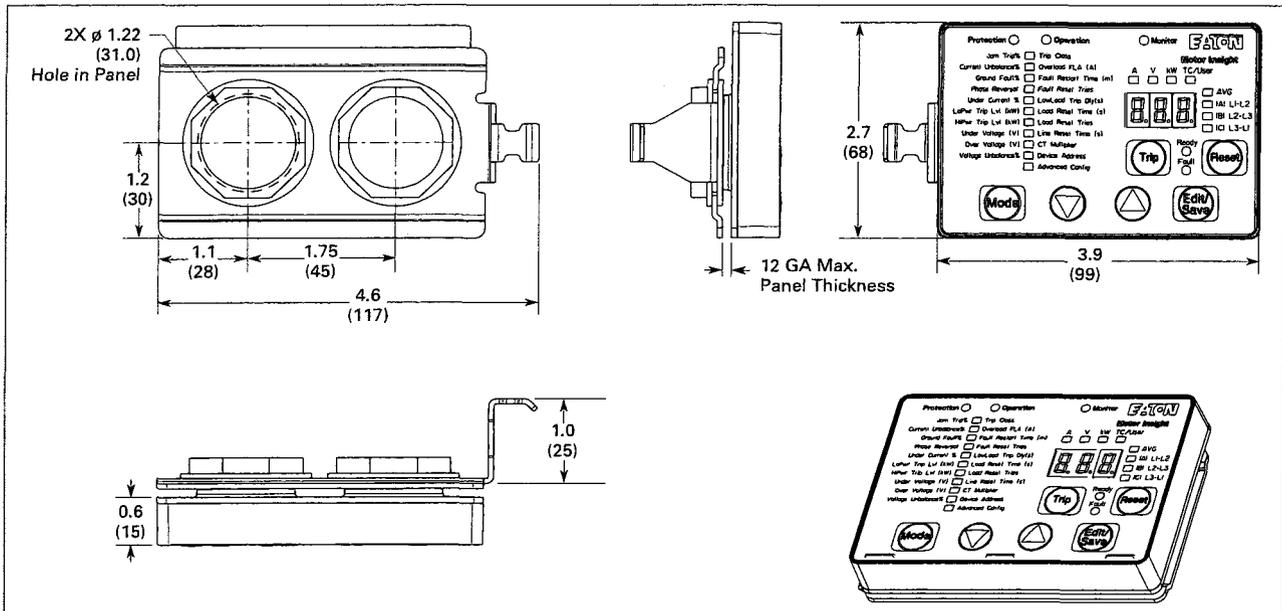
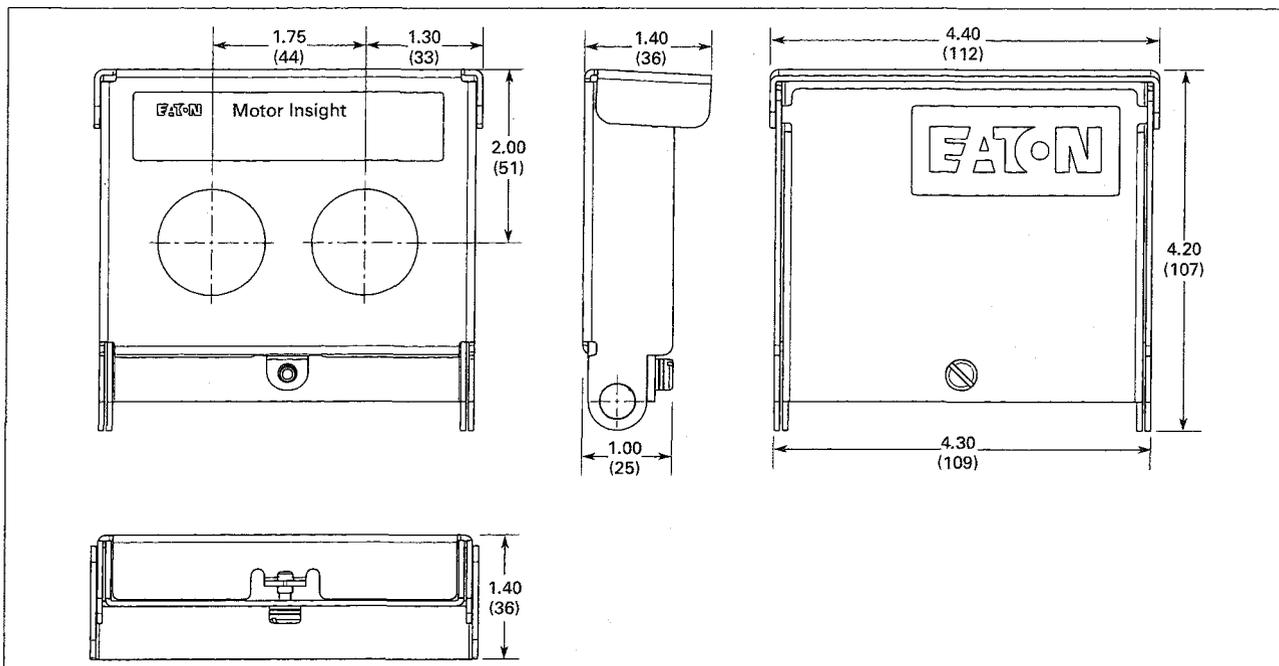


Figure 42-5. Motor Insight Remote Display

Dimensions



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Figure 42-6. Motor Insight Cover Assembly

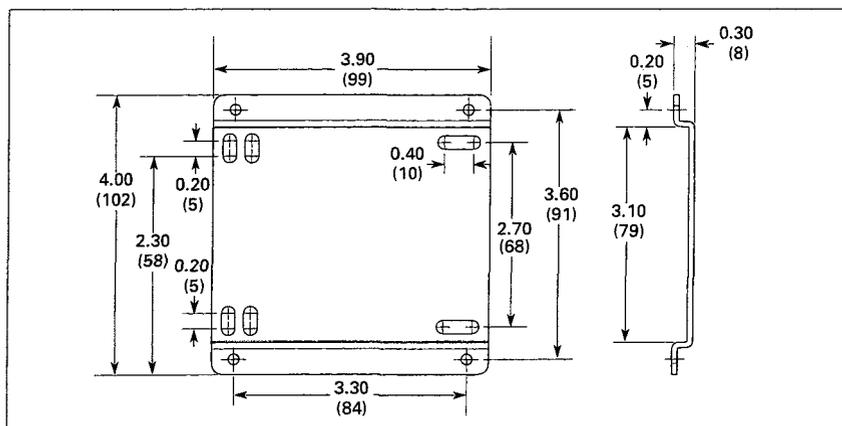


Figure 42-7. Motor Insight Conversion Plate

10250T Series, Assembled Devices — Momentary Pushbutton Units

Product Selection

Non-illuminated Momentary Pushbutton Units

- Flush, Extended, Mushroom Head or Jumbo Mushroom Head Operators

Table 47-173. Pushbutton Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Contact Type	Button Color	Flush Button		Extended Button		Mushroom Button		Jumbo Mushroom ^①			
		 Flush Button — Black Cat. No. 10250T23B	 Extended Button — Red Cat. No. 10250T31R	 Mushroom Button — Red Cat. No. 10250T32R	 Jumbo Mushroom — Red Cat. No. 10250T17213-3	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
1NO	Black Red Green Yellow Red — Engraved EMERG. STOP	10250T23B 10250T23R 10250T23G 10250T23Y —	10250T25B 10250T12-53 10250T25G 10250T25Y —	10250T26B 10250T122-53 10250T26G 10250T26Y —	10250T27B 10250T172-53 10250T27G 10250T27Y 10250T17213-53						
1NC	Black Red Green Yellow Red — Engraved EMERG. STOP	10250T101-51 10250T102-51 10250T103-51 10250T104-51 —	10250T111-51 10250T125R 10250T112-51 10250T120-51 —	10250T121-51 10250T26R 10250T123-51 10250T124-51 —	10250T171-51 10250T27R 10250T173-51 10250T174-51 10250T29						
1NO-1NC	Black Red Green Yellow Red — Engraved EMERG. STOP	10250T30B 10250T30R 10250T30G 10250T30Y —	10250T31B 10250T31R 10250T31G 10250T31Y —	10250T32B 10250T32R 10250T32G 10250T32Y —	10250T33B 10250T33R 10250T33G 10250T33Y 10250T33						
2NO	Black Red Green Yellow Red — Engraved EMERG. STOP	10250T101-2 10250T102-2 10250T103-2 10250T104-2 —	10250T111-2 10250T112-2 10250T113-2 10250T120-2 —	10250T121-2 10250T122-2 10250T123-2 10250T124-2 —	10250T171-2 10250T172-2 10250T173-2 10250T174-2 10250T17213-2						
2NC	Black Red Green Yellow Red — Engraved EMERG. STOP	10250T101-3 10250T102-3 10250T103-3 10250T104-3 —	10250T111-3 10250T112-3 10250T113-3 10250T120-3 —	10250T121-3 10250T122-3 10250T123-3 10250T124-3 —	10250T171-3 10250T172-3 10250T173-3 10250T174-3 10250T17213-3						

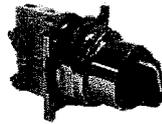
① Anodized aluminum head is not suitable for use in ultraviolet light applications.

Accessories Pages 47-155 – 47-156
 Dimensions Pages 47-160 – 47-162
 Enclosures Pages 47-153 – 47-154
 Legend Plates Pages 47-151 – 47-152
 Discount Symbol 1CD1C

10250T Series, Assembled Devices — Selector Switch Units

Selector Switch Units

- Two-, Three- and Four-Position Maintained
- Non-illuminated and Illuminated



3-Position Maintained Switch
Catalog Number
10250T21KB



3-Position Maintained Switch
Catalog Number
10250T22KB

Table 47-200. 2-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ①		Operator Action ②	Non-illuminated			Illuminated — 120V Transformer			Contact Type	Mounting Location	
			Black Knob ③	Black Lever ③	Price U.S. \$	Red Knob ③	Red Lever ③	Price U.S. \$		A	B
			Catalog Number	Catalog Number		Catalog Number	Catalog Number				
X O	O X	M	10250T20KB	<u>10250T20LB</u>		10250ED1117-KR	10250ED1117-LR		1NC 1NO	 	

- ① X = closed circuit, O = open circuit.
 ② M = Maintained. S = Spring return in direction of arrow (→).
 ③ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
 Example: 10250T20KG.

Table 47-201. 3-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ④			Operator Action ⑤	Non-illuminated			Illuminated — 120V Transformer			Contact Type	Mounting Location	
				Black Knob ⑥	Black Lever ⑥	Price U.S. \$	Red Knob ⑥	Red Lever ⑥	Price U.S. \$		A	B
				Catalog Number	Catalog Number		Catalog Number	Catalog Number				
X O	O O	O X	M	10250T21KB	10250T21LB		10250ED1117-2KR	10250ED1117-2LR		1NO 1NO	 	
X O	O X	O O		10250T22KB	10250T22LB		10250ED1117-3KR	10250ED1117-3LR		1NO 2NC (Series) 1NO	 	

- ④ X = closed circuit, O = open circuit.
 ⑤ M = Maintained. S = Spring return in direction of arrow (→).
 ⑥ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
 Example: 10250T20KG.

Table 47-202. 4-Position Selector Switch — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Operator Position ⑦				Operator Action ⑧	Non-illuminated			Illuminated — 120V Transformer			Contact Type	Mounting Location	
					Black Knob ⑨	Black Lever ⑨	Price U.S. \$	Red Knob ⑨	Red Lever ⑨	Price U.S. \$		A	B
					Catalog Number	Catalog Number		Catalog Number	Catalog Number				
X O O O	O X O O	O O X O	O O O X	M	10250T46KB	10250T46LB		10250ED1117-4KR	10250ED1117-4LR		1NC 1NO 1NO 1NC	 	

- ⑦ X = closed circuit, O = open circuit.
 ⑧ M = Maintained. S = Spring return in direction of arrow (→).
 ⑨ To order different type or color selector switch, substitute the underlined character with appropriate Suffix Code from the Color Selection table.
 Example: 10250T20KG.

Table 47-203. Color Selection

Illuminated						Non-illuminated					
Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter	Color	Code Letter
Red	R	White	W	Amber	A	Black	B	Green	G	Blue	L
Green	G	Blue	B	Clear	C	Red	R	White	W	Orange	O

Accessories Pages 47-155 – 47-156
 Additional Circuit Arrangements Pages 47-133 – 47-134
 Dimensions Pages 47-160 – 47-162
 Enclosures Pages 47-153 – 47-154
 Legend Plates Pages 47-151 – 47-152
 Discount Symbol 1CD1C

Indicating Light Units

- LED or Incandescent
- Full Voltage, Resistor or Transformer Type
- Standard and PresTest Types
- Plastic Lenses

PresTest — This device incorporates a press-to-test feature whereby depressing the lens disconnects the light from the source being monitored and connects the lamp to a continuously energized circuit for immediate detection of faulty lamps.

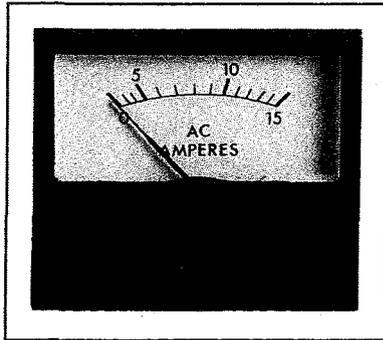
Table 47-182. Indicating Light Units — UL (NEMA) Type 3, 3R, 4, 4X, 12, 13 ①

Lamp	Type	Voltage	Color	 24V Full Voltage Indicating Light — Red Catalog Number 10250T206NC1N	 120V AC Transformer PresTest — Green Catalog Number 10250T74NG	LED/Lamp Number
LED	Full Voltage	24V AC/DC	Red	10250T197LRP24	10250T297LRP24	Bayonet Base
			Green	10250T197LGP24	10250T297LGP24	
	Amber	10250T197LAP24	10250T297LAP24			
	Yellow	10250T197LYP24	10250T297LYP24			
	Blue	10250T197LLP24	10250T297LLP24			
	White	10250T197LWP24	10250T297LWP24			
120V AC	Red	10250T197LRP2A	10250T297LRP2A			
	Green	10250T197LGP2A	10250T297LGP2A			
Transformer	120V AC	Red	10250T181LRP06	10250T221LRP06		
		Green	10250T181LGP06	10250T221LGP06		
Incandescent	Full Voltage	24V AC/DC	Red	10250T206NC1N	10250T235NC21	#757
			Green	10250T206NC2N	10250T235NC22	
	Amber	10250T206NC19N	10250T235NC43			
	Yellow	10250T206NC3N	10250T235NC23			
	Blue	10250T206NC4N	10250T235NC24			
	Clear	10250T206NC5N	10250T235NC25			
White	10250T206NC6N	10250T235NC26				
Resistor	120V AC/DC	Red	10250T201NC1N	10250T231NC21	120MB	
		Green	10250T201NC2N	10250T231NC22		
Amber	10250T201NC19N	10250T231NC43				
Yellow	10250T201NC3N	10250T231NC23				
Blue	10250T201NC4N	10250T231NC24				
Clear	10250T201NC5N	10250T231NC25				
White	10250T201NC6N	10250T231NC26				
Transformer ②	120V AC	Red	10250T34R	10250T74NR	#755	
		Green	10250T34G	10250T74NG		
Amber	10250T34A	10250T74NA				
Yellow	10250T34Y	10250T74NY				
Blue	10250T34B	10250T74NB				
Clear	10250T34C	10250T74NC				
White	10250T34W	10250T74NW				

① Standard indicating lights are rated UL (NEMA) 3S as well.
 ② For flashing lamp add letter F to listed Catalog Number. Example: 10250T34RF.

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 Enclosures Pages 47-153 – 47-154
 Legend Plates Pages 47-151 – 47-152
 Replacement
 Lamps/LEDs Page 47-157
 Discount Symbol 1CD1C

549 Series Panel Meters



A.C. Ammeter

K-Tech Inc.
 Ph.1 847-375 9524
 Fx.1 847-375-9523
 meters@k-Tech.com
 www.K-Tech.com

A.C. Ammeter

Product Codes – Self Contained rating 50mA for use with separate wound primary current transformer

Input	Scaling	Catalogue No.
50mA	0-1A	549-78AA-HXLA
50mA	0-5A	549-78AA-HXLS
50mA	0-7.5A	549-78AA-HXMF
50mA	0-10A	549-78AA-HXMT
50mA	0-15A	549-78AA-HXND
50mA	0-20A	549-78AA-HXNG
50mA	0-30A	549-78AA-HXNL
50mA	0-40A	549-78AA-HXNP
50mA	0-50A	549-78AA-HXNT

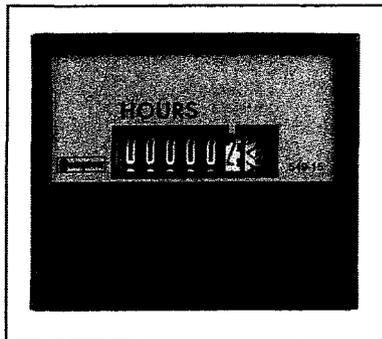
Product Codes – For use with external current transformer. Other scales are available.

Input	Scaling	Catalogue No.
5A	0-50A	549-78AA-LSNT
5A	0-60A	549-78AA-LSNW
5A	0-75A	549-78AA-LSPB
5A	0-80A	549-78AA-LSPD
5A	0-100A	549-78AA-LSPK
5A	0-150A	549-78AA-LSPZ
5A	0-200A	549-78AA-LSRL
5A	0-300A	549-78AA-LSRX
5A	0-400A	549-78AA-LSSC
5A	0-500A	549-78AA-LSSF
5A	0-600A	549-78AA-LSSJ
5A	0-800A	549-78AA-LSSN
5A	0-1000A	549-78AA-LSSS
5A	0-1200A	549-78AA-LSSU
5A	0-1500A	549-78AA-LSTC
5A	0-1600A	549-78AA-LSTE
5A	0-2000A	549-78AA-LSTM

A.C. Voltmeter

Product Codes – Other scales are available.

Input	Scaling	Catalogue No.
150V	0-150V	549-78VA-PZPZ
150V	0-300V	549-78VA-PZRX
150V	0-600V	549-78VA-PZSJ
150V	0-750V	549-78VA-PZSM



Elapsed Time Meter

Elapsed Time Meter

Product Codes

Input	Scale	Catalogue No.
110/130V A.C., 50Hz	99999.99	549-156A-PNC6-ZH
110/130V A.C., 60Hz	99999.99	549-156A-PNC6-ZH
200/250V A.C., 50Hz	99999.99	549-156A-RNC6-ZH
200/250V A.C., 60Hz	99999.99	549-156A-RNC6-ZH
6V D.C., D.C.	99999.99	549-151A-LWZH
12V D.C., D.C.	99999.99	549-151A-MUZH

Impulse Counters

Product Codes

Input	Scale	Catalogue No.
120V A.C., 60Hz	999999	549-257A-PQC6

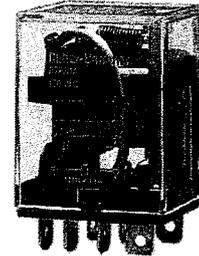
D7 Series

Features

- Arc barrier equipped relay with high dielectric strength
- Panel, DIN rail and flange mounting

Standards and Certifications

-  File # E37317, E65657
-  File # LR217017, LR217069
- 



D7 Series Relay

Technical Data and Specifications

Table 49-38. Coil Resistance

Coil Voltage	Ohms				Milliamps							
	D7PR1	D7PR2	D7PR3	D7PR4	D7PR1	D7PR2	D7PR2	D7PR3	D7PR3	D7PR4	D7PR4	
					50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
6V AC	11	11	6.5	5	222.3	190	234	200	326	278	393	336
12V AC	41	41	25.5	20	111.2	95	95.9	82	148	126	202	173
24V AC	180	180	102	80	58.5	50	48	41	77	66	91	78
48V AC	788	788	735	735	21	18	21	18	21.5	18.4	24	20
120V AC	4430	4430	2700	2000	12.9	11	12.9	11	14.7	12.6	17.3	14.8
240V AC	15700	15700	10000	8000	5.9	5	7	6	9.7	8.3	11.4	9.7
6V DC	47	40	25	24	—	127.7	—	150	—	240	—	250
12V DC	188	160	100	96	—	63.8	—	75	—	120	—	125
24V DC	750	650	400	360	—	32	—	36.9	—	60	—	67
48V DC	2600	2600	1600	1600	—	18.5	—	18.5	—	18.5	—	18.5
110V DC	13800	11000	8400	6800	—	8	—	10	—	13	—	16.2

Table 49-39. Relay Specifications

	D7PR1		D7PR2/D7PR3/D7PR4		
	Resistive Load (p.f. = 1)	Inductive Load (p.f. = 0.4, L/R = 7 ms)	Resistive Load (p.f. = 1)		Inductive Load (p.f. = 0.4, L/R = 7 ms)
Rated Load	120/240V AC 15A 30V DC 15A	120/240V AC 10A 30V DC 7A	120/240V AC 30V DC 250V AC 120V AC 28V DC	10A (D7PR2 only) 10A (D7PR2 only) 10A (D7PR3/D7PR4 only) 15A (D7PR2 only) 10A (D7PR3/D7PR4 only)	120/240V AC 7.5A 30V DC 5A
Carry Current	15A	15A	10A		10A
Max. Operating Voltage	250V AC/125V DC	250V AC/125V DC	250V AC/125V DC		250V AC/125V DC
Max. Operating Current	15A	15A	10A		10A
Contact Material	AgCdO	AgCdO	AgCdO		AgCdO
Max. Switching Capacity	1700 VA 360W	1100 VA 170W	1100 VA 240W		830 VA 120W
Min. Permissible Load	100 mA, 5V DC	100 mA, 5V DC	100 mA, 5V DC		100 mA, 5V DC
Pickup Voltage (max.)	80%	80%	80%		80%
Drop Out Voltage (min.)	30% AC, 10% DC	30% AC, 10% DC	30% AC, 10% DC		30% AC, 10% DC
Voltage (max.)	110%	110%	110%		110%
Mechanical Life (min.)	10,000,000 AC 100,000,000 DC	10,000,000 AC 100,000,000 DC	10,000,000 AC 100,000,000 DC		10,000,000 AC 100,000,000 DC
Electrical Life @ All Contact Ratings (min.)	200,000	200,000	200,000		200,000
Maximum hp Rating	1/3 hp (120V AC)	1/2 hp (240V AC)	1/3 hp (120V AC) (D7PR2 only)		1/2 hp (240V AC) (D7PR2 only)

Table 49-40. Socket Specifications

Catalog Number	Electrical Ratings	Mounting Torque	Hook-Up Wire Range
D7PA2	15A, 250V	.785 Nm – 1.18 Nm	AWG 14 Max.
D7PA3	10A, 300V	7 – 8 in-lbs	AWG 12 to 22 Solid or Stranded
D7PA4	10A, 300V	7 – 8 in-lbs	AWG 12 to 22 Solid or Stranded
D7PA5	15A, 250V	N/A	AWG 14 Max.

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D7 Series — Standard

Dimensions

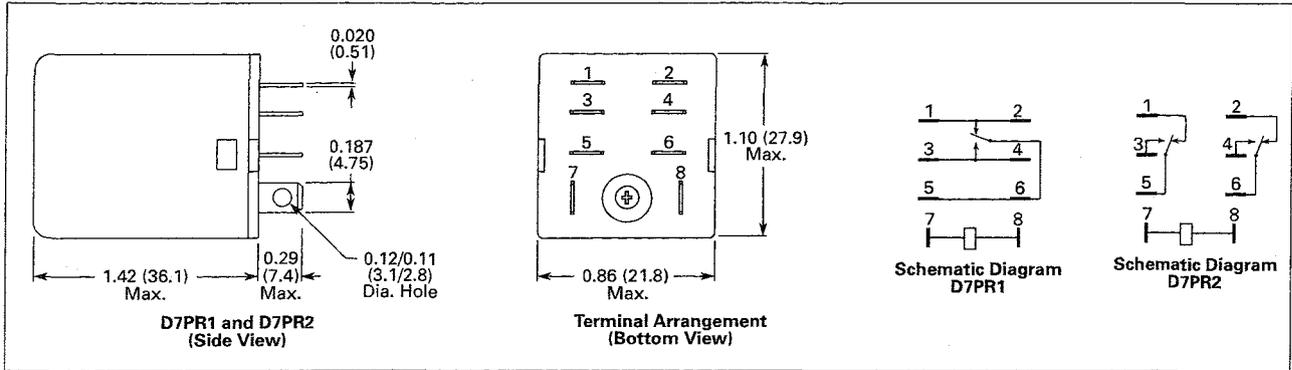


Figure 49-39. D7PR1 and D7PR2 — Approximate Dimensions in Inches (mm)

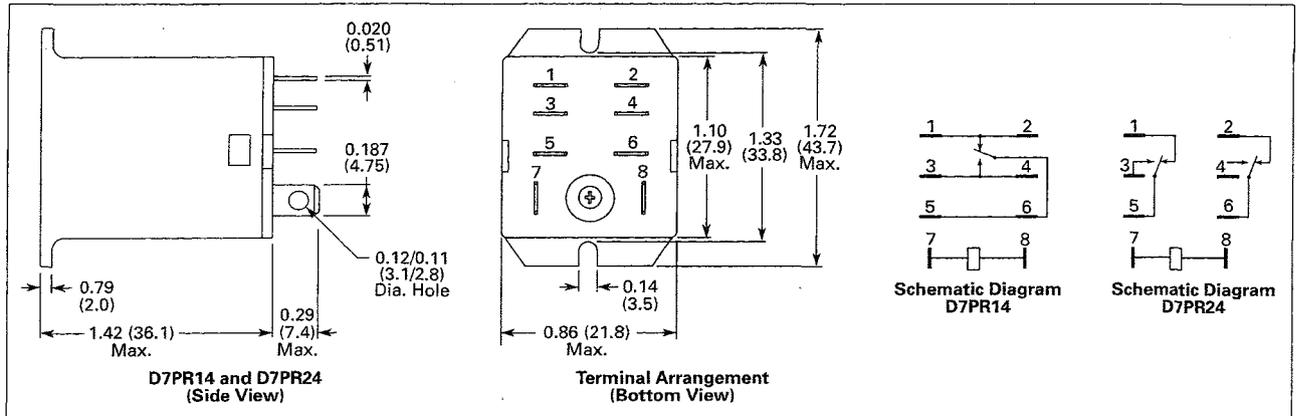


Figure 49-40. D7PR14 and D7PR24 — Approximate Dimensions in Inches (mm)

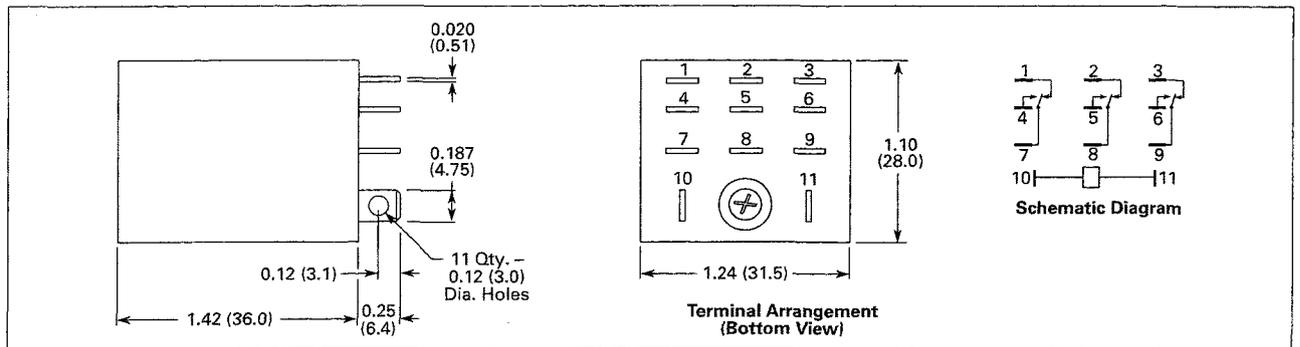


Figure 49-41. D7PR3 — Approximate Dimensions in Inches (mm)

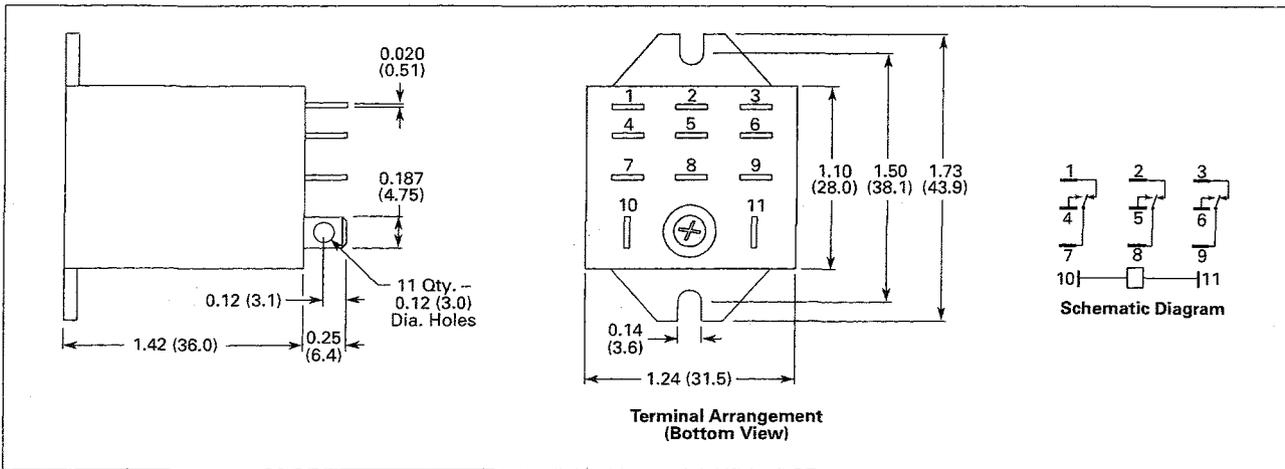


Figure 49-42. D7PR34 — Approximate Dimensions in Inches (mm)

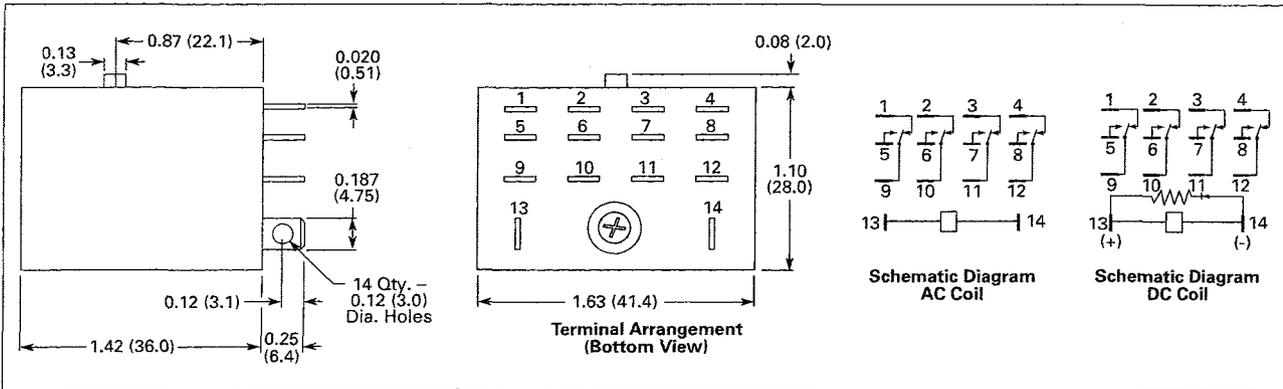


Figure 49-43. D7PR43 — Approximate Dimensions in Inches (mm)

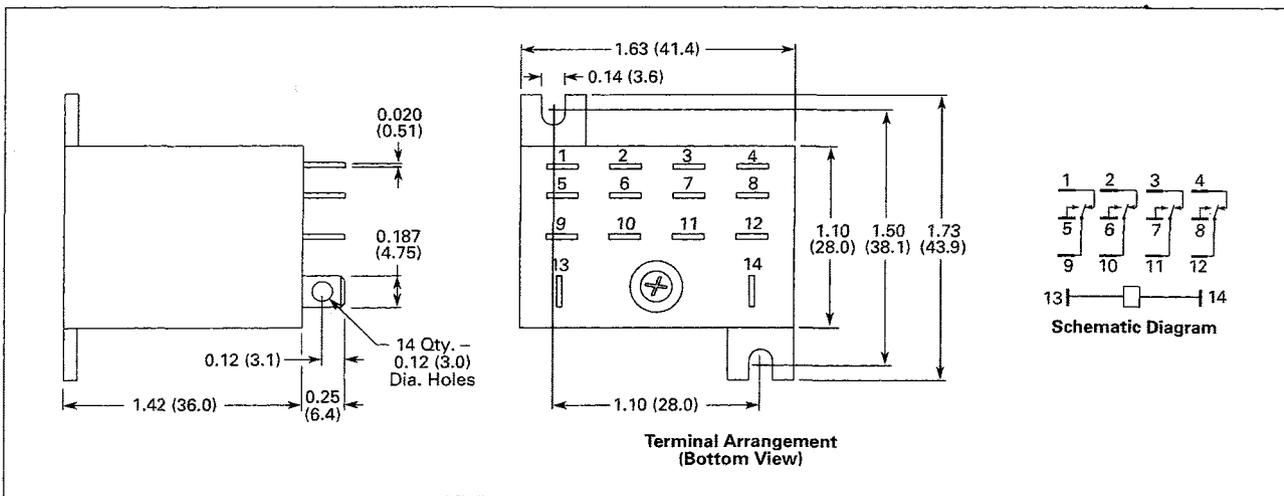


Figure 49-44. D7PR44 — Approximate Dimensions in Inches (mm)

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D7 Series — Standard

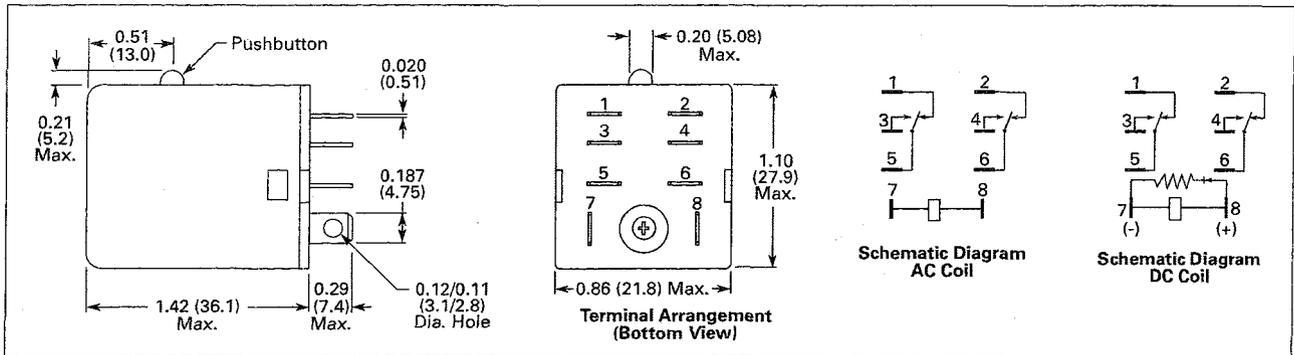


Figure 49-45. D7PR23 — Approximate Dimensions in Inches (mm)

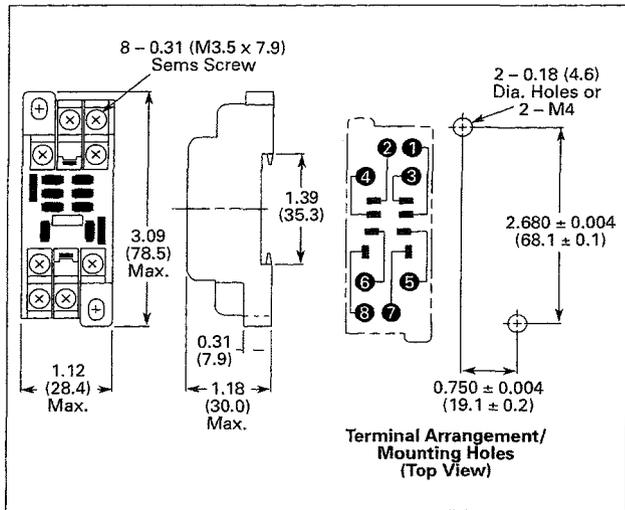


Figure 49-46. D7PA2 — Approximate Dimensions in Inches (mm)

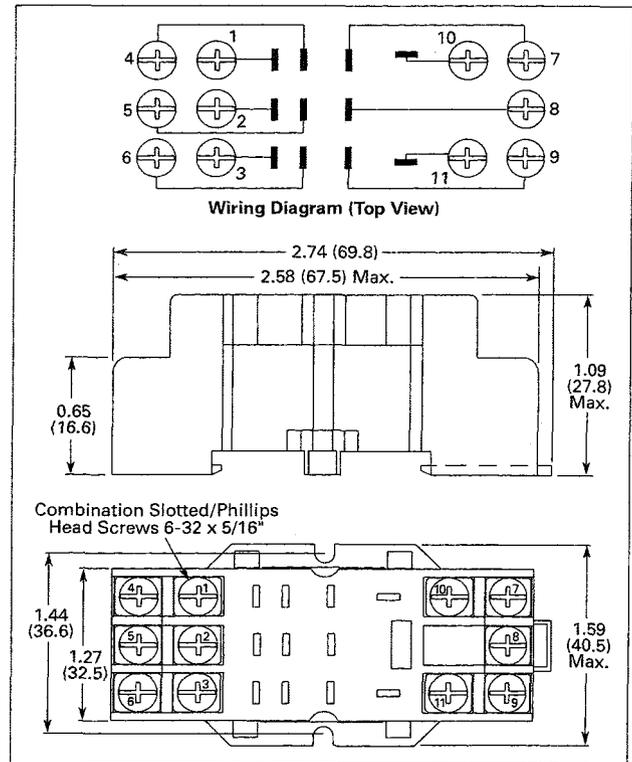


Figure 49-47. D7PA3 — Approximate Dimensions in Inches (mm)

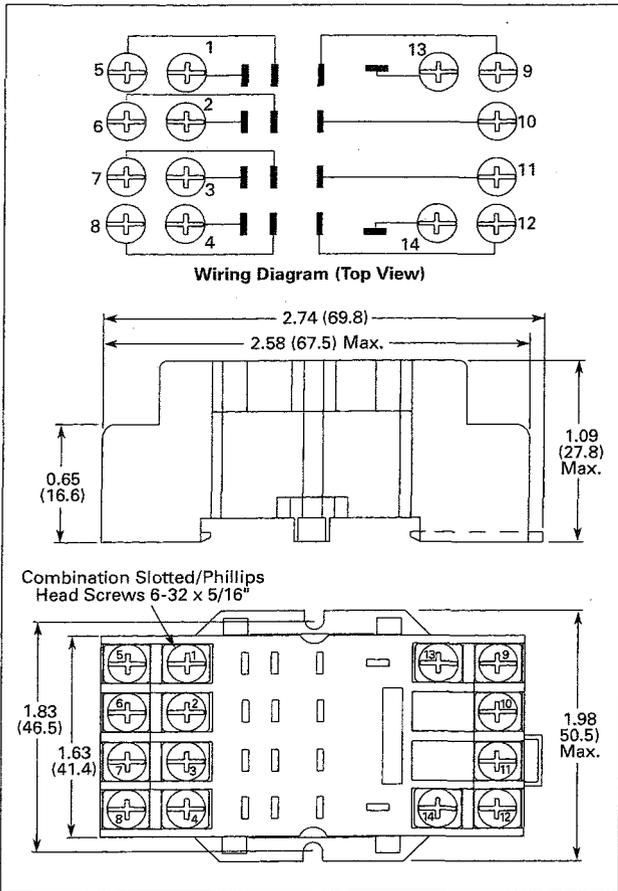


Figure 49-48. D7PA4 — Approximate Dimensions in Inches (mm)

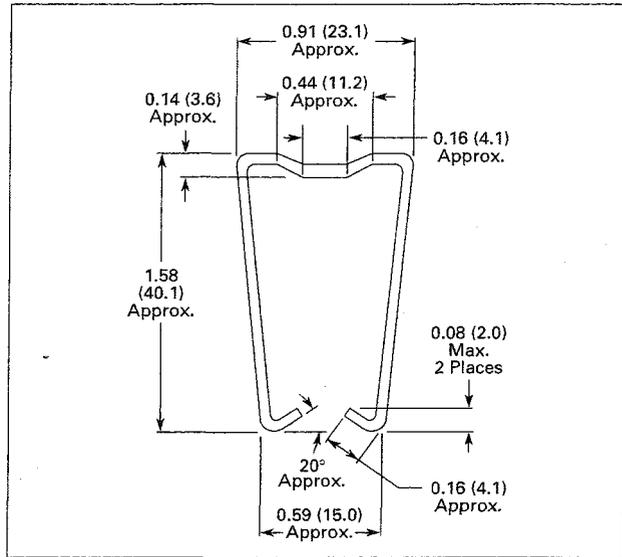


Figure 49-50. PMC-A1 Hold Down Clip — Approximate Dimensions in Inches (mm)

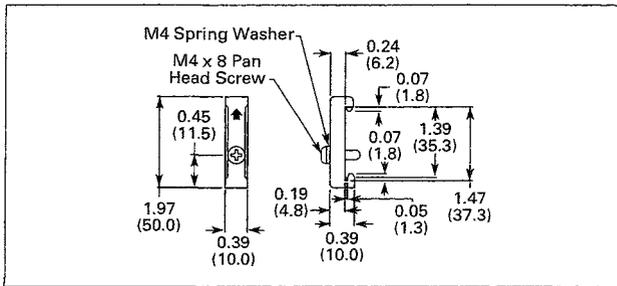


Figure 49-51. PFP-M DIN Rail End Stop — Approximate Dimensions in Inches (mm)

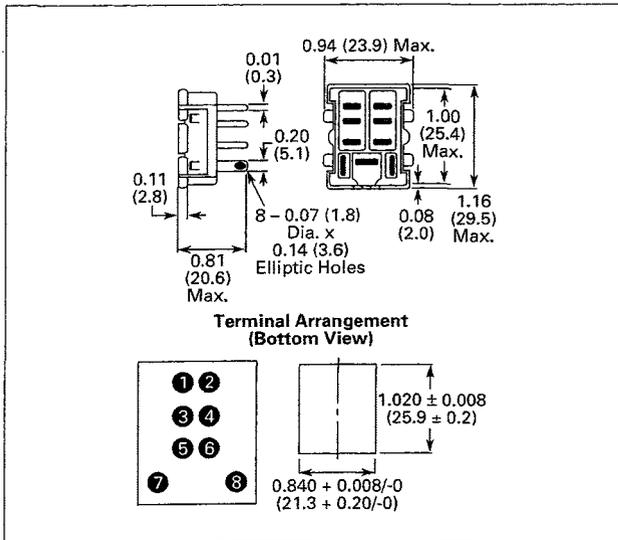


Figure 49-49. D7PA5 — Approximate Dimensions in Inches (mm)

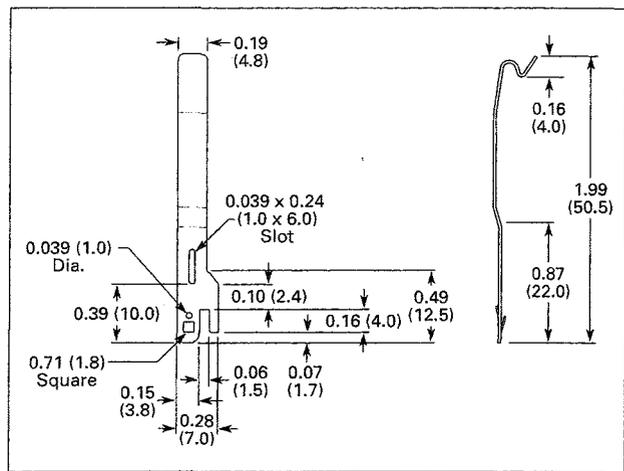


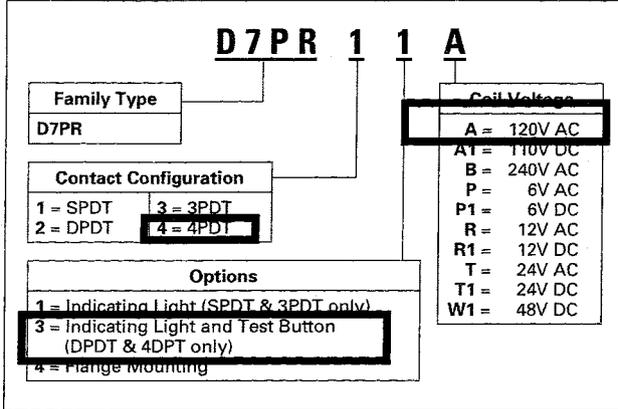
Figure 49-52. PYC-B2 Hold Down Spring — Approximate Dimensions in Inches (mm)

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D7 Series — Standard

Catalog Number Structure

Table 49-41. D7 Series Catalog Numbering System ①



① For deciphering Catalog Numbers. Do not use for ordering as not all combinations are readily available.

Product Selection

Table 49-43. D7 Product Selection ②

	Catalog Number	Price U.S. \$
Standard SPDT		
Coil Voltage:		
24V AC	D7PR1T	9.20
120V AC	D7PR1A	9.20
240V AC	D7PR1B	9.20
6V DC	D7PR1P1	9.20
12V DC	D7PR1R1	9.20
24V DC	D7PR1T1	9.20
SPDT with Indicating Light		
24V AC	D7PR11T	11.80
120V AC	D7PR11A	11.80
24V DC	D7PR11T1	11.80
SPDT Flange Mount		
120V AC	D7PR14A	9.80
Standard DPDT		
24V AC	D7PR2T	10.50
120V AC	D7PR2A	10.50
240V AC	D7PR2B	10.50
12V DC	D7PR2R1	10.50
24V DC	D7PR2T1	10.50
48V DC	D7PR2W1	10.50
110V DC	D7PR2A1	10.50
DPDT with Indicating Light and Test Button		
Coil Voltage:		
24V AC	D7PR23T	14.30
120V AC	D7PR23A	14.30
24V DC	D7PR23T1	14.30
DPDT Flange Mount		
24V AC	D7PR24T	11.20
120V AC	D7PR24A	11.20
Standard 3PDT		
120V AC	D7PR3A	13.20
12V DC	D7PR3R1	13.20
24V DC	D7PR3T1	13.20

Table 49-42. Relay/Socket Quick Reference

Relay Type	Socket	Hold Down Spring
D7PR1	D7PA2/D7PA5	PMC-A1
D7PR2	D7PA2/D7PA5	PMC-A1
D7PR3	D7PA3	PYC-B2
D7PR4	D7PA4	PYC-B2

	Std. Pack	Catalog Number	Price U.S. \$
3PDT with Indicating Light			
120V AC		D7PR31A	15.70
12V DC		D7PR31R1	15.70
24V DC		D7PR31T1	15.70
3PDT Flange Mount			
120V AC		D7PR34A	13.80
Standard 4PDT			
Coil Voltage:			
24V AC		D7PR4T	15.70
120V AC		D7PR4A	15.70
24V DC		D7PR4T1	15.70
110V DC		D7PR4A1	15.70
4PDT with Indicating Light and Test Button			
120V AC		D7PR43A	19.50
240V AC		D7PR43B	19.50
12V DC		D7PR43R1	19.50
24V DC		D7PR43T1	19.50
110V DC		D7PR43A1	19.50
4PDT Flange Mount			
120V AC		D7PR44A	16.30
24V DC		D7PR44T1	16.30
DIN Rail Mount Sockets			
1- and 2-Pole	10	D7PA2	6.45
3-Pole	10	D7PA3	8.75
4-Pole	10	D7PA4	9.30
Panel Mount Sockets			
1- and 2-Pole	10	D7PA5	3.90
Accessories			
Spring Clip	100	PMC-A1	1.35
DIN Rail End Stop	100	PEP-M	1.90
Hold Down Spring	100	PYC-B2	1.85

② Additional coil voltages available — consult Sales Office or Customer Support Center.

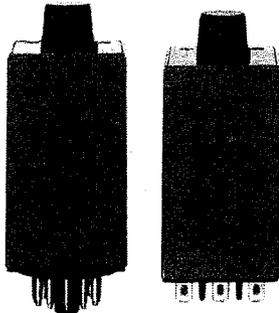
49

Discount Symbol 1CD1

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TR Series

TR Series



TR Timing Relay

Product Description

The upgraded TR Series timing relays are designed to meet most timing requirements by offering more flexibility in range of input voltage, timing range and functionality. Use a rotary switch to choose from 20 selectable time ranges from 0.1 second to 600 hours. We offer both a power triggered and signal triggered model — each with expanded operation modes. There is a green LED to indicate when power is ON and an orange LED when output is ON.

Features

- 20 time ranges and 10 timing functions
- Time delays from 0.1 sec to 600 hrs.
- Space-saving, compact package
- High repeat accuracy of ± 0.2%
- LED indication
- Standard 8- or 11-pin and 11-blade termination
- 2 Form C DPDT delayed output contacts
- 10A Contact Rating

Standards and Certifications



Technical Data and Specifications

Table 49-129. Contact Ratings

Item	Specification
Contact Configuration	2 Form C, DPDT (Delayed Output)
Allowable Voltage/Current	240V AC, 30V DC/10A
Max. Permissible Operating Frequency	1800 cycles per hour
Rated Load — Resistive Inductive Horsepower Rating	10A, 240V AC/30V DC 7A, 240V AC/30V DC 1/6 hp 120V AC, 1/3 hp 240V AC
Life — Electrical Mechanical	500,000 operations min. (resistive) 50,000,000 operations minimum

Table 49-130. General Specifications

Item	Specification
Operation System	Solid-State CMOS Circuit
Time Range	0.1 sec to 600 hours
Pollution Degree	2 (IE60664-1)
Overvoltage Category	III (IE60664-1)
Rated Operational Voltage 240AC 24AC 12DC	100 – 240V AC (50/60 Hz) 24V AC (50/60 Hz)/24V DC 12V DC
Voltage Tolerance 240AC 24AC 12DC	85 – 264V AC (50/60 Hz) 20.4 – 26.4V AC (50/60 Hz)/21.6 – 26.4V DC 10.8 – 13.2V DC
Input OFF Voltage	Rated Voltage x 10% Minimum
Ambient Operating Temperature	-4 – 149°F (-20 – 65°C)
Reset Time	100 mS maximum
Repeat Error	± 0.2%, ± 20 mS ①
Voltage Error	± 0.2%, ± 20 mS ①
Temperature Error	± 0.5%, ± 20 mS ①
Setting Error	± 10% maximum
Insulation Resistance	100M ohm minimum (500V DC)
Dielectric Strength Between power and output terminals Between contacts of different poles Between contacts of same pole	2000V AC, 1 minute 2000V AC, 1 minute 1000V AC, 1 minute
Vibration Resistance	10 – 55 Hz amplitude 0.5 mm; 2 hrs in each of 3 axes
Shock Resistance Operating extremes Damage limits — TRNP, TRFP TRNB, TRFB	10G 40G (3x in each of 3 axes) 10G (3x in each of 3 axes)
Power Consumption (Approx.) 240AC 120V AC/60 Hz 240V AC/60 Hz 24AC (AC/DC) 12DC	6.5 VA TRNP, TRNB/6.6 VA TRFP, TRFB 11.6 VA TRNP, TRNB/12.1 VA TRFP, TRFB 3.4 VA – 1.7W TRNP, TRNB/3.5 VA – 1.7W TRFP, TRFB 1.6W
Dimensions TRNP, TRFP TRNB, TRFB	1.58H x 1.42W x 3.07D in. (40H x 36W x 77.9D mm) 1.58H x 1.42W x 2.95D in. (40H x 36W x 74.9D mm)
Weight	TRNP — 87g; TRFP — 89g; TRNB, TRFB — 85g

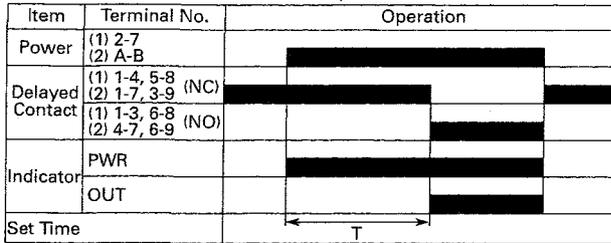
① For the value of the error against a preset time, whichever value is larger should apply.

Operation

TRNP, TRNB

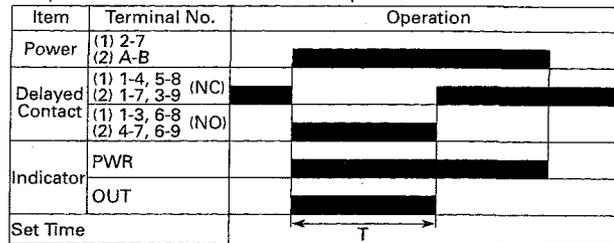
A: ON-Delay 1 (Power Start)

Set timer for desired delay, apply power to coil. Contacts transfer after preset time has elapsed, and remain in transferred position until timer is reset. Reset occurs with removal of power.



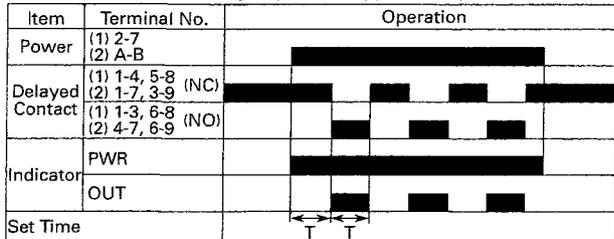
B: Interval (Power Start)

Set timer for desired delay, apply power to coil. Contacts transfer immediately, and return to original position after preset time has elapsed. Reset occurs with removal of power.



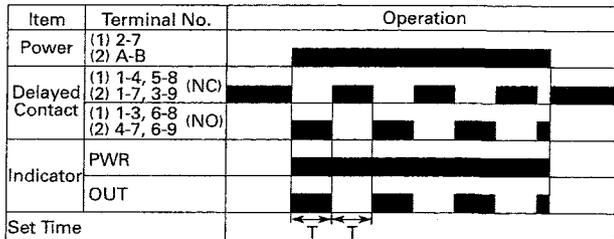
C: Cycle 1 (Power Start, OFF First)

Set timer for desired delay, apply power to coil. First transfer of contacts occurs after preset delay has elapsed, after the next elapse of preset delay contacts return to original position. The timer now cycles between on and off as long as power is applied (Duty Ratio 1:1).



D: Cycle 3 (Power Start, ON First)

Functions in same manner as Mode C, with the exception that first transfer of contacts occurs as soon as power is applied. The ratio is 1:1. Time On = Time Off.



Note: T=Set Time, Ta=Shorter Than Set Time,
(1):TRNP, (2): TRNB, (A): TRFP, (B): TRFB

Internal Connections

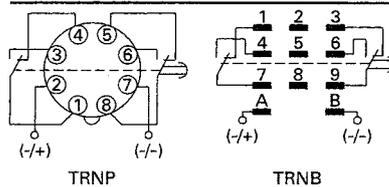


Figure 49-85. Operational Figures (1 of 2)

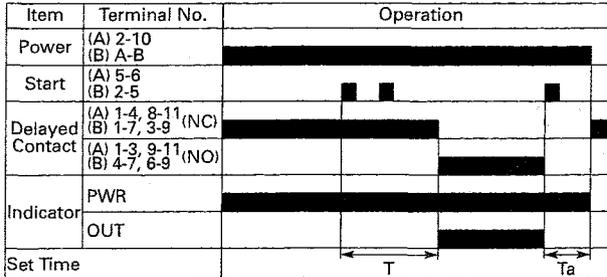
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TR Series

TRFP, TRFB

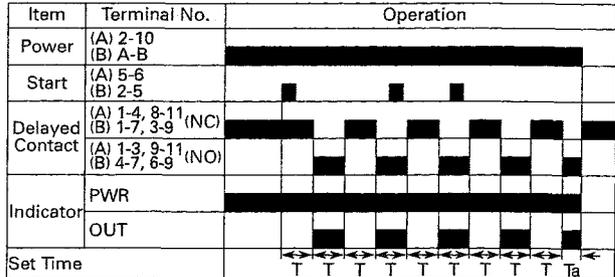
A: ON-Delay 2 (Signal Start)

When a preset time has elapsed after the start input turned on while power is on, the NO output contact goes on.



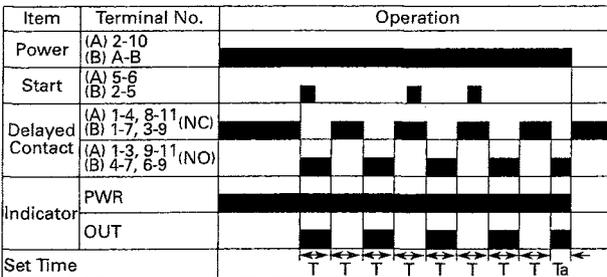
B: Cycle 2 (Signal Start, OFF First)

When the start input turns on while power is on, the output oscillates at a preset cycle (Duty Ratio 1:1), starting while the NO contact off.



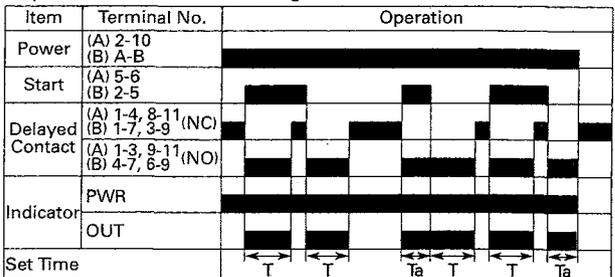
C: Cycle 4 (Signal Start, ON First)

When the start input turns on while power is on the NO contact goes on. The output oscillates at a preset cycle (Duty Ratio 1:1).



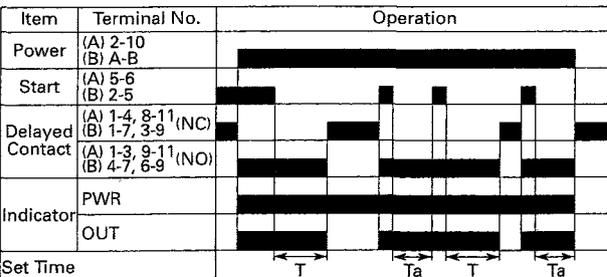
D: Signal ON/OFF-Delay

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed while the start input remains on, the output contact goes off. When the start input turns off, the NO contact goes on again. When a preset time has elapsed after the start input turned off, the NO contact goes off.



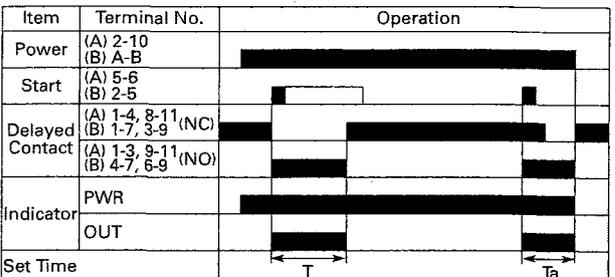
E: Signal OFF-Delay

When power is turned on while the start input is on, the NO output contact goes on. When a preset time has elapsed after the start input turned off, the NO output contact goes off.



F: One-Shot (Signal Start)

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed, the output contact goes off.



Note: T=Set Time, Ta=Shorter Than Set Time.
(1):TRNP, (2): TRNB, (A): TRFP, (B): TRFB.

Internal Connections

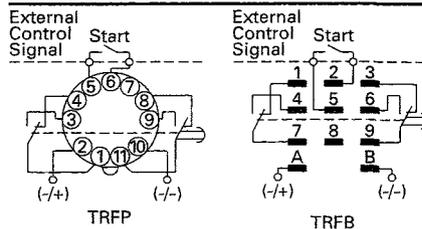


Figure 49-86. Operational Figures (2 of 2)

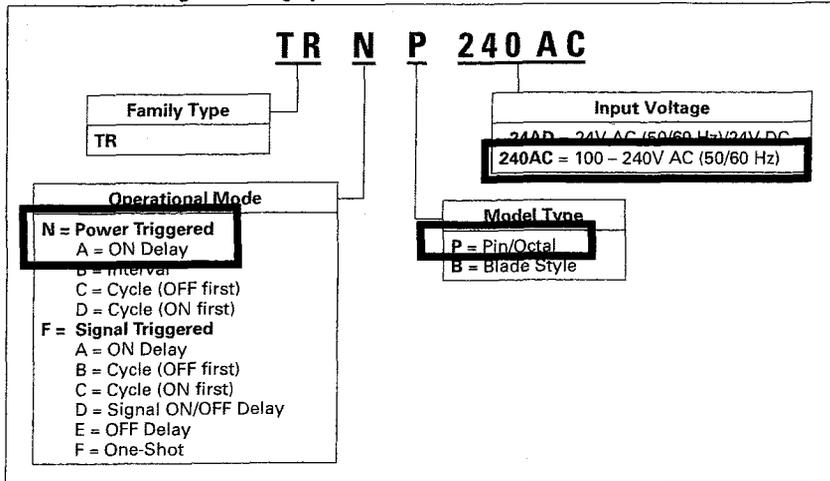
Accessories

Table 49-131. Sockets for Use with TR Timers — Standard Pack of 10

Timing Relay	Terminal Style	Catalog Number	Price U.S. \$
TRNP	8 Pin Octal	D3PA2	5.80
TRFP	11 Pin Octal	D3PA3	8.10
TRNB, TRFB	0.187" solder/QC terminals (Blade style)	D5PA2	12.60

Catalog Numbering System

Table 49-132. Catalog Numbering System



Dimensions

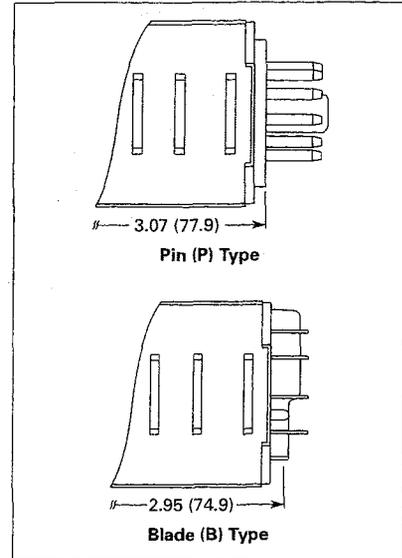


Figure 49-87. Approximate Dimensions in Inches (mm)

Product Selection

When Ordering Specify

- Catalog Number of Timing Relay

Table 49-133. TR Plug-In Timing Relays ①

Coil Voltage	Octal		Blade	
	Catalog Number	Price U.S. \$	Catalog Number	Price U.S. \$
Power Triggered				
24V AC/DC	TRNP24AD	145.00	TRNB24AD	145.00
100 – 240V AC	TRNP240AC	145.00	TRNB240AC	145.00
Signal Triggered				
24V AC/DC	TRFP24AD	168.00	TRFB24AD	168.00
100 – 240V AC	TRFP240AC	168.00	TRFB240AC	168.00

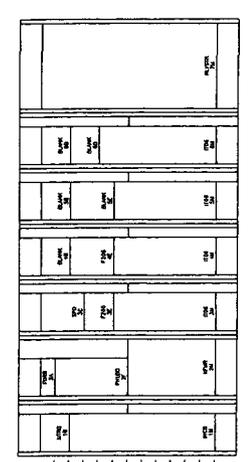
① Please see Page 54-6 to view Durant® multi-function timing relay products.



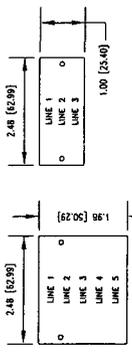
Eaton Corporation
Power & Controls Systems Operations
Tel: (949)-689-1107
Fax: (562)-366-9851
Email: christopherbutler@eaton.com

Section 3: Approval Drawings

LOW VOLTAGE MCC UNIT SCHEDULE																								
PROTECTION INFO			UNIT DATA				TERMINATIONS																	
ID	SECTION NUMBER	CIRCUIT NAME/PLATE	DEVICE MOUNTING (SEE NOTES)	DEVICE TYPE	RELAY STRUCTURE (RELISH)	DEVICES SIZE	POLES	BREAKER FRAME	RATING FLUG	TRIP	AMPERES	STARTER NEMA SIZE	ACTUAL LOAD SIZE	FULL LOAD AMPERES	OVERLOAD (HEATER OR SOLID STATE CURRENT RANGE)	CPT SIZE	ADDITIONAL ACCESSORIES, FEATURES, & NOTES	DEVICES (SPACES) REQUIREMENT (INCHES)	CONTROL CABLE ENTRY DIRECTION	POWER CABLE ENTRY DIRECTION	TYPE (SEE NOTES)	PHASE SIZE	# PER PHASE	DETAILED DRAWING REFERENCE CATALOG NUMBER
7	M																	72						



NAMEPLATE FEATURES
 NAMEPLATE COLOR IS BLACK / WHITE LETTERS
 NAMEPLATE ATTACHED WITH STAINLESS STEEL BELT TAPPING SCREWS
 1" x 3 LINE NAMEPLATE IS SUPPLIED AS STANDARD. 2" x 5 LINE SUPPLIED WHEN LINES 4 & 5 HAVE VALUES.
 STANDARD CHARACTER HEIGHT IS 0.875 (4.76)
 17 CHARACTERS MAXIMUM ON LINES 1, 3, 4 & 5 (STANDARD HEIGHT).
 15 CHARACTERS MAXIMUM ON LINE 2 (STANDARD HEIGHT).



**** WARNING ****
 THE SHIPPING SECTION EXCEEDS 80"
 SHIPPING SPLITS ARE REQUIRED

NOTES:
 1) DEVICE MOUNTING: D=DRAWOUT, F=FIXED
 2) TERMINATION TYPE: M=MECHANICAL, C=CRIMP

ITEM NUMBER: PXS02026904-0000
 ITEM NUMBER: 002
 REFERENCE NUMBER: MCC

1 Cutter-Hammer
 TITLE: PXS02026904
 TYPE: MCC-01
 FREEDOM 2100 MOTOR CONTROL CENTER

DATE: 1/11/10
 DATE: 1/11/10
 S.O.

THE INFORMATION ON THIS DOCUMENT WAS CREATED BY THE INFORMATION ON THIS DOCUMENT IS ONLY TO BE USED AND IS ONLY TO BE USED WHICH IT WAS SUPPLIED.

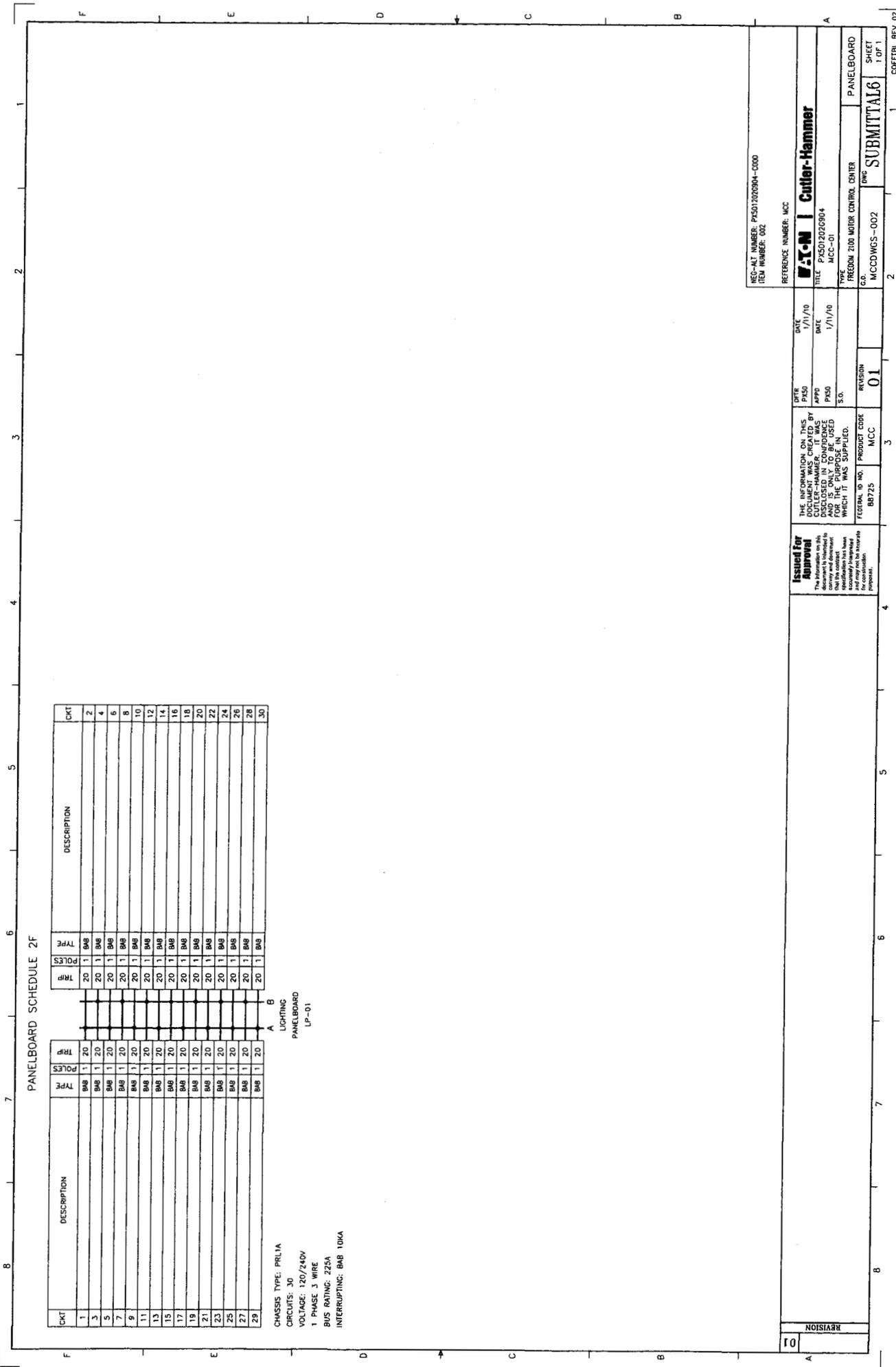
PRODUCT CODE: MCC
 REVISION: 01

UNIT SCHEDULE SHEET 2 OF 2

REVISION: 01

88725 MCC

UNIT SCHEDULE SHEET 2 OF 2



PANELBOARD SCHEDULE 2F

CKT	DESCRIPTION	TYPE	POLES	TRIP	DESCRIPTION	TYPE	POLES	TRIP	CKT
1		BAB	1	ZO					2
2		BAB	1	ZO					4
3		BAB	1	ZO					6
4		BAB	1	ZO					8
5		BAB	1	ZO					10
6		BAB	1	ZO					12
7		BAB	1	ZO					14
8		BAB	1	ZO					16
9		BAB	1	ZO					18
10		BAB	1	ZO					20
11		BAB	1	ZO					22
12		BAB	1	ZO					24
13		BAB	1	ZO					26
14		BAB	1	ZO					28
15		BAB	1	ZO					30
16		BAB	1	ZO					
17		BAB	1	ZO					
18		BAB	1	ZO					
19		BAB	1	ZO					
20		BAB	1	ZO					
21		BAB	1	ZO					
22		BAB	1	ZO					
23		BAB	1	ZO					
24		BAB	1	ZO					
25		BAB	1	ZO					
26		BAB	1	ZO					
27		BAB	1	ZO					
28		BAB	1	ZO					
29		BAB	1	ZO					
30		BAB	1	ZO					

CHASSIS TYPE: PRL1A
 CIRCUITS: 30
 VOLTAGE: 120/240V
 1 PHASE 3 WIRE
 BUS RATING: 225A
 INTERRUPTING: BAB 10KA

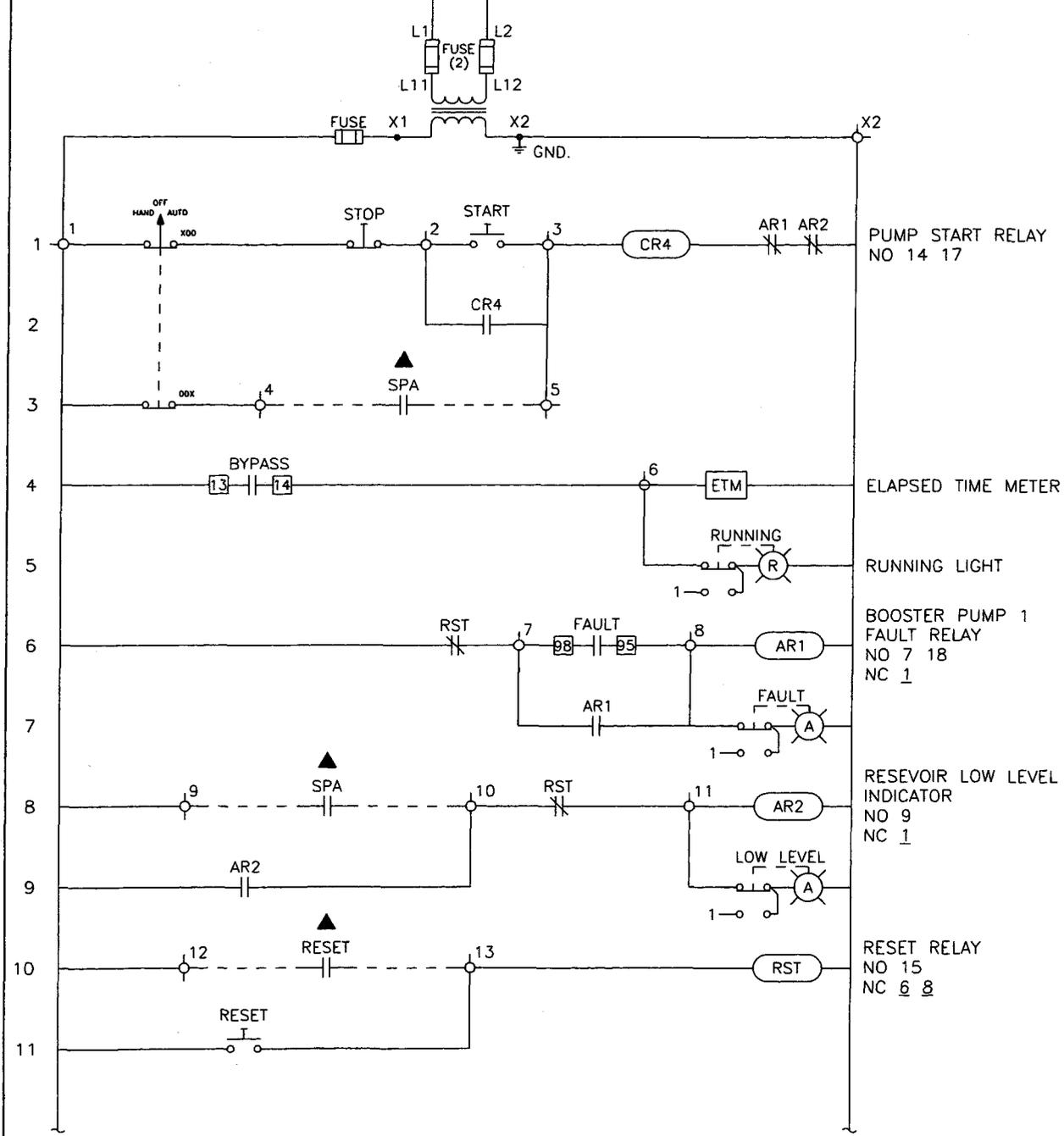
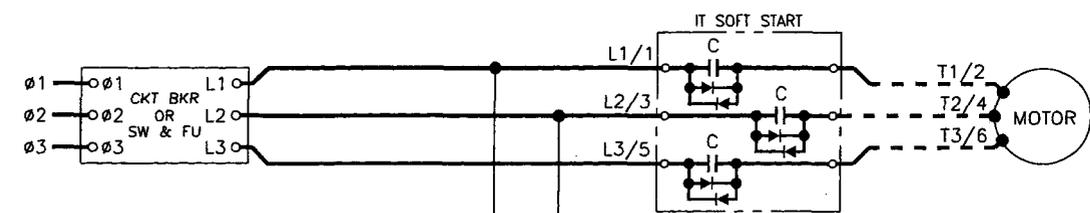
NEG-ALT NUMBER: PX501202090M-C000 ITEM NUMBER: 002		REFERENCE NUMBER: MCC	
DATE: 1/11/10 BY: PXS0		DATE: 1/11/10 BY: PXS0	
TITLE: PX5012020904 MCC-01		TITLE: Cutter-Hammer	
TYPE: FREEDOM 2100 MOTOR CONTROL CENTER		TYPE: FREEDOM 2100 MOTOR CONTROL CENTER	
FEDERAL ID NO.: 88725 PRODUCT CODE: MCC		FEDERAL ID NO.: MCC PRODUCT CODE: MCC	
REVISION: 01		REVISION: 01	
C.O. MCCDWGS-002		C.O. MCCDWGS-002	
SHEET 1 OF 1		SHEET 1 OF 1	

01



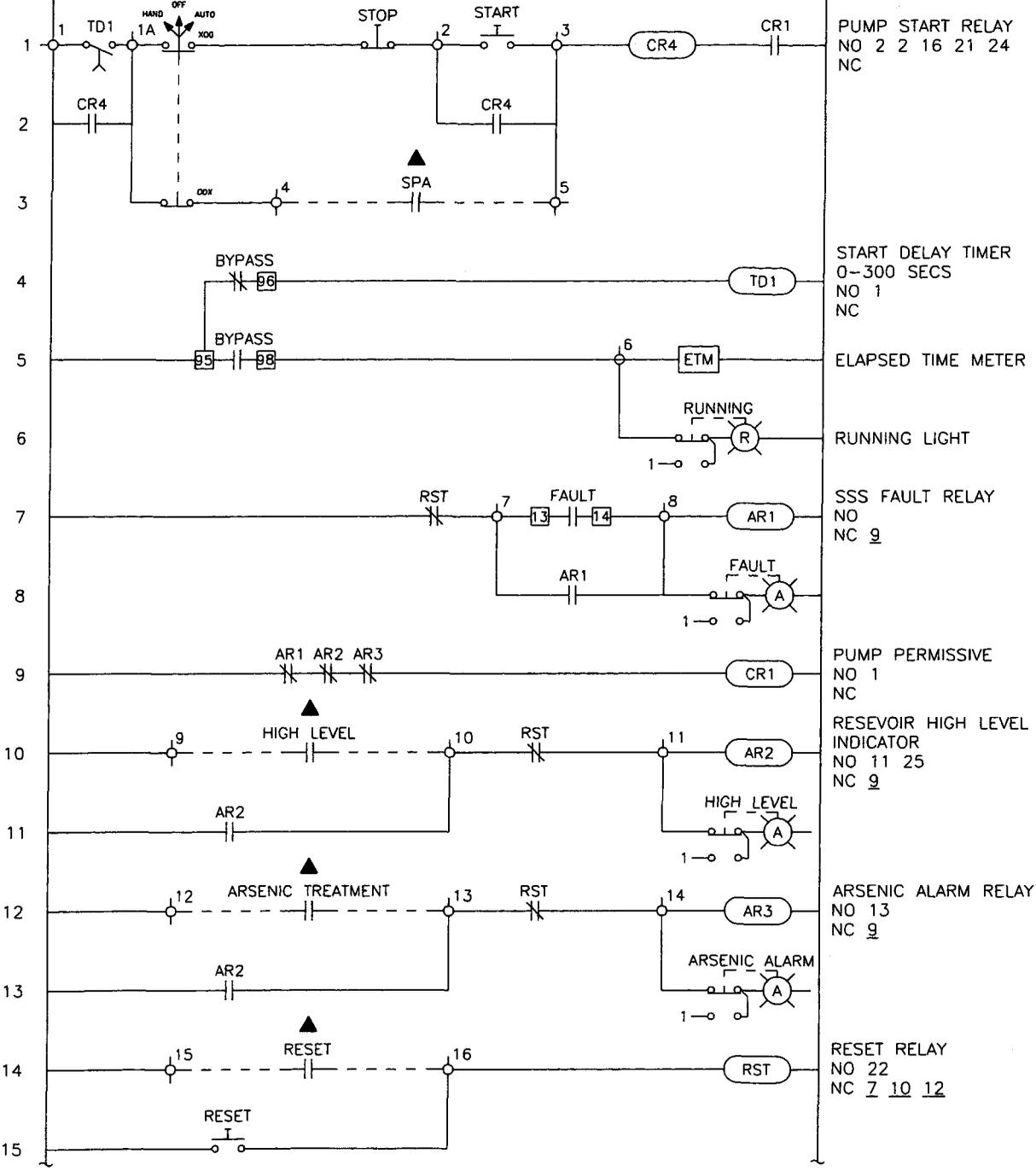
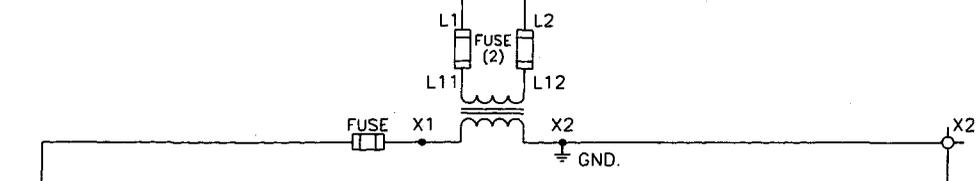
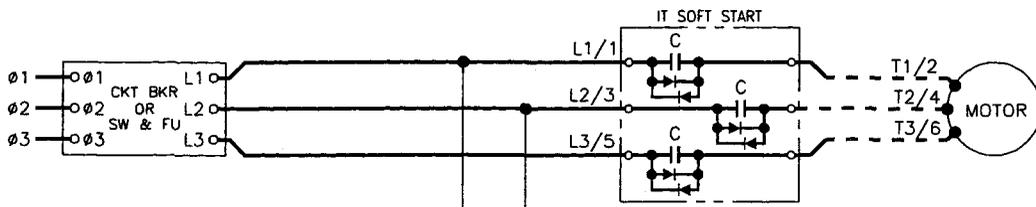
Eaton Corporation
Power & Controls Systems Operations
Tel: (949)-689-1107
Fax: (562)-366-9851
Email: christopherbutler@eaton.com

Section 4: Wiring Schematics

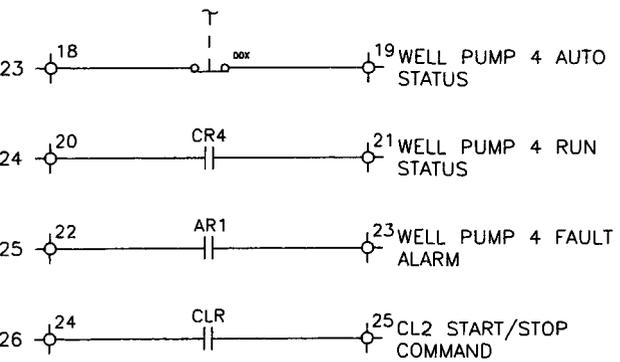
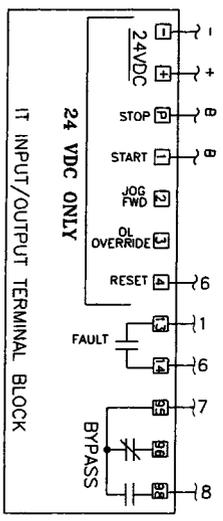
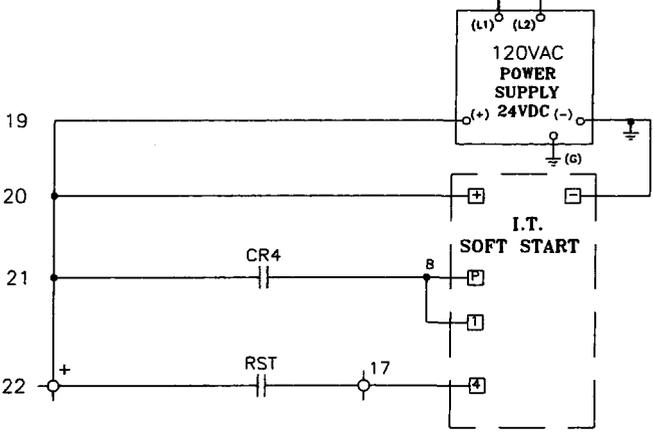
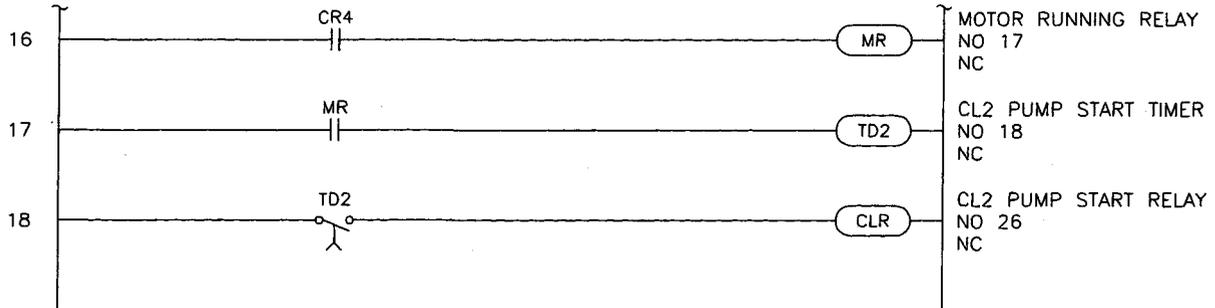


Cutler-Hammer		SANTA FE SPRINGS, CA	
DATE		1/11/10	
TITLE		MONTE VISTA SSS-BPOX	
TYPE		SCHEMATIC	
DWC		WD-1	
SHEET		1 OF 2	
G.O.		SPX0127200	
DWC		A	
REVISION		1	
FEDERAL ID NO		PRODUCT CODE	
CF		CF	
Typical for BP1- 3			
REVISION			
1			

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Cutler-Hammer		SANTA FE SPRINGS, CA	
DATE	1/11/10	TITLE	MONTE VISTA SSS-WP04
DFTR	HECHT	TYPE	SCHEMATIC
APPD		G.O.	SPX0127200
APPD		DWG	WD-3
REVISION	1	DWG SIZE	A
FEDERAL ID NO	CF	SHEET	1 OF 2
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REVISION			
1			



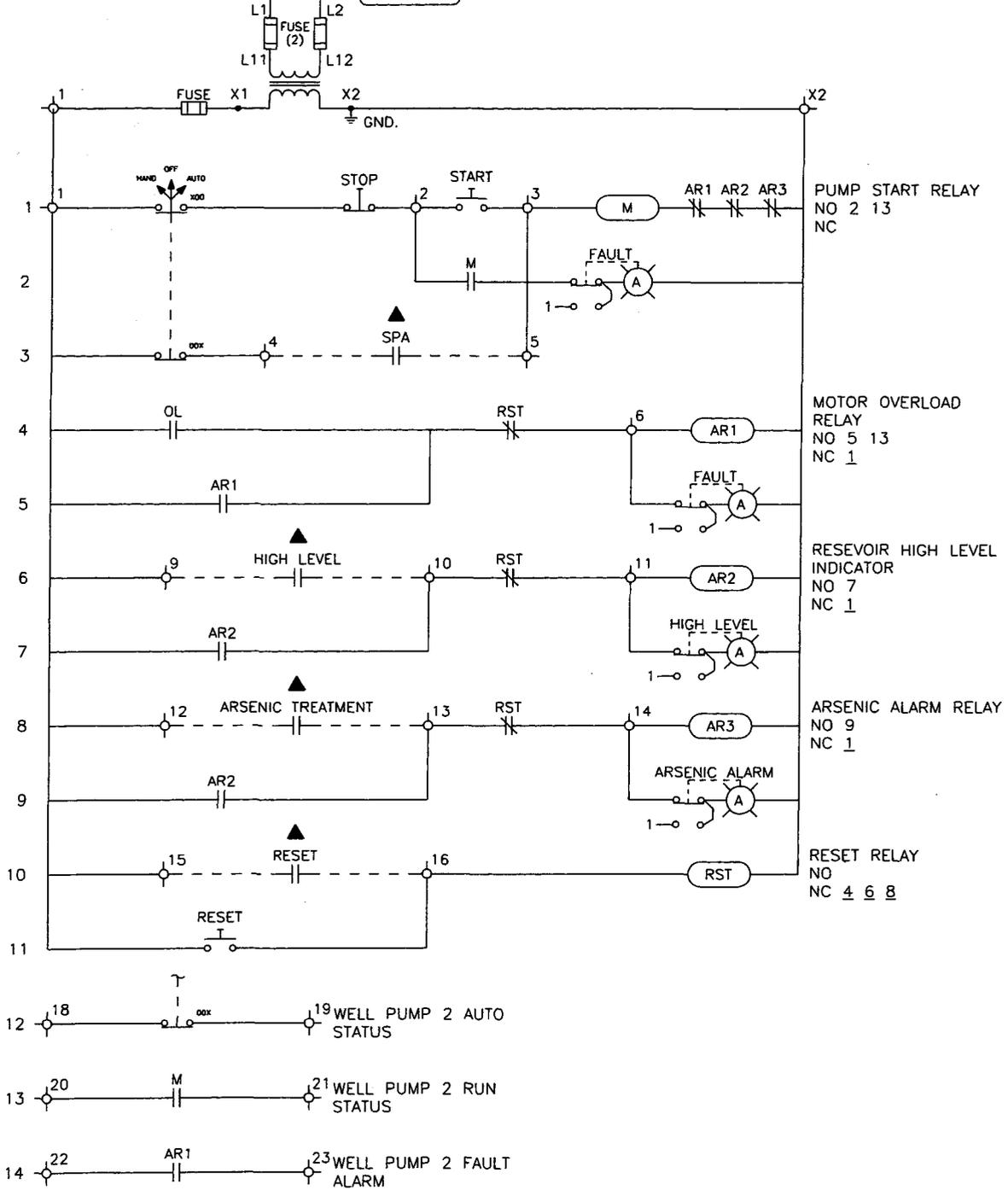
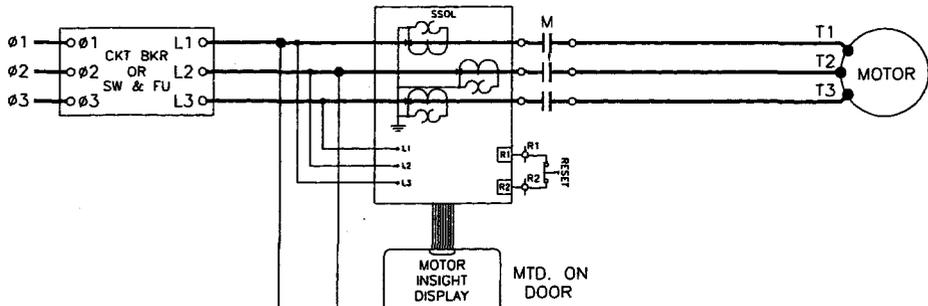
MOTOR RUNNING RELAY
NO 17
NC

CL2 PUMP START TIMER
NO 18
NC

CL2 PUMP START RELAY
NO 26
NC

DATE		1/11/10	
DTR		HECHT	
APPD		APPD	
APPD		APPD	
REVISION		1	
PRODUCT CODE		CF	
FEDERAL ID NO			
DATE		1/11/10	
TITLE		MONTE VISTA SSS-BPOX	
TYPE		SCHEMATIC	
G.O.		SPX0127200	
DWG		WD-3	
SHEET		2 OF 2	

REVISION	1
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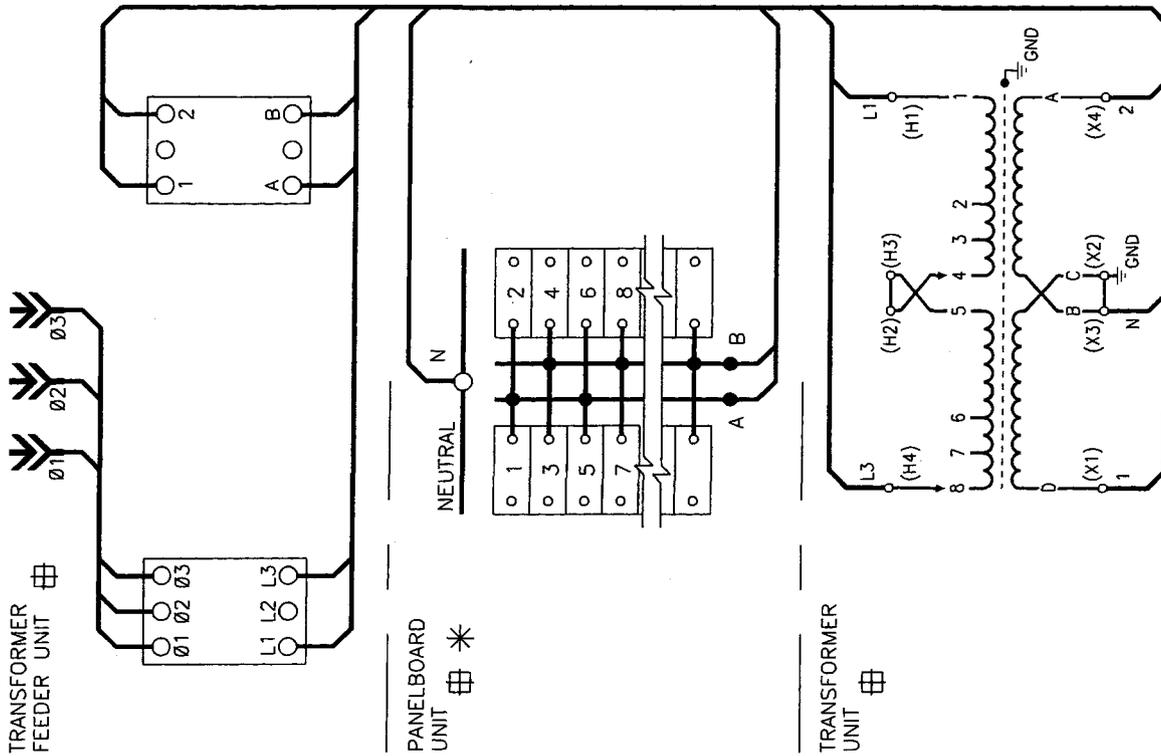
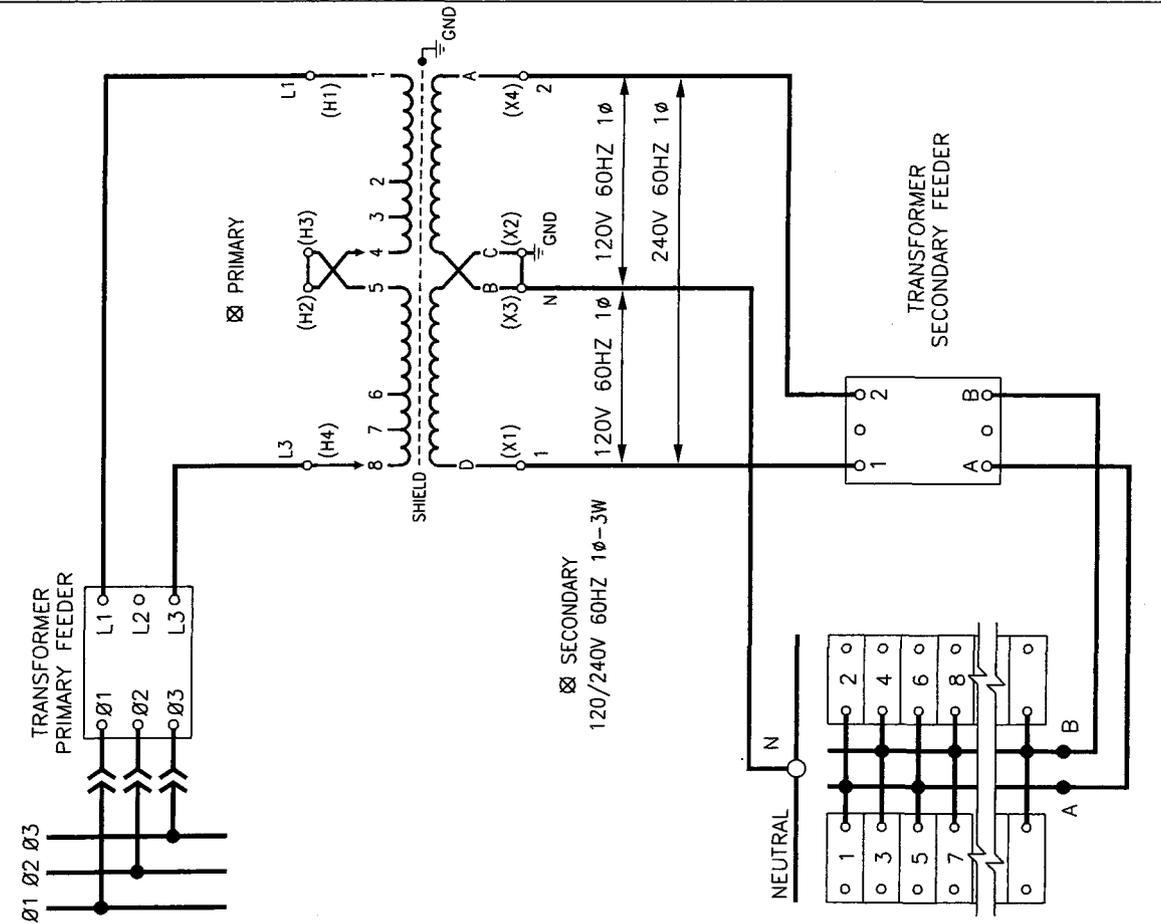


NOTE:

SEE INSTRUCTIONS MANUAL BEFORE OPERATION.

▲ REMOTE DEVICES

		Cutler-Hammer		WELL PUMP 02 - ATL-WP02		WD-4		1 OF 1	
DATE 1/12/10		TITLE WELL PUMP 02 - ATL-WP02		TYPE SCHEMATIC		G.O. SPX0127200		DWG WD-4	
DFTR HECHT		DATE		DATE		DATE		DWG SIZE A	
APPD		APPD		APPD		REVISION 1		PRODUCT CODE CF	
FEDERAL ID NO		REVISION		PRODUCT CODE		DATE		FILE:	
THE INFORMATION ON THIS DOCUMENT IS CREATED BY CUTLER-HAMMER. IT IS DISCLOSED IN CONFIDENCE AND IS ONLY TO BE USED FOR THE PURPOSE IN WHICH IT IS SUPPLIED		REVISION 1		PRODUCT CODE CF		DATE		FILE:	

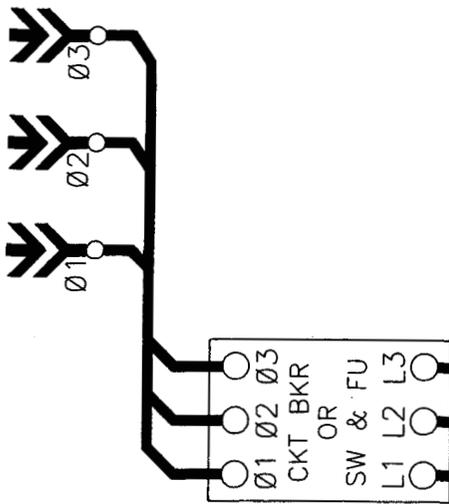


MOTOR CONTROL CENTER STANDARD UNIT WIRING DIAGRAM
 1Ø-3W PANELBOARD, OPEN CORE XFMR, CIRCUIT BREAKER OR SW & FU
 ⌘ -SEE UNIT SPECIFICATION FORM FOR UNIT ARRANGEMENT
 * -SEE PANELBOARD LAYOUT FORM FOR BREAKER ARRANGEMENT
 ⊗ -PRIMARY AND SECONDARY WIRED PER TRANSFORMER NAMEPLATE

C Cutler-Hammer
 FREEDOM 2100/ADVANTAGE
 MOTOR CONTROL CENTER
 REV DRAWING NUMBER
C 5A10397 **CC**

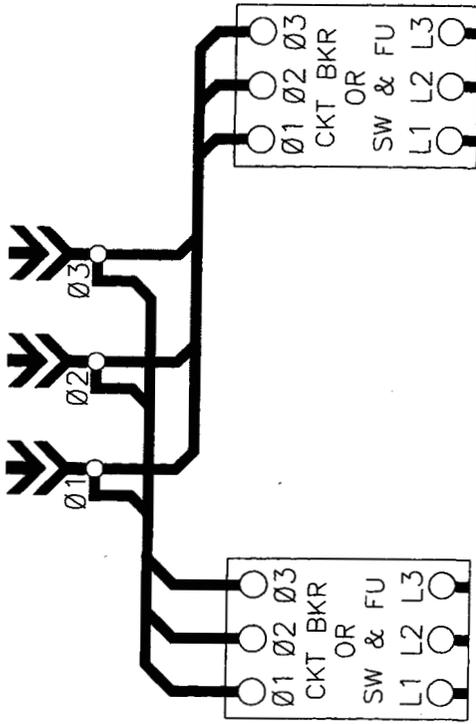
COMB A

VERTICAL BUS



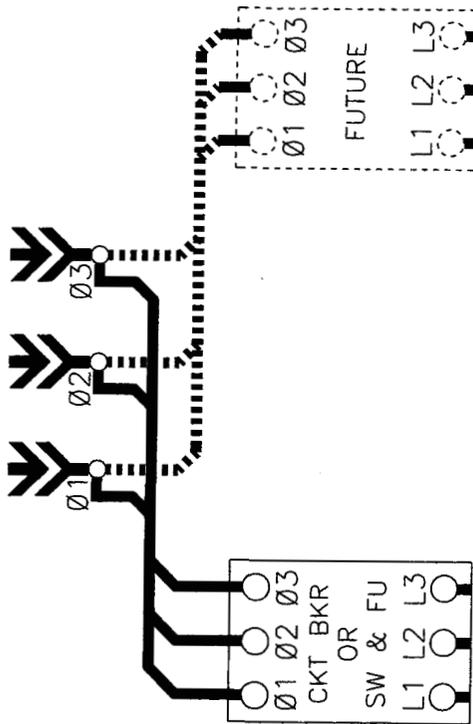
COMB B

VERTICAL BUS



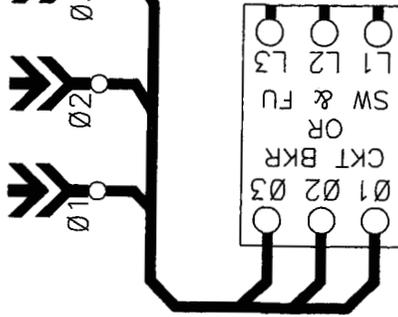
COMB C

VERTICAL BUS



COMB D

VERTICAL BUS



MOTOR CONTROL CENTER STANDARD UNIT WIRING DIAGRAM

COMBINATION A: SINGLE BREAKER OR SWITCH & FUSE 3 POLE

COMBINATION B: DUAL BREAKERS OR SWITCH & FUSE 3 POLE

COMBINATION C: SINGLE BREAKER OR SWITCH & FUSE 3 POLE WITH FUTURE SPACE

COMBINATION D: SINGLE BREAKER OR SWITCH & FUSE 3 POLE (6" UNIT).

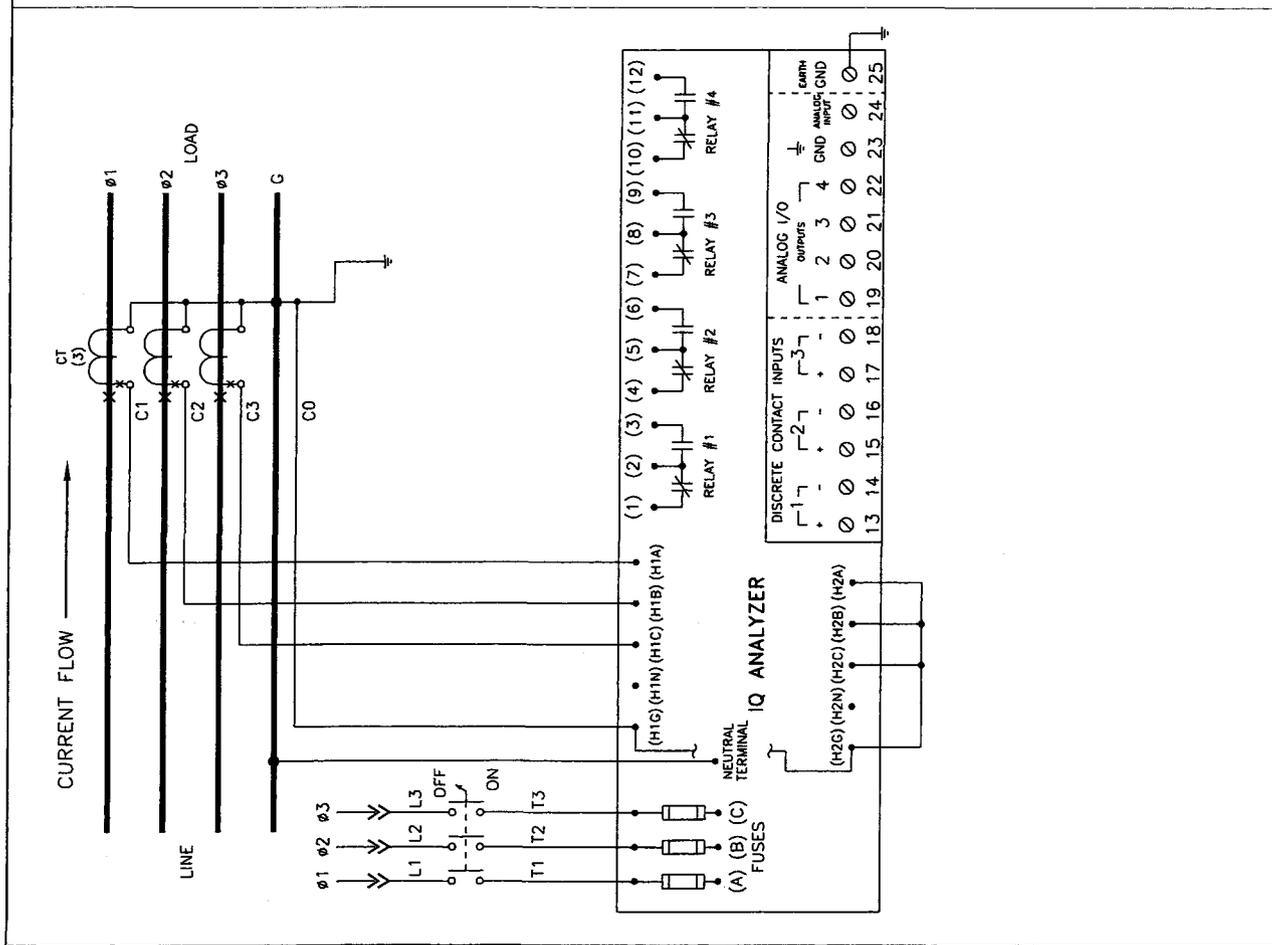
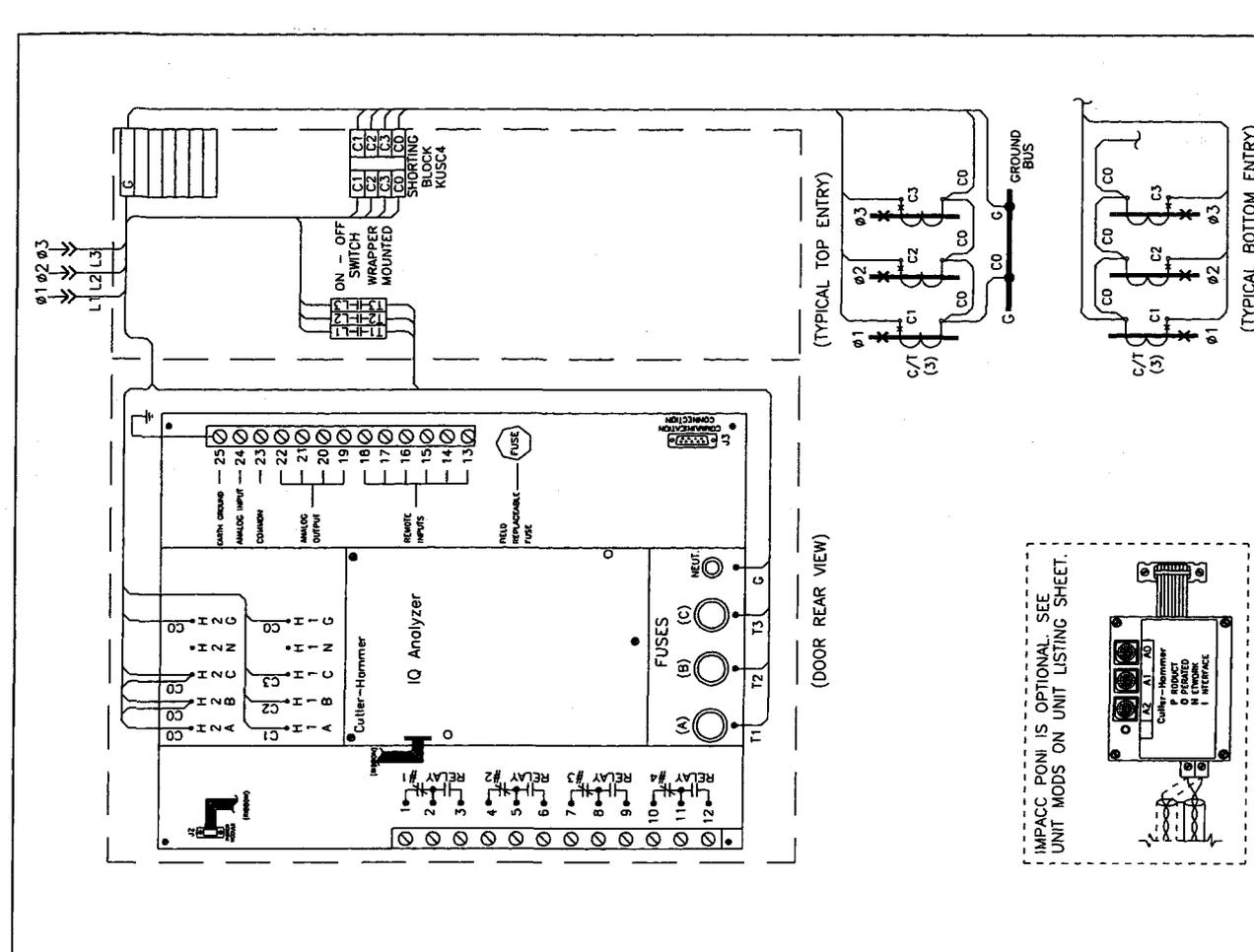
A-C Cutler-Hammer
FREEDOM 2100/ADVANTAGE
MOTOR CONTROL CENTER

REV
DRAWING NUMBER

G

5599A85

CC



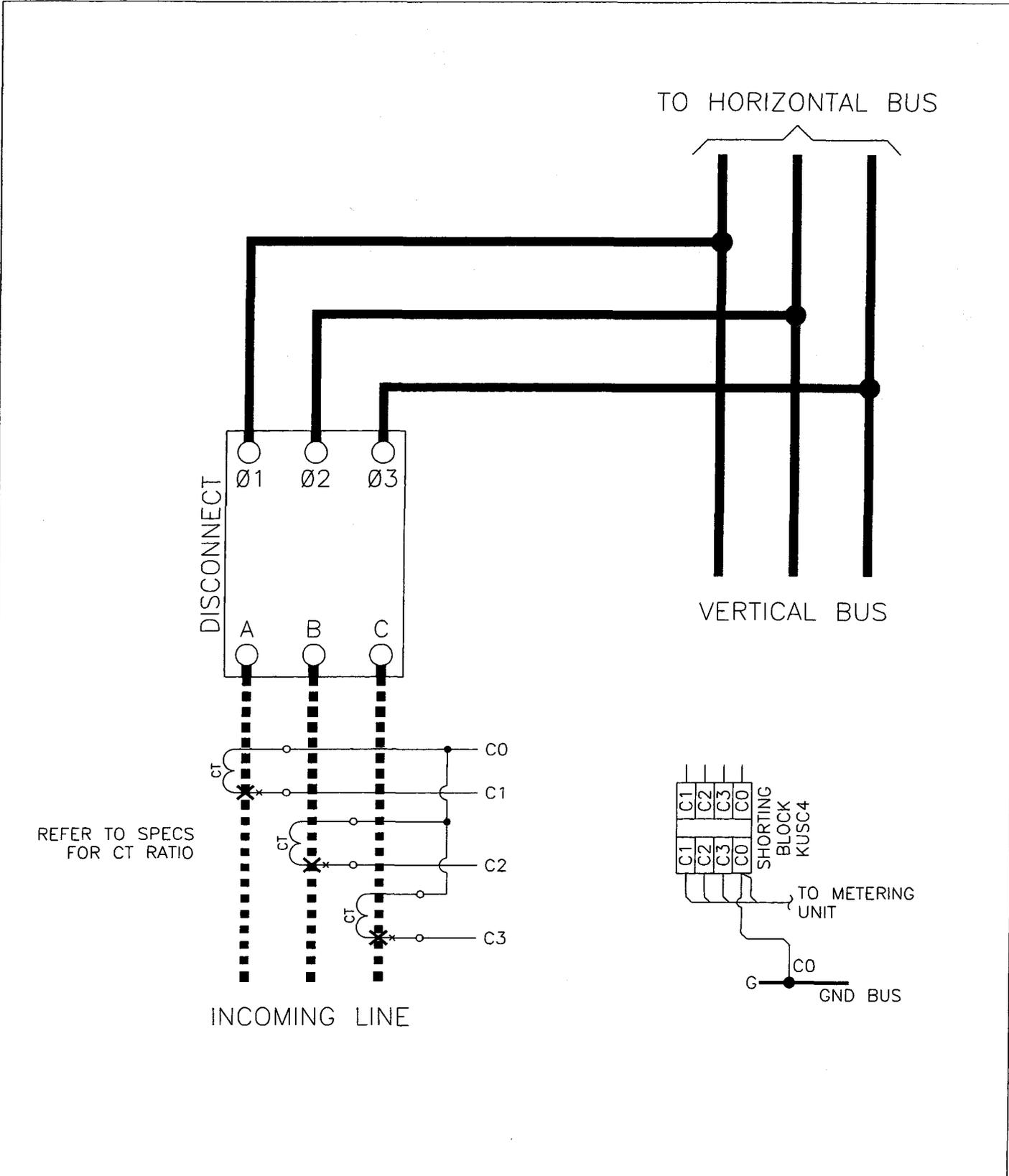
WATSON | Cutler-Hammer
 FAYETTEVILLE, NC

TITLE IQ ANALYZER 3 PHASE 3 WIRE (UP TO 600V) CT'S ON LOAD
 TYPE MOTOR CONTROL CENTER
 G.O. STANDARD

DATE 4/15/03
 APPD
 REVISION 2

FEDERAL ID NO
 PRODUCT CODE
 DWG 281734
 1 OF 1

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	APPD	DATE	TITLE		INCOMING MAIN DISCONNECT BOTTOM ENTRY FIXED ASSEMBLY WITH CTs
	APPD	DATE	TYPE		MOTOR CONTROL CENTER
FEDERAL ID NO	PRODUCT CODE	REVISION	G.O.	DWG	SCHEMATIC
		1	STANDARD	281911	1 OF 1

EATON

TAB 3 Safety Switches

Neg# PX501202G904 Alt# C000

01/09/10

08:43:30

Customer Bill of Material

4 Safety Switches
DH364URK,
BE90B, 600 VAC, 200 Amps, 3-Pole, Non-Fusible with Neutral, NEMA 3R Enclosure

1 Heavy Duty Switch - Non-Fusible, 3-Pole, 600 VAC, 200 A, NEMA 3R (DH364URK)
1 Neutral Assembly (Factory Installed) (DTN)

Designations: DS-BP01, DS-BP02, DS-BP03, DS-WP04

1 Safety Switches
DH362URK,
BE90B, 600 VAC, 60 Amps, 3-Pole, Non-Fusible with Neutral, NEMA 3R Enclosure

1 Heavy Duty Switch - Non-Fusible, 3-Pole, 600 VAC, 60 A, NEMA 3R (DH362URK)
1 Neutral Assembly (Factory Installed) (DTN)

Designations: DS-WP02

1 Safety Switches
DH361URK,
BE90B, 600 VAC, 30 Amps, 3-Pole, Non-Fusible with Neutral, NEMA 3R Enclosure

1 Heavy Duty Switch - Non-Fusible, 3-Pole, 600 VAC, 30 A, NEMA 3R (DH361URK)
1 Neutral Assembly (Factory Installed) (DTN)

Designations: DS-AC01

All orders must be released for manufacture within 90 days of date of order entry. If approval drawings are required, drawings must be returned approved for release within 60 days of mailing. If drawings are not returned accordingly, and/or if shipment is delayed for any reason, the price of the order will increase by 1.0% per month or fraction thereof for the time the shipment is delayed.

Safety Switch General Information

Global Specifications

System Voltage	600 VAC
Switch Type	Single Throw - Heavy Duty
Poles/Blades	3-Pole
Amperage	60
Protection	Non-Fusible with Neutral
Enclosure Type	NEMA 3R
Special Paint	ANSI-61 (Gray) Standard
Switch Lugs	Standard
Fungus Proof Treatment	N
Lock-On Provision	N
Trapped Key Interlock	None
Fuse Pullers	N
Control Pole	N
Ground Lugs	N
316 Stainless	N
Stainless Mechanism	N
Mill Duty	N

Cover Controls

Nameplate

Field Installed Kits

Safety Switch Catalog No.

DH362URKN

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	APPROVED BY _____ DATE _____		JOB NAME Monte Vista Booster Station DESIGNATION DS-WP02		
	VERSION 6.9		TYPE		DRAWING TYPE Customer Appr.
NEG-ALT NUMBER PX501202G904-C000	REVISION	DWG SIZE A	G.O. SPX0127200	ITEM 005	SHEET 1 OF 1

Safety Switch General Information

Global Specifications

System Voltage	600 VAC
Switch Type	Single Throw - Heavy Duty
Poles/Blades	3-Pole
Amperage	30
Protection	Non-Fusible with Neutral
Enclosure Type	NEMA 3R
Special Paint	ANSI-61 (Gray) Standard
Switch Lugs	Standard
Fungus Proof Treatment	N
Lock-On Provision	N
Trapped Key Interlock	None
Fuse Pullers	N
Control Pole	N
Ground Lugs	N
316 Stainless	N
Stainless Mechanism	N
Mill Duty	N

Cover Controls

Nameplate

Field Installed Kits

Safety Switch Catalog No.
DH361URKN

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	PhillipL Fulmer	01/09/10			
	APPROVED BY	DATE	JOB NAME	Monte Vista Booster Station	
			DESIGNATION	DS-AC01	
	VERSION		TYPE	DRAWING TYPE	
	6.9			Customer Appr.	
NEG-ALT NUMBER	REVISION	DWG SIZE	G.O.	ITEM	SHEET
PX501202G904-C000		A	SPX0127200	006	1 OF 1

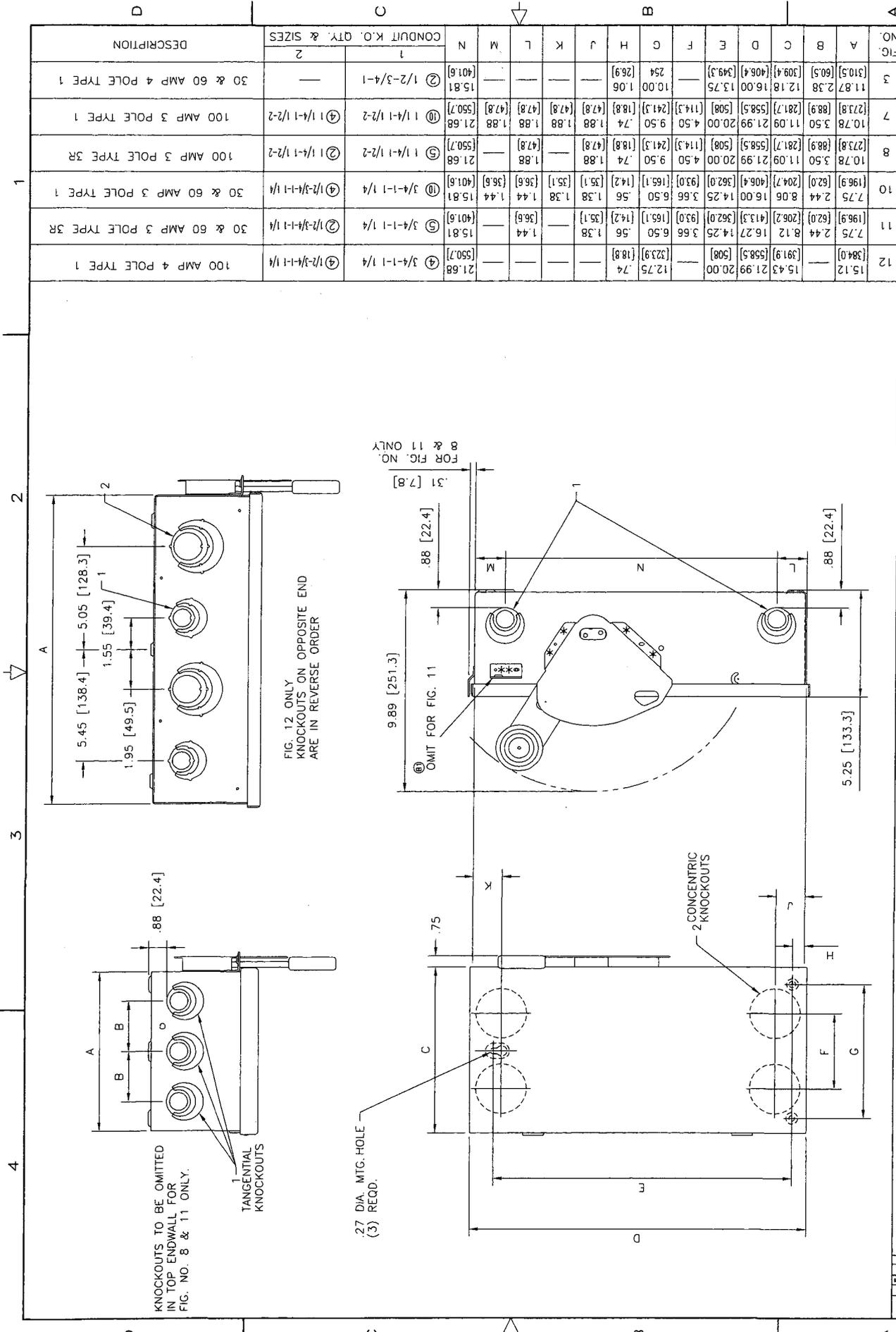


FIG. NO.	CONDUIT K.O. QTY. & SIZES		DESCRIPTION
	1	2	
12	④ 3/4-1-1/4	④ 1/2-3/4-1-1/4	100 AMP 4 POLE TYPE 1
11	⑤ 3/4-1-1/4	② 1/2-3/4-1-1/4	30 & 60 AMP 3 POLE TYPE 3R
10	⑩ 3/4-1-1/4	④ 1/2-3/4-1-1/4	30 & 60 AMP 3 POLE TYPE 1
8	⑤ 1/4-1-1/2	② 1/4-1-1/2	100 AMP 3 POLE TYPE 3R
7	⑩ 1/4-1-1/2	④ 1/4-1-1/2	100 AMP 3 POLE TYPE 1
3	② 1/2-3/4-1	—	30 & 60 AMP 4 POLE TYPE 1

DATE	10/5/82	DATE	10/5/82
APPRO. BY	J. BISCHOF	APPRO. BY	J. BISCHOF
DESIGNER	EDDIE CARSON	SCALE	1=3
PRODUCT NO.	DV89-1069	REVISION	BT
FEDERAL NUMBER	95-955 DWG	PRODUCT CODE	
SIZE	C	DWG. NO.	95-955
SHEET NO.	1	OF 1	

REVISION	BT	DATE	10/5/82
BY		BY	
DATE		DATE	

CUTLER-HAMMER
PITTSBURGH, PA.
DIMENSION SHEET 30, 60, & 100 AMP
TYPE 1 & 3
TYPE 3P & 4P

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DRAWN BY: EDDIE CARSON
CHECKED BY: J. BISCHOF
DATE: 10/5/82
SCALE: 1=3
PRODUCT NO.: DV89-1069
FEDERAL NUMBER: 95-955 DWG
REVISION: BT

OMPCN
REV. 5/15/88

Safety Switch General Information

Global Specifications

System Voltage	600 VAC
Switch Type	Single Throw - Heavy Duty
Poles/Blades	3-Pole
Amperage	200
Protection	Non-Fusible with Neutral
Enclosure Type	NEMA 3R
Special Paint	ANSI-61 (Gray) Standard
Switch Lugs	Standard
Fungus Proof Treatment	N
Lock-On Provision	N
Trapped Key Interlock	None
Fuse Pullers	N
Control Pole	N
Ground Lugs	N
316 Stainless	N
Stainless Mechanism	N
Mill Duty	N

Cover Controls

Nameplate

Field Installed Kits

Safety Switch Catalog No.
DH364URKN

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	<p>APPROVED BY</p>	<p>DATE</p>	<p>JOB NAME Monte Vista Booster Station</p>	<p>DESIGNATION DS-BP01, DS-BP02, DS-BP03, DS-WP04</p>	
	<p>VERSION 6.9</p>		<p>TYPE</p>	<p>DRAWING TYPE Customer Appr.</p>	
<p>NEG-ALT NUMBER PX501202G904-C000</p>	<p>REVISION</p>	<p>DWG SIZE A</p>	<p>G.O. SPX0127200</p>	<p>ITEM 004</p>	<p>SHEET 1 OF 1</p>

Eaton
CUTLER-HAMMER
 PITTSBURGH, PA.
 DIMENSION SHEET 30, 60, & 100 AMP
 TYPE 1 & 3 3P & 4P

DATE: 10/5/82
 DRAWN BY: EDDIE CARSON
 CHECKED BY: J. BISCHOF
 APPR.:
 PROJECT NO.: 95-955-DWG
 FEDERAL ID NUMBER: DV89-1069
 SCALE: 1=3
 REVISION: B1

NO.	REVISION	DATE	BY	APPR.
1		12/17/84	REDDMAN	
2		12/13/84	REDDMAN	
3		12/13/84	REDDMAN	
4		12/13/84	REDDMAN	

A NO.	B FIG.	C CONDUIT K.O. QTY. & SIZES		D DESCRIPTION													
		1	2	N	M	L	K	J	H	G	F	E	D	C	B	A	
12	15.12	④ 3/4-1-1/4	④ 1/2-3/4-1-1/4	21.68	—	—	—	—	—	—	—	—	—	—	—	—	100 AMP 4 POLE TYPE 1
11	7.75	⑤ 3/4-1-1/4	② 1/2-3/4-1-1/4	15.81	1.44	—	—	—	—	—	—	—	—	—	—	—	30 & 60 AMP 3 POLE TYPE 3R
10	7.75	⑩ 3/4-1-1/4	④ 1/2-3/4-1-1/4	15.81	1.44	36.6	36.6	35.1	1.38	1.38	5.6	3.66	4.25	16.00	8.06	2.44	30 & 60 AMP 3 POLE TYPE 1
8	10.78	⑤ 1/4-1-1/2	② 1/4-1-1/2	21.68	—	—	—	—	—	—	—	—	—	—	—	—	100 AMP 3 POLE TYPE 3R
7	10.78	⑩ 1/4-1-1/2	④ 1/4-1-1/2	21.68	1.88	47.8	47.8	47.8	1.88	1.88	7.4	1.88	4.50	20.00	8.89	3.50	100 AMP 3 POLE TYPE 1
3	11.87	② 1/2-3/4-1	—	15.81	—	—	—	—	—	—	—	—	—	—	—	—	30 & 60 AMP 4 POLE TYPE 1

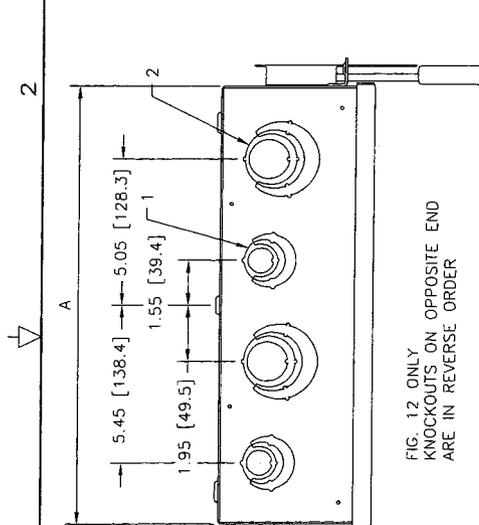
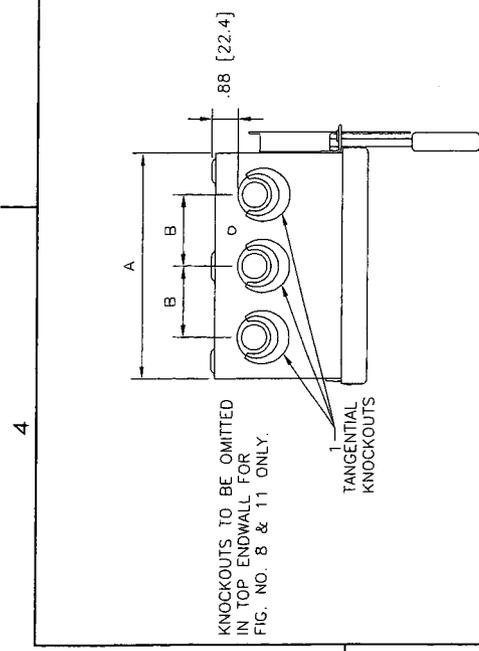
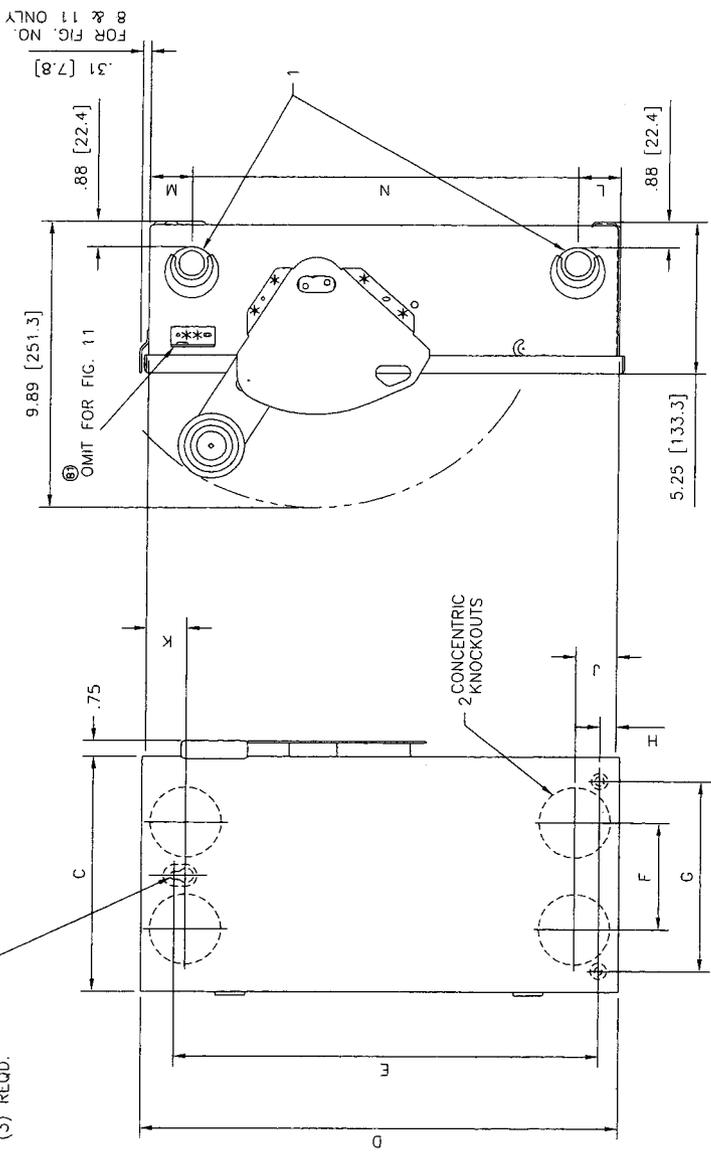


FIG. 12 ONLY
 KNOCKOUTS ON OPPOSITE END
 ARE IN REVERSE ORDER



27 DIA. MTC. HOLE
 (3) REQD.



FOR FIG. NO.
 8 & 11 ONLY

EATON

Technical Data

Product Description

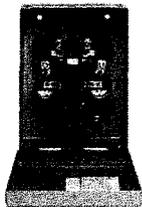
Product Description

- Used to open or close a circuit.
- Non-fusible safety switches provide a means to manually connect or disconnect the load from the source.
- Fusible safety switches provide a means to manually open and close a circuit and overcurrent protection by means of installed fuses.
- Also commonly referred to as a disconnect switch or disconnect.
- Available from 30 – 1200 amperes.

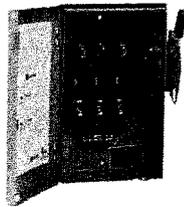
Application Description

8

General Duty



*Plug Fuse
General-Duty
Safety Switch*



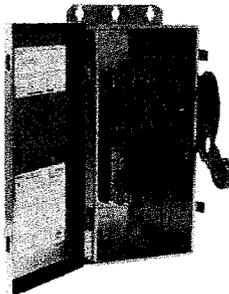
*Cartridge Fuse
General-Duty
Safety Switch*

For residential and commercial applications. Suitable for light-duty motor circuits and service entrance.

- 30 – 600 amperes.
- Suitable for service entrance applications unless otherwise noted.
- Fusible and non-fusible switches are 100% load break and 100% load make rated.
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated.
- 200 – 600 amperes features K-series design.
- Horsepower rated.
- Fusible and non-fusible switches. One-pole S/N through 4-wire; 120/240, and 240 Vac.
- Ample wire bending space provides for easier installation.
- With Class R fuses, switches may be used on systems capable of delivering 100,000 amperes rms symmetrical.

Note: Plug fuse switches are not service entrance rated.

Heavy Duty

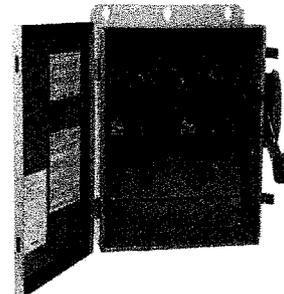


Heavy-Duty Safety Switches

For heavy commercial and industrial applications where reliable performance and service continuity are critical.

- 30 – 1200 amperes.
- 600 Vac, 600 Vdc maximum.
- Horsepower rated.
- Fusible and non-fusible switches are 100% load break and 100% load make rated.
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated.
- Suitable for service entrance applications unless otherwise noted.
- Visible double break quick-make, quick-break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help prevent contact burning for longer contact life.
- Triple padlocking capability. Personnel safety feature since the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks. Cabinet door can be further padlocked at the top and bottom.
- Interlocking mechanism. Door cannot be opened when the handle is in the ON position. Built-in defeater mechanism provides for user access when necessary.
- For the toughest heavy commercial and industrial applications, refer to **Page 8-47** for catalog information on our Mill-Duty Safety Switch.
- Deionizing arc chutes. Arc chutes confine and suppress the arcs produced by opening contacts under load.

6-Pole Switches



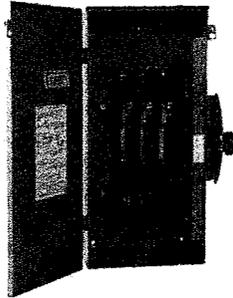
6-Pole Motor Circuit

A compact safety switch that's ideal for use in heavy industry...when an "in sight" disconnecting means is required for two-speed motors that are remote from their motor control devices.

- 600 Vac, 250 Vdc maximum.
- 30 – 200 amperes.
- Fusible or non-fusible.
- Trunk-type latches keep the cover tightly closed and a neoprene gasket seals out moisture and dust from the switch assembly.
- Visible double break quick-make, quick-break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help prevent contact burning for longer contact life.
- Clear line shield protection.
- Built-in fuse pullers.
- Clearly visible handle.
- Triple padlocking capability. Cabinet door can be further padlocked at the top and bottom.
- Deionizing arc chutes. Arc chutes confine and suppress the arcs produced by opening contacts under load.

Product Description

Double Throw Switches

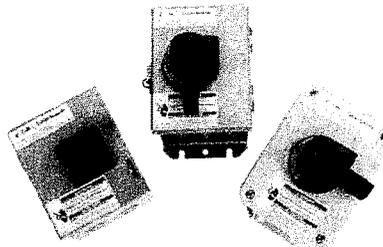


Heavy-Duty Double Throw

Used to transfer service from a normal power source to an alternate source...or to switch from one load circuit to another.

- 30 – 800 ampere switches are horsepower rated.
 - 600 Vac, 250 Vdc maximum.
 - Fusible or non-fusible.
 - Fusible and non-fusible switches are 100% load break and 100% load make rated.
 - Suitable for service entrance applications unless otherwise noted.
 - The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated.
 - Approved for service entrance with neutral or ground lug kit installed.
 - Wiring configuration from factory allows a single load to be supplied by a normal or alternate source. Can be field modified to allow two loads to be alternately supplied by a single power source.
 - Non-fusible double throw switch can be used to feed a single throw fusible switch, the normal method to provide manual transfer from one power source to another in 800 ampere and larger switches.
 - Ample wire bending space provides for easier installation.
 - Visible double break quick-make, quick-break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help prevent contact burning for longer contact life.
 - Triple padlocking capability. Personnel safety feature since the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks.
 - Clearly visible handle. The position (ON or OFF) can be clearly seen from a distance.
- Deionizing arc chutes. Arc chutes confine and suppress the arcs produced by opening contacts under load.
 - Additional locking capability. Cabinet door can be further padlocked at the top and bottom.
 - Clear line shield (provided on fusible double throw) protects against accidental contact with energized parts. Probe holes enable the user to test if the line side is energized without removing the shield.
 - Tangential knockouts on sides, top and bottom. Enables any size of conduit to be mounted close to the wall, providing for cable installation closer to the wall and a neat appearance.
 - UL® listed switching neutral capability is available on 3-pole and 4-pole non-fusible double throw switches with the installation of the proper bonding kit shown on Page 8-5.

Rotary Switches

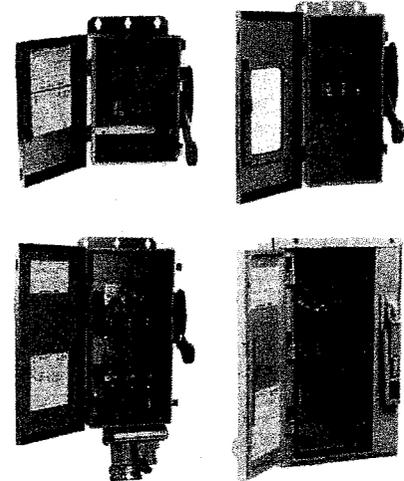


Enclosed Rotary

Provide users with the ability to lock directly wired motor loads in the OFF position to comply with new OSHA lockout/tagout regulations. Also for machine applications that require compact, economical disconnect switches.

- Meets NEC® Article 430 requirements for a separate disconnect means within sight of all motor loads.
- Padlockable in the OFF position (up to three padlocks) to meet OSHA lockout requirements.
- Available in 16 – 125 ampere ratings.
- 600 Vac, 3- and 4-pole non-fusible device.
- Rated for making and breaking loads.
- Accepts auxiliary contacts. Capability to signal PLC controllers.
- Ground lug connection provided.

EnviroLine



EnviroLine

Eaton offers a line of Cutler-Hammer® safety switches designed for your special application and/or extreme environmental conditions.

- **EnviroLine Stainless Steel Switch** — Primarily for use in the meat packing and food processing industries or any application where water is frequently used to hose down equipment. In addition to the stainless steel NEMA® 4X enclosure, the interior mechanism, backpan, and springs are stainless steel. Ratings for these heavy-duty switches are 30 – 400 amperes, 240 – 600 Vac, available as fusible and non-fusible switches.
- **Window Switches** — The new enlarged window on 30 – 100 ampere ratings allows visual blade position verification and blown fuse indication without opening the door. Higher ampere ratings continue to use the Upper and Lower window design. The Upper window switch provides visual verification of ON/OFF status (blade position), while the Lower window design shows fuse status on fuses with blown fuse indicators. Overall ratings are 30 – 800 amperes, 240 – 600 Vac, fusible and non-fusible. Available in NEMA 12/3R, 4X stainless steel enclosures.

Product Description

- **Receptacle Switches** — These heavy-duty switches are pre-wired and interlocked to polarized receptacles for 3-phase, 3-wire, grounded type power plugs. These are used for portable power applications such as welders, infrared ovens, batch feeders, conveyors, truck and marine docks. Receptacles are interlocked to handle mechanisms so that power plugs may not be inserted or removed when the switch is in the ON position unless noted otherwise. Ratings are 30 – 100 amperes, 600 Vac, NEMA 12/3R, 4X stainless steel enclosures.
- **Non-Metallic Switch** — This switch has a Halyester or KRYDON™ enclosure. These are compression molded fiberglass reinforced polyester enclosure, which is capable of withstanding almost any corrosive environment. Ratings are 30 – 200 amperes, 240 – 600 Vac, fusible and non-fusible. Enclosure is NEMA 4X rated.
- **NEMA 7/9 Hazardous Location Disconnect Switch** — See Page 8-43 for information.

Features, Benefits and Functions

General-Duty (Cartridge Fuse)

- Visible double break quick-make, quick-break rotary blade mechanism.
- Side opening door on all enclosures.
- Mechanically interlocked cover to prevent easy access when the switch is in the ON position.
- With Class R fuses, switches may be used on systems capable of delivering 100,000 amperes rms symmetrical.
- Clearly visible and accessible neutral where applicable.
- Visible ON/OFF indication.
- Tangential knockouts on 30 – 60 ampere designs.
- Ample wiring space.
- Double padlocking capability on 30 – 100 amperes.
- Triple padlocking capability on 200 – 600 amperes.
- Additional door locking capability.
- Bilingual English/Spanish door label on 30 – 100 amperes.
- Tri-lingual nameplates.

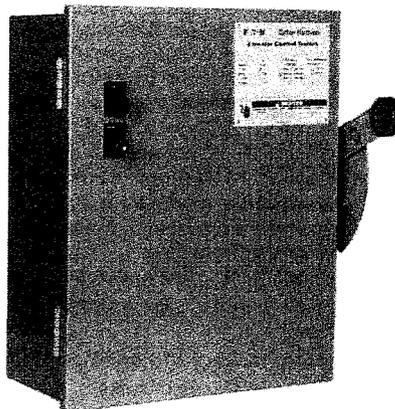
Heavy-Duty

- Visible double break quick-make, quick-break rotary blade mechanism.
- Mechanically interlocked cover to prevent easy access when the switch is in the ON position.
- Clear line shield with probe holes.
- Clearly visible palm fitting red handle.
- Triple padlocking capability.
- Deionizing arc chutes to confine and suppress the arcs produced by opening contacts under load.
- Tangential knockouts on NEMA 1 and NEMA 3R enclosures through 200 amperes.
- Built-in fuse pullers on NEMA 4X and NEMA 12 enclosures through 200 amperes.
- Additional door locking capability.
- Complete accessory and renewal parts data shown on inner door label.
- 30 – 800 ampere NEMA 12 designs convertible to NEMA 3R by opening factory installed drain hole.
- 30 – 800 ampere switches are seismic qualified and exceed the requirements of the Uniform Building Code® (UBC) and California Code Title 24.
- Tri-lingual nameplates.

Standards and Certifications

- UL 98.
- UL 50.
- NEMA KS-1.

Elevator Control Switch



Elevator Control Switch

Features, Benefits and Functions

Standard Features

- 30 – 200 ampere 600 Vac 3-phase fused power switch.
- 200,000 ampere rms short-circuit current rating.
- Shunt trip 120 volts.
- Control power terminal block.
- Ground lug per NEC.
- Class J Fuse mounting only (Class J Fuses not included).
- Key to Test switch 120 volts.
- Mechanically interlocked auxiliary contact for hydraulic elevators with automatic recall (5 A, 120 Vac rated) 1NO, 1NC.

Optional Features

- Control power transformer with fuses and blocks.
- Fire safety interface relay.
- Pilot light — ON.
- Isolated neutral lug (oversized 200% rated neutral option available where required by excessive non-linear loads).
- Fire Alarm Voltage Monitoring Relay (to monitor Shunt Trip voltage).
- NEMA 3R, 4 and 12 enclosures available through 200 amperes.
- Phase failure and undervoltage relay available, consult factory.
- For added protection, use Eaton fuse covers to improve maintenance personnel protection, through 200 amperes (OSHA 1910.333, Paragraph C).

Standards and Certifications

- UL 98 Enclosed and Deadfront Switch Guide 96NK3917, File No. E182262.
- NEMA 1, UL 50, listed enclosure.
- cUL® per Canadian Standards C22.2, No. 0-M91-CAN/CSAT C22.2, No. 4-M89 Enclosed Switch.

Product Specifications

Product Specifications

Table 8-24. Safety Switch Selection Guide

Type	Fuse Type		Fuse Class	Ampere Rating	Number of Poles	Enclosure Types							
						NEMA 1	NEMA 3R	NEMA 12	NEMA 4 Painted Steel	NEMA 4X Stainless Steel	NEMA 4X Non-Metallic	NEMA 7/9	
General-Duty	Single Throw Max. 240 Vac Horsepower Rated	Fusible	Plug	—	30	1 and 2	YES	YES	—	—	—	—	—
		Cartridge	H	30 – 600	2 and 3	YES	YES	—	—	—	—	—	
	Non-Fusible	—	—	30 – 600	2 and 3	YES	YES	—	—	—	—	—	
Heavy-Duty	Single Throw Max. 600 Vac Horsepower Rated	Fusible	Cartridge	H L	30 – 600 800 – 1200	2, 3 and 4	YES Up to 1200 A	YES Up to 1200 A	YES ^① Up to 1200 A	YES 400 – 800 A	YES Up to 1200 A	YES Up to 200 A	YES ^② Up to 200 A
		Non-Fusible	—	—	30 – 1200	2, 3 and 4	YES	YES	YES ^① Up to 200 A	YES 400 – 800 A	YES Up to 1200 A	YES Up to 200 A	YES Up to 200 A
6-Pole Motor Circuit	Single Throw Max. 600 Vac	Fusible	Cartridge	H	30 – 200	6	—	YES	YES ^①	—	YES	—	—
		Non-Fusible	—	—	30 – 200	6	—	YES	YES ^①	—	YES	—	—
Double Throw	Max. 600 Vac Horsepower Rated	Fusible	Cartridge	H T (600 V) T (240 V)	30 – 200 400 600	2 and 3	YES Up to 600 A	YES Up to 400 A	—	—	—	—	—
		Non-Fusible	—	—	30 – 800	2, 3, 4 and 6	YES	YES	YES Up to 400 A	—	YES Up to 400 A	—	—
Rotary Switches	Max. 600 Vac	Non-Fusible	—	—	16 – 125	3, 4	YES	YES ^①	YES ^①	—	YES	YES	—

① NEMA Type 12 enclosures (30 – 800 amperes) can be field modified to meet NEMA 3R rainproof requirements when a factory provided drain screw is removed.

② Class J fuse clips provided.

Table 8-25. EnviroLine Safety Switch Selection Guide

EnviroLine	Fuse Type		Fuse Class	Ampere Rating	Number of Poles	Enclosure Types					
						NEMA 1	NEMA 3R	NEMA 12	NEMA 4 Painted Steel	NEMA 4X Stainless Steel	NEMA 4X Non-Metallic
Stainless Enclosure with Stainless Mechanism	Fusible	Cartridge	H	30 – 400	2 and 3	—	—	—	—	YES	—
	Non-Fusible	—	—	30 – 400	3	—	—	—	—	YES	—
Viewing Window Upper or Lower ^{③④⑤}	Fusible	Cartridge	H L	30 – 600 800	3	—	—	YES ^⑥	YES	YES	—
	Non-Fusible	—	—	30 – 800	3	—	—	YES ^⑥	YES	YES	—
Receptacle	Fusible	Cartridge	H	30 – 100	3	—	—	YES	—	YES	—
	Non-Fusible	—	—	60	3	—	—	YES	—	YES	—
Non-Metallic	Fusible	Cartridge	H	30 – 200	3	—	—	—	—	—	YES
	Non-Fusible	—	—	30 – 200	3	—	—	—	—	—	YES

③ 800 ampere upper window switches are not UL listed.

④ Lower Window switches are available through 600 amperes.

⑤ 30 – 100 ampere switches provided with full view window.

⑥ NEMA Type 12 enclosures (30 – 800 amperes) can be field modified to meet NEMA 3R rainproof requirements when a factory provided drain screw is removed.

General-Duty

Table 8-35. Short Circuit Ratings Using Class "R", "J" or "T" Fusing where Applicable

Ampere Rating	Voltage Ratings	
	Type 1	Type 3R
30	100k at 240	100k at 240
60	100k at 240	100k at 240
100	100k at 240	100k at 240
200	100k at 240	100k at 240
400	100k at 250	100k at 250
600	100k at 250	100k at 250

Note: Class "H" fuse clips supplied as standard for 30 – 600 amperes. Rated at 10,000 rms symmetrical when using Class "H" fuses.

Heavy-Duty

Table 8-36. Short Circuit Ratings Using Class "R", "J" or "T" Fusing where Applicable

Ampere Rating	Voltage Ratings			
	Type 1	Type 3R	Type 12	Type 4 and 4X
30	200k at 600	200k at 600	200k at 600	200k at 600
60	200k at 600	200k at 600	200k at 600	200k at 600
100	200k at 480 100k at 600	200k at 480 100k at 600	200k at 600	200k at 600
200	200k at 600	200k at 600	200k at 600	200k at 600
400	200k at 480 100k at 600			
600	200k at 480 100k at 600	200k at 480 100k at 600	200k at 480 100k at 600	200k at 480 100k at 600
800	200k at 480 100k at 600			
1200	200k at 600	200k at 600	200k at 600	200k at 600

Note: Class "H" fuse clips supplied as standard for 30 – 600 amperes. Class "L" fuse clips supplied as standard for 800 – 1200 amperes. Rated at 10,000 rms symmetrical when using Class "H" fuses.

Double Throw

Table 8-37. Short Circuit Ratings Using Class "R", "J" or "T" Fusing where Applicable

Ampere Rating	Voltage Ratings			
	Type 1	Type 3R	Type 12	Type 4 and 4X
30	100k at 600	100k at 600	100k at 600	100k at 600
60	100k at 600	100k at 600	100k at 600	100k at 600
100	100k at 600	100k at 600	100k at 600	100k at 600
200	100k at 600	100k at 600	100k at 600	100k at 600
400	100k at 600	100k at 600	100k at 600	100k at 600
600	100k at 600	100k at 600	100k at 600	100k at 600
800	100k at 600	100k at 600	—	—

Note: Class "H" fuse clips supplied as standard for 30 – 600 amperes except Class "T" for 400 amperes at 600 volts and 600 amperes at 240 volts. Rated at 10,000 rms symmetrical when using Class "H" fuses.

Note: Table 8-37 is not applicable to the Compact Design shown on Page 8-32. The Compact Design is suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes.

Note: Class "R" fuse adapter kits are shown on Page 8-6. Individual adapter kits are applicable as shown on Page 8-6 and yield the short circuit ratings per the tables above when Class "R" fuses are installed. When installed, Class "R" fuse adapter kits reject all fuses except Class "R."

Note: Class "J" fuse provisions can be obtained on most 60 – 400 ampere safety switches by moving the fuse base to a new position as instructed by the device publication label. Class "J" fuse adapter kits, where needed, are shown on Page 8-5 and yield the short circuit ratings per the tables above when Class "J" fuses are installed. Class "J" fuse provisions must be factory installed on 30 ampere heavy-duty switches. Catalog numbers are shown in Table 8-15 on Page 8-10. Class "J" fusing is not applicable on 30 – 200 ampere general-duty switches, 30 – 100 ampere double throw switches, 600 ampere double throw switches, and any switch higher than 600 amperes.

Note: Class "T" fuse adapter kits are shown on Page 8-6. Individual adapter kits are applicable to 200 – 800 ampere switches as shown on Page 8-6 and yield the short circuit ratings per the tables to the left when Class "T" fuses are installed. On 1200 ampere switches, Class "T" fuse provisions can be obtained by moving the fuse base to a new position as instructed by the device publication label.

Non-Fusible Switches

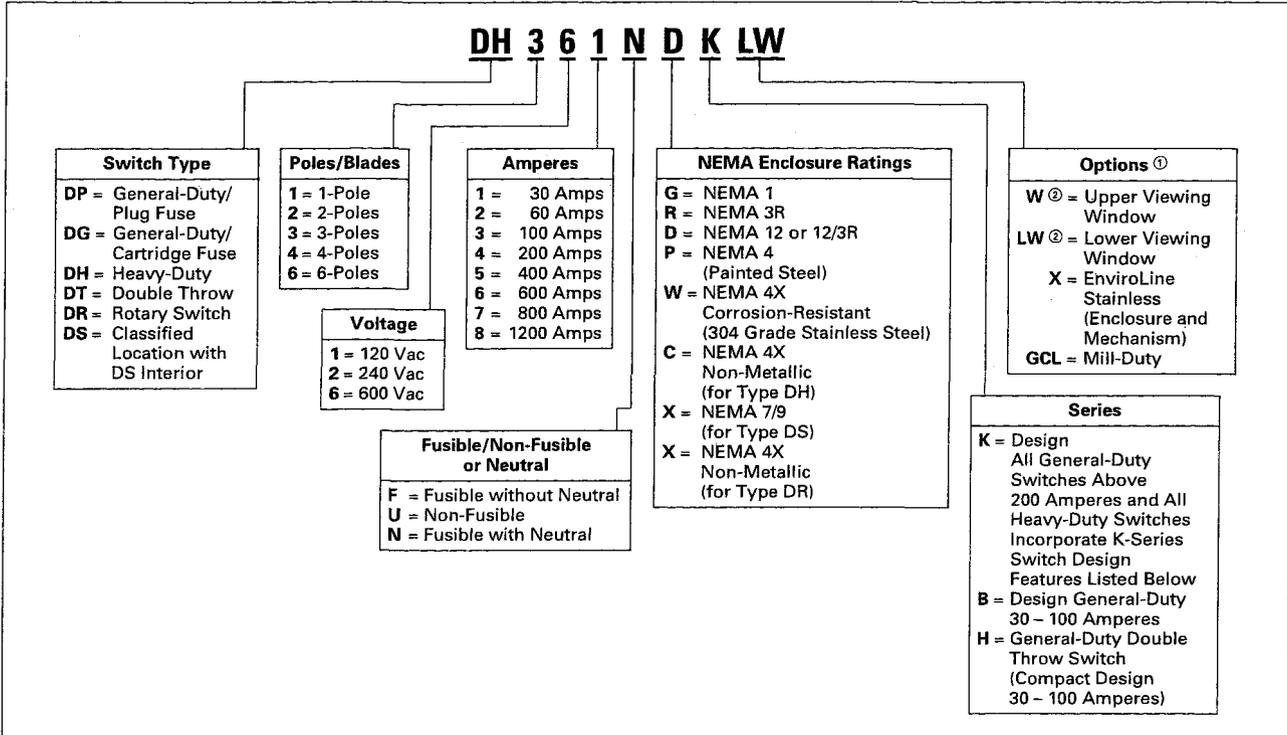
The UL listed short circuit ratings for Cutler-Hammer Non-Fusible switches by Eaton Corporation are based on the switches being properly protected by overcurrent protective devices. For applications that require a UL listed short circuit rating of 10,000 rms symmetrical amperes or less, a Cutler-Hammer Non-Fusible switch must be properly protected by any overcurrent protective device rated no greater than the ampere rating of the switch. For applications that require a UL listed short circuit rating of greater than 10,000 rms symmetrical amperes, a Cutler-Hammer Non-Fusible switch must be properly protected by the appropriate class and size fusing noted on the switch publication (located on the inside cover). Otherwise, this Non-Fusible switch must be replaced with a Cutler-Hammer Fusible switch that utilizes the appropriate fusing required. Molded case circuit breaker protection of Non-Fusible Cutler-Hammer switches for applications that require a short circuit rating of greater than 10,000 rms symmetrical amperes has not been evaluated. Refer to the reference tables for typical Cutler-Hammer fusible switch UL listed short circuit ratings.

Note: Safety switch short circuit ratings are applicable to ac only.

Note: Safety switch I^2t and I_p values are identical to UL maximum acceptable I^2t and I_p values for the corresponding class fuse.

Product Selection

Table 8-38. Safety Switch Catalog Numbering System



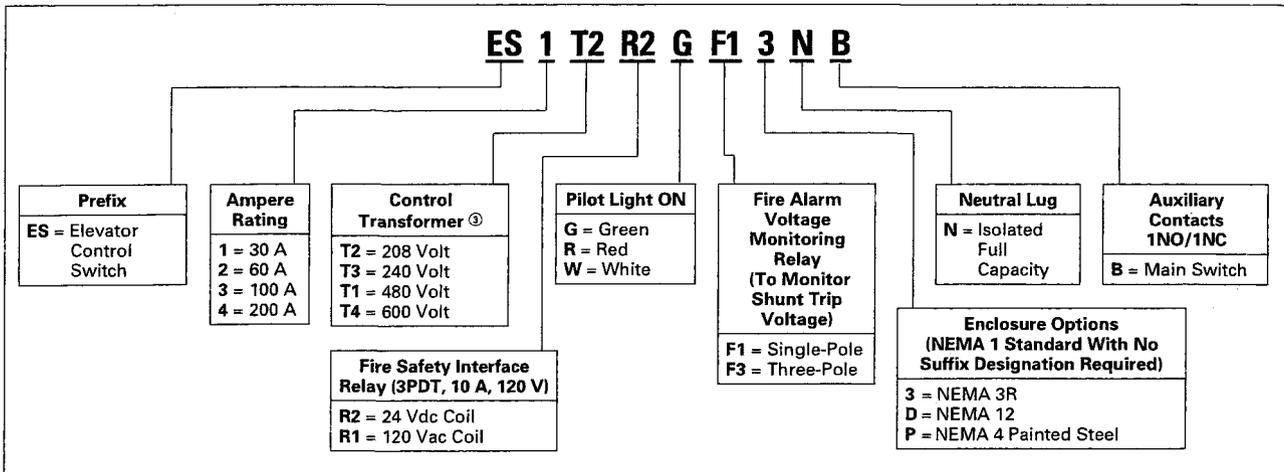
8

① See Pages 8-8 through 8-11 for additional Flex Center options.

② Effective August 2003, 30 – 100 ampere window switches are replaced by a full view window which allows blade position verification and blown fuse indication. See Page 8-37 for catalog numbers.

Note: This table is intended for use in breaking down existing catalog numbers. It is not intended for building new catalog numbers.

Table 8-39. Elevator Control Switch Catalog Numbering System

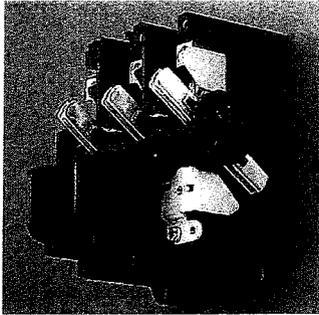


③ 100 VA with Primary and Secondary fusing (120 Volt Secondary).

Catalog Number Example: ES3T1R1GF3

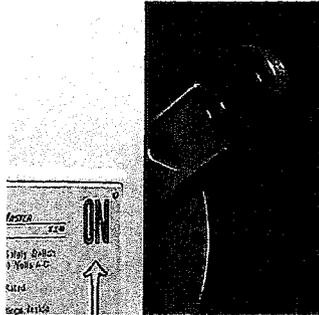
- 100 Ampere S.T. Switch 480V-3P — ES3.
- 480 – 120 Volt CPT — T1.
- 120 Vac Coil Fire Safety Interface Relay — R1.
- Pilot Light — ON (Green) — G.
- Fire Alarm Voltage Monitoring Relay (Three-Pole) — F3.

All General-Duty Switches Above 100 Amperes and All Heavy-Duty Switches Incorporate These K-Series Switch Design Features



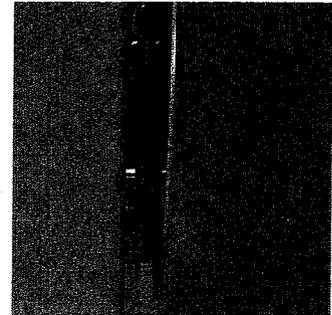
Visible Double Break Rotary Blade Mechanism

Two points of contact provide a positive open and close, easier operation, and also help prevent contact burning for longer contact life.



Clearly Visible Handle

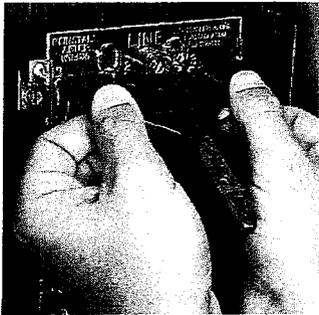
The position (ON or OFF) can be clearly seen from a distance and the length provides for easy operation.



Interlocking Mechanism

Door cannot be opened when the handle is in the ON position. Front and side operable defeater mechanism provides for user access when necessary on single throw switches.

8



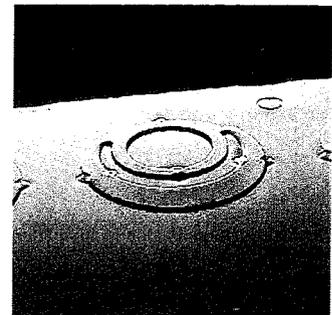
Clear Line Shield

Protects against accidental contact with energized parts. Probe holes enable the user to test if the line side is energized without removing the shield. Not typically provided on general-duty switches, but available as a field kit or factory installed.



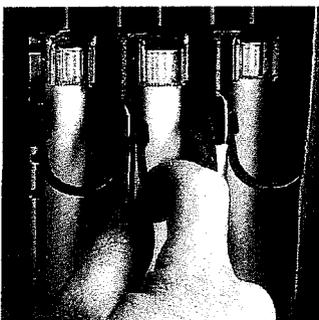
Triple Padlocking Capability

Personnel safety feature since the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks.



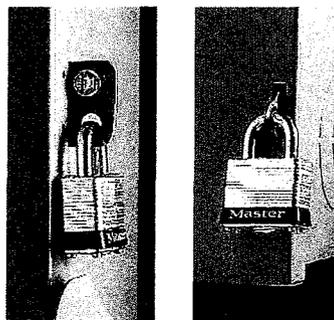
Tangential Knockouts

An ample number are provided on the top, bottom and sides of both NEMA Types 1 and 3R enclosures through 200 amperes.



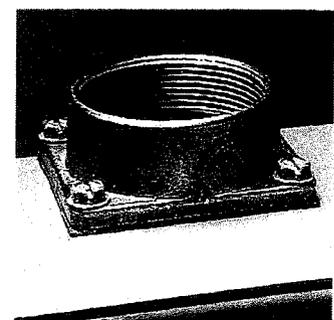
Built-in Fuse Pullers (NEMA 12 and 4X 30 - 200 Amperes Only)

Provide easy removal of fuses.



Additional Locking Capability

Cabinet door can be further padlocked at the top and bottom as applicable.



Bolt-on Hub Kits

For switches in a NEMA Type 3R, 30 - 200 A. Use a Myers type hub for all others

EATON

Options and Accessories

Table 8-1. Safety Switches — Accessories

Description	Catalog Number	Price U.S. \$
Neutral Kits/Ground Kits 30 A DG 60 – 100 A DG 200 A DG, DH (NEMA 1, 3R Enclosures) 30 – 60 A DH 100 A DH 200 A DH (NEMA 4X, 12 Enclosures) 400 A DG, DH 600 A DG, DH 400 – 600 A Fusible DT, 800 – 1200 A DH 30 – 100 A DT 200 A DT 400 A Non-Fusible DT 600 A Non-Fusible DT	DG030NB DG100NB DG200NK DH030NK DH100NK DH200NK DS400NK DS600NK DS800NK DT100NK DT200NK DT400NK DT600NK	
Ground Lug Kits 30 – 100 A DG 30 – 100 A DH, DT ① 200 A DG, DH, DT 400 – 600 A DG, 400 – 1200 A DH, 400 – 800 A DT	DG030GB DS100GK DS200GK DS468GK	
Switching Neutral Bonding Kits ④ 30 – 100 A DT, 3P, 4P Non-Fusible 200 A DT, 3P, 4P Non-Fusible 400 A DT, 3P, 4P Non-Fusible 600 A DT, 3P, 4P Non-Fusible 800 A DT, 3P, 4P Non-Fusible	DT100BK DT200BK DT400BK DT600BK DT800BK	
Control Pole Kit (for 2P, 3P Switches) 400 – 600 A DG, 30 – 1200 A DH, 30 – 800 A DT	DS16CP	
Auxiliary Contact Kits All Switches (except 30 – 100 A DG) 1NO/1NC All Switches (except 30 – 100 A DG) 2NO/2NC NEMA 7/9 Switches (30 – 100 A) 1NO/1NC NEMA 7/9 Switches (30 – 100 A) 2NO/2NC NEMA 7/9 Switches (200 A) 1NO/1NC NEMA 7/9 Switches (200 A) 2NO/2NC	DS200EK1 DS200EK2 178C265G05 178C265G06 178C619G01 178C619G02	
Copper Lug Kits 30 A DH, DT ② 60 A DH, DT ② 100 A DH, DT ② 200 A DH ② 400 A DH (NEMA 4, 4X, 12 Enclosures) ③ 600 – 800 A DH (NEMA 4, 4X, 12 Enclosures) ③	DS16CL DS16CL DS36CL DS46CL DS56CL DS66CL	
Crimp Lug Pad Kit (NEMA 4, 4X, 12 Enclosures) 400 – 600 A DH ② 800 A DH ③ 400 – 800 A Neutral DH ④	DS56CK DS76CK DS800CNK	
Fuse Puller Kits 30 – 60 A DH ② 30 – 60 A DH ⑤ 100 A DH ② 200 A DH ②	DS30FP DS60FP DS100FP DS200FP	
"J" Fuse Adapter Kits 60 A 240 Volt DH ② 60 A DT and Receptacle Switches ⑥ 400 A 600 Volt DT ⑥ 600 A 240 – 600 Volt DH, 600 A DG ③	DS22JK DS26JK DT400JK DS600JK	

① Ground bar kit is not listed on device publications.

② Order one kit for 3 poles.

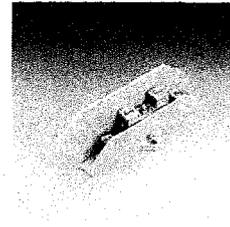
③ Order one kit for each pole.

④ Order one kit per switch.

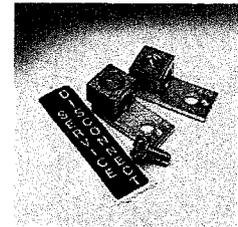
⑤ Receptacle switches.

⑥ Order one kit for 6 poles.

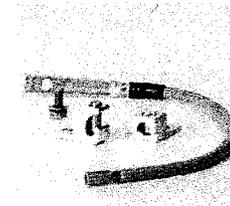
Note: Accessories are not applicable to NEMA 7/9 switches unless indicated otherwise.



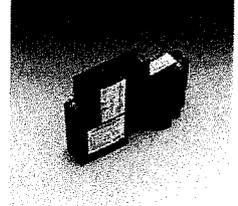
DH030NK



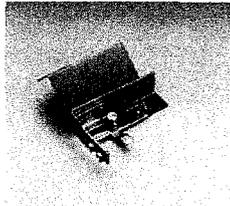
DS200GK



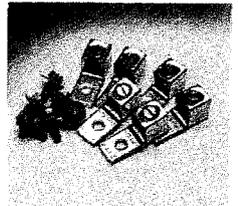
DT100BK



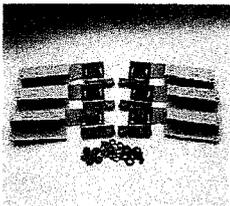
DS16CP



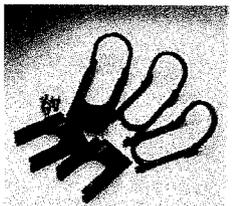
DS200EK1



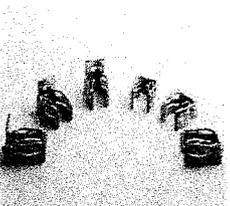
DS36CL



DS56CK



DS60FP



DS22JK

Note: A factory installed ground lug is supplied on all NEMA 4, 4X and 12 safety switches, as well as all 400 ampere and higher NEMA 1 and 3R safety switches. A factory installed ground lug is also supplied on all Heavy-Duty NEMA 1 and 3R 30 – 200 ampere switches that do NOT have a factory installed neutral.

Discount Symbol 22CD

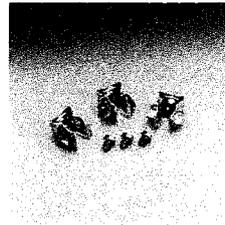
Accessories

Table 8-1. Safety Switches — Accessories (Continued)

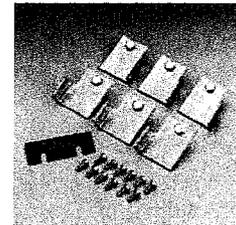
Description	Catalog Number	Price U.S. \$
"R" Fuse Adapter Kits ① 30 A DG 100 A DG 30 A 240 Volt DH, DT 30 A 600 Volt DH, DT, 60 A 240 Volt DH, DT, 60 A DG 60 A 600 Volt DH, DT 100 A 240 — 600 Volt DH, DT 200 A 240 — 600 Volt DH, DT, 200 A DG 400 A 240 — 600 Volt DH, 240 Volt DT, 400 A DG 600 A 240 — 600 Volt DH, 600 A DG	DG030RB DG100RB DS12FK DS16FK DS26FK DS36FK DS46FK DS56FK DS66FK	
"T" Fuse Adapter Kits 200 A 240 Volt DH ① 200 A 600 Volt DH ① 400 A 240 Volt DG, DH ② 400 A 600 Volt DH ② 600 A 240 Volt DG, DH ② 600 A 600 Volt DH ② 800 A 240 Volt DH ② 800 A 600 Volt DH ②	DS426TK DS466TK DS526TK DS566TK DS626TK DS666TK DS726TK DS766TK	
Hookstick Handle	DH800HSH	
Lubricating Grease for Safety Switch Blades and Contacts (Each kit contains three 30 cc tubes of lubricating grease.)	DSLUBEKIT	

① Order one kit for 3 poles.

② Order one kit for each pole.

Note: Accessories are not applicable to NEMA 7/9 switches.

DS12FK



DS426TK

Accessories

Accessories, Hubs, Lug Data

Table 8-2. Plate Type Hubs

For NEMA 3R Enclosures (Up to 200 Amperes)

Group 1 General-Duty, Heavy-Duty, Double Throw Through 100 A			Group 2 General-Duty, Heavy-Duty, Double Throw — 200 A				
Conduit Size		Catalog Number	Price U.S. \$	Conduit Size		Catalog Number	Price U.S. \$
Inches	mm			Inches	mm		
.75	19.1	DS075H1		2.00	50.8	DS200H2	
1.00	25.4	DS100H1		2.50	63.5	DS250H2	
1.25	31.8	DS125H1		3.00	76.2	DS300H2	
1.50	38.1	DS150H1		—	—	—	
2.00	50.8	DS200H1		—	—	—	

Catalog Number **DS900AP** Adapter Kit (Price U.S. \$ = 14.10) — Permits Installation of Group 1 Hubs on 200 Ampere Type General-Duty, Heavy-Duty and Double Throw Switches

Table 8-3. Myers Type Hubs

NEMA 3R (400 Amperes and Above)
NEMA 4, 4X (Stainless Steel), 12

Conduit Size		Catalog Number	Price U.S. \$
Inches	mm		
.50	12.7	DS050MH	
.75	19.1	DS075MH	
1.00	25.4	DS100MH	
1.25	31.8	DS125MH	
1.50	38.1	DS150MH	
2.00	50.8	DS200MH	
2.50	63.5	DS250MH	
3.00	76.2	DS300MH	
3.50	88.9	DS350MH	
4.00	101.6	DS400MH	
5.00	127.0	DS500MH	

Note: Contact the Flex Center at 1-888-329-9272 for information on hubs for non-metallic NEMA 4X switches.

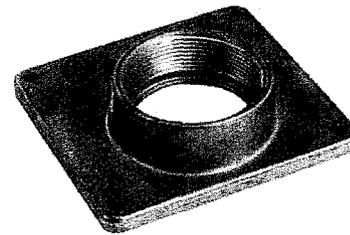
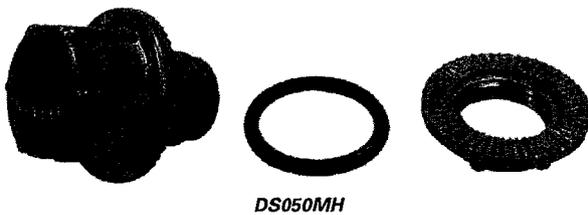


Table 8-4. Standard Lug Capacities

Description	Minimum Wire Size	Maximum Wire Size	Wire Type
30 A DP	#14 #12	#10 #10	Cu OR Al
30 A DG 30 A DH, DT	#14 #14	#6 #2	Cu/Al Cu/Al
60 A DG 60 A DH, DT	#14 #14	#1/0 #2	Cu/Al Cu/Al
100 A DG ① 100 A DH, DT	#14 #14	#1/0 #1/0	Cu/Al Cu/Al
200 A DG, DT 200 A DH Type 1 and 3R 200 A DH Type 4 and 12	#6 #6 #6	250 kcmil 250 kcmil 300 kcmil	Cu/Al Cu/Al Cu/Al
400 A DG, DH, DT	(2) #1/0 (1) #1/0	(2) 300 kcmil (1) 750 kcmil	Cu/Al OR Cu/Al
600 A DG, DH, Fusible DT	(1) #2 (1) #1/0	(1) 600 kcmil (1) 750 kcmil	Cu/Al AND Cu/Al
600 A Non-Fusible DT	(2) #250	(2) 500 kcmil	Cu/Al
800 A DH 800 A DT	(4) #1/0 (3) #250	(4) 750 kcmil (3) 500 kcmil	Cu/Al Cu/Al
1200 A DH	(4) #1/0	(4) 750 kcmil	Cu/Al

Copper-Bodied Lugs

30 A Cu	#14	#6	Cu
60 A Cu	#14	#4	Cu
100 A Cu	#6	#1/0	Cu
200 A Cu	#6	250 kcmil	Cu
400 A Cu	#1/0	500 kcmil	Cu
600 A Cu	(2) #1/0	(2) 500 kcmil	Cu

① The maximum size aluminum or copper-clad aluminum wire allowable for applications where the conductor enters or leaves the enclosure through the wall opposite its terminal is #1 gauge.

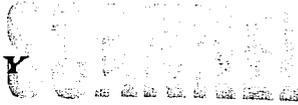
Note: Although certain lug capacities are larger than required, only minimum wire bending space is provided per the requirements noted in NEC Tables 373-6 (a) and (b) for respective ampere ratings.

8

WA1-4682

ARIZONA WATER COMPANY

WORK AUTHORIZATION



W.A. NUMBER: 1-4682
 P.E. NUMBER: WT
 BUDGET ITEM NO.: Special #22
 SHEET NO.: 1 of 2

SYSTEM: White Tank
 DIVISION: Casa Grande
 TAX CODE: 7900

WORK TO START BY: UPON AUTHORIZATION
 WORK TO BE FINISHED BY: WITHIN 60 DAYS

DESCRIPTION OF WORK:
 Pull and replace the pump and motor at White Tank Well #2. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:
 Well blows fuses when attempting to start. Testing indicates either the cable or motor has gone to ground.

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	James F. Wilson <i>gw 11/16/09</i>	11/2/09
LABOR	2,500	REVIEWED BY: <i>ML</i>	11-2-09
CONTRACT PORTION	19,603	Mike Loggins <i>ML 11-13-09</i>	
OVERHEAD	2,056	APPROVED BY: <i>Fred Schneider</i>	11-3-09
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 24,159	Fred Schneider <i>FS 11-16-09</i>	
FUNDS RECEIVED:		APPROVED BY: <i>William M. Garfield</i>	11/6/09
CONTRIBUTIONS RECEIVED	0	FOR SPECIAL BUDGET ITEM UNDER \$10,000 --	
REFUNDABLE ADVANCES RECEIVED	0		
TOTAL CONTRIBUTIONS/ADVANCES	0		
NET CASH REQUIRED	\$ 24,159	FOR SPECIAL BUDGET ITEM EXCEEDING \$10,000 --	11-13-09
		William M. Garfield	
		AUTHORIZED BY: APPROVED VIA FAX	11/13/09
		R. H. Nicholson, Jr.	

COMMENTS:
 Verified pricing by comparing to 2007 pricing.
FILE COPY

CONSTRUCTION RELEASE:
RELEASED TO CONSTRUCTION
 Authorized by **FRED SCHNEIDER**
 Date 11/13/09

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-4682
 P.E. NUMBER: WT
 BUDGET ITEM NO.: Special #22
 SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER
	325	Grundfos 230S300-9 pump	1	2007 1-4434
	325	30HP submersible motor	1	2007 1-4434
	325	#6 Submersible pump cable	410	2006 1-4217

PROJECT DESCRIPTION:
 Pull and replace the pump at Coolidge Airport Well #1 (North Well)

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Grundfos 230S300-9 Submersible Pump	325	1	\$ 3,500.00	\$ 3,500
	Grundfos 30-HP Submersible Motor	325	1	3,200.00	3,200
	#6 Submersible Pump Cable	325	410	5.25	2,153
	Misc. materials	325	1	250.00	250
	Labor	325	1	6,500.00	6,500
	Video Well	325	2	750.00	1,500
	Brush and Bail well	325	10	250.00	2,500
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345				
TOTAL CONTRACT WORK					\$ 19,603

M A T E R I A L S	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			
	TOTAL MATERIALS				

L A B O R	TESTING FEE				
	PERMIT FEE				
	SURVEY FEE				
	FIELD INSPECTION	325	1	2,500.00	2,500
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			
TOTAL LABOR					\$ 2,500

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					\$ 22,103
OVERHEAD					2,056
TOTAL	REFUNDABLE PORTION <input type="checkbox"/>	NON-REFUNDABLE PORTION <input type="checkbox"/>	COST ESTIMATE		\$ 24,159

AFH

ARIZONA WATER COMPANY
WORK AUTHORIZATION

W.A. NUMBER: 1-4682
P.E. NUMBER: WT
BUDGET ITEM NO.: 1-4682
SHEET NO.: 1 of 2



SYSTEM: WHITE TANK DIVISION: CASA GRANDE TAX CODE: 7900	WORK TO START BY: UPON AUTHORIZATION WORK TO BE FINISHED BY: WITHIN 60 DAYS
---	--

DESCRIPTION OF WORK:

Pull and replace the pump and motor at White Tank Well #2 and install 300 lf of blank casing. Construct in accordance with attached drawings and/or Arizona Water Company specifications.

FACTORS JUSTIFYING WORK:

APPROVED 2009 BUDGET ITEM (\$24,159) - SPENT \$17,077.38
APPROVED 2010 BUDGET ITEM (\$50,000)

COST ESTIMATE		AUTHORIZATION	DATE
COST OF WORK:		PREPARED BY:	
MATERIAL	0	James Wilson	3/29/10
LABOR	2,000	REVIEWED BY:	
CONTRACT PORTION	31,366	Charles Briggs	3-29-2010
OVERHEAD	8,008	APPROVED BY:	
TOTAL AUTHORIZED EXPENDITURES CHARGEABLE TO THIS W.A.	\$ 41,374	Fred Schneider	3-30-10
FUNDS RECEIVED:		APPROVED BY:	
CONTRIBUTIONS RECEIVED	0	Joe Harris	3/31/10
REFUNDABLE ADVANCES RECEIVED	0	AUTHORIZED BY:	
TOTAL CONTRIBUTIONS/ADVANCES	0	William M Garfield	4-1-2010
NET CASH REQUIRED	\$ 41,374		

COMMENTS:

FILE COPY

CONSTRUCTION RELEASE:

RELEASED TO CONSTRUCTION
Authorized by FRED SCHNEIDER
Date 4/1/10
2010 BUDGET

AFH

ARIZONA WATER COMPANY

WORK AUTHORIZATION - DETAIL SHEET

W.A. NUMBER: 1-4682
 P.E. NUMBER: WT
 BUDGET ITEM NO.: B-1
 SHEET NO.: 2 of 2

RETIREMENT PROPERTY UNITS	PLANT PROPERTY ACCOUNT	UNIT DESCRIPTION	QUANTITY	YEAR INSTALLED AND W.A. NUMBER

PROJECT DESCRIPTION:
 Pull and replace the pump and motor at White Tank Well #2 and install 220' lf of blank casing

C O N T R A C T W O R K	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	Labor to Install casing	314	1	\$ 8,050.00	\$ 8,050
	Sanitary Seal	314	1	7,976.00	7,976
	Brush lower casing and bail fill	314	48	190.00	9,120
	6" x 0.25 wall blank casing	314	300	12.00	3,342
	Video Well	314	2	850.00	1,700
	Tax	314	1	1,178.00	1,178
	SERVICE CONNECTIONS COMPLETE: DOUBLE-LONG	345			
	SERVICE CONNECTIONS COMPLETE: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345			

TOTAL CONTRACT WORK \$ 31,366

M A T E R I A L S	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	SERVICE CONNECTIONS: DOUBLE-LONG	345			
	SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	SERVICE CONNECTIONS: SINGLE-LONG	345			
	SERVICE CONNECTIONS: SINGLE-SHORT	345			
	METERS	346			

TOTAL MATERIALS \$ -

L A B O R	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL
	TESTING FEE	314	1	\$ 500.00	500
	PERMIT FEE	314	1		0
	SURVEY FEE	314	1		0
	FIELD INSPECTION	314	1	1,500.00	1,500
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-LONG	345			
	INSTALL SERVICE CONNECTIONS: SINGLE-SHORT	345			

TOTAL LABOR \$ 2,000

SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR \$ 33,366

OVERHEAD 8,008

TOTAL REFUNDABLE PORTION NON-REFUNDABLE PORTION **COST ESTIMATE** \$ 41,374

AFH

ARIZONA DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT DIVISION
3550 North Central Avenue, Phoenix, Arizona 85012
Phone (602) 771-8585 Fax (602) 771-8688

RECEIVED
DEC - 8 2009
PHOENIX AMA

WELL CONSTRUCTION SUPPLEMENT (form DWR 55-90)

Well Registration Number 55- 616689

1. Well Location:

SE 1/4 of the NW 1/4 of the SW 1/4, Sec. 33, Township 2N Range 2W.
10AC 40AC 160AC

2. Position Location of the Well:

Latitude 33 ° 28 ' 11.84 " N Longitude 112 ° 28 ' 35.29 " W

Datum: • NAD 83 • NAD 27 • Other: _____

3. County MARICOPA

4. Date construction to start: DECEMBER 14, 2009

COPY

5. Time period well will remain in use: INDEFINITELY

6. Is pump equipment to be installed? YES If so, design pump capacity: 200 GPM.

7. Well construction plan: INSTALL 6" BLANK CASING FROM 0 FT TO 218 FT

a. Drilling method (mud rotary, hollow-stem auger, etc.) N/A

b. Borehole diameters _____ inches from _____ feet to _____ feet.

_____ inches from _____ feet to _____ feet.

c. Casing materials BLANK STEEL CASING FROM 0 FT TO 218 FT

d. Method of well development (bail, air lift, surge, etc.) BAIL

e. Will surface or conductor casing extend above grade? NO

8. Include a detailed construction diagram of the proposed well design. The diagram should verify consistency with minimum construction requirements specified in the Department's well construction rules found in Arizona Administrative Code (A.A.C.) R12-15-801 et seq. Specifically, the diagram should include borehole diameters; casing materials and diameters; perforation intervals; the expected water level; depth and thickness of the surface seal; proposed grouting materials; and the length that the surface or conductor casing will extend above grade, or vault details, if specified.

Pursuant to Arizona Revised Statutes (A.R.S.) § 45-594.B, all well construction, replacement, deepening and abandonment operations shall comply with the rules adopted pursuant to this section. Therefore, any existing well that is deepened or modified must be brought into compliance with minimum well construction standards specified above, if not already in compliance.

9. Proposed materials and method of abandonment if well is to be abandoned after project is completed (Minimum requirements per A.A.C. R12-15-816):

10. Is the proposed wellsite within 100 feet of a septic tank system, sewage disposal area, landfill, hazardous waste facility, storage area of hazardous material, or petroleum storage area or tank? ___ Yes No

11. Is this well to monitor existing contamination? ___ Yes No
Potential contamination? ___ Yes No If yes, please provide explanation: _____

12. Name of Consulting firm, if any: NONE

Address _____ City _____ State _____ Zip _____

Contact Person: _____ Telephone Number: _____

13. Drilling firm WEBER GROUP LC

DWR License Number: 215 ROC License Category: KB-01 146265

14. Special construction standards, if any, required pursuant to A.A.C. R12-15-821: _____

N/A

I (we), JAMES T. WILSON hereby affirm that all information provided in this
(print name) application is true and correct to the best of my/our
knowledge and belief.

Signature of Applicant _____

Date 11/23/09

COPY

SCANNED

STATE OF ARIZONA
DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT DIVISION
MAIL TO: P.O. BOX 33589, PHOENIX, ARIZONA 85067-3589
3550 North Central Avenue, Phoenix, Arizona 85012
Phone (602) 771-8500 Fax (602) 771-8688

NOTICE OF INTENTION TO DEEPEN OR MODIFY AN EXISTING NON-EXEMPT WELL OR CONSTRUCT A REPLACEMENT NON-EXEMPT WELL AT APPROXIMATELY THE SAME LOCATION IN AN ACTIVE MANAGEMENT AREA

PLEASE READ GENERAL INSTRUCTIONS AND CONDITIONS BEFORE COMPLETING.

Section 45-597, Arizona Revised Statutes provides: In an Active Management Area, prior to deepening an existing well or constructing a replacement well at approximately the same location, a person must file a Notice of Intention to Drill. A person must also file a Notice of Intention to Drill prior to modifying a Non-Exempt Well Permit. Pursuant to A.R.S. § 45-596, the fee for this application is \$150.00.

1. Applicant ARIZONA WATER COMPANY
Mailing Address 3805 N BLACK CANYON HIGHWAY
PHOENIX AZ 85015
City State Zip Code
Telephone Number 602-240-6860
E-mail Address: engineering@azwater.com

FOR DEPARTMENT USE ONLY
File No. _____
Registration 55- _____
Date Filed _____
Input _____ By _____
AMA/INA _____

1A. Public Water System ID #: _____

2. This Notice is filed by (check all applicable):
 Land Owner Owner of Withdrawal Authority Lessee Consultant Other _____

Note: If Notice is not filed by the land owner, the applicant must submit signed documentation containing land owner's name, address, telephone number, and signature consenting to the deepening, replacing, or modifying of the well.

3. Action Requested: Deepen Replace Modify

4. Principal Use of Water: (please be specific): MUNICIPAL/POTABLE WATER SUPPLY FOR THE WHITE TANK COMMUNITY

5. Other Uses Intended (please be specific): CONSTRUCTION IRRIGATION

6. Claim of Entitlement to Withdraw Water:
58- _____ Grandfathered Groundwater Right Certificate
OR 59- _____ Groundwater Withdrawal Permit
OR 57- _____ Irrigation District
OR 56- 000016.0000 Service Area
OR 74- _____ Recovery Well Permit

7. Construction:
a. Drilling Firm: Name WEBER GROUP LC DWR License Number 215 ROC License Category KA-01 146265
b. Deepening/Replacement/Modification Will Start: DECEMBER 2009
Month Year
c. Estimated Time to Complete: 1 Months
d. Attach a Well Construction Supplement, DWR form 55-90, and include a detailed construction diagram as indicated on the form.

FILE COPY

8. Original Well:

- a. Location: SE 1/4 NW 1/4 SW 1/4 Section 33 Township 2N N/S Range 2W E/W
10 Acre 40 Acre 160 Acre
- b. Position: Latitude 33 ° 28 ' 11.84 " N Longitude 112 ° 28 ' 35.29 " W
- c. Position Datum: NAD 83 NAD 27 Other: _____
- d. County: MARICOPA
- e. Parcel Number: 502 - 67 - 009-G
- f. Registration Number: 55- 616689
- g. Registered/Permitted Capacity (see instructions for details): N/A Registered GPM OR N/A Acre-Feet Per Year

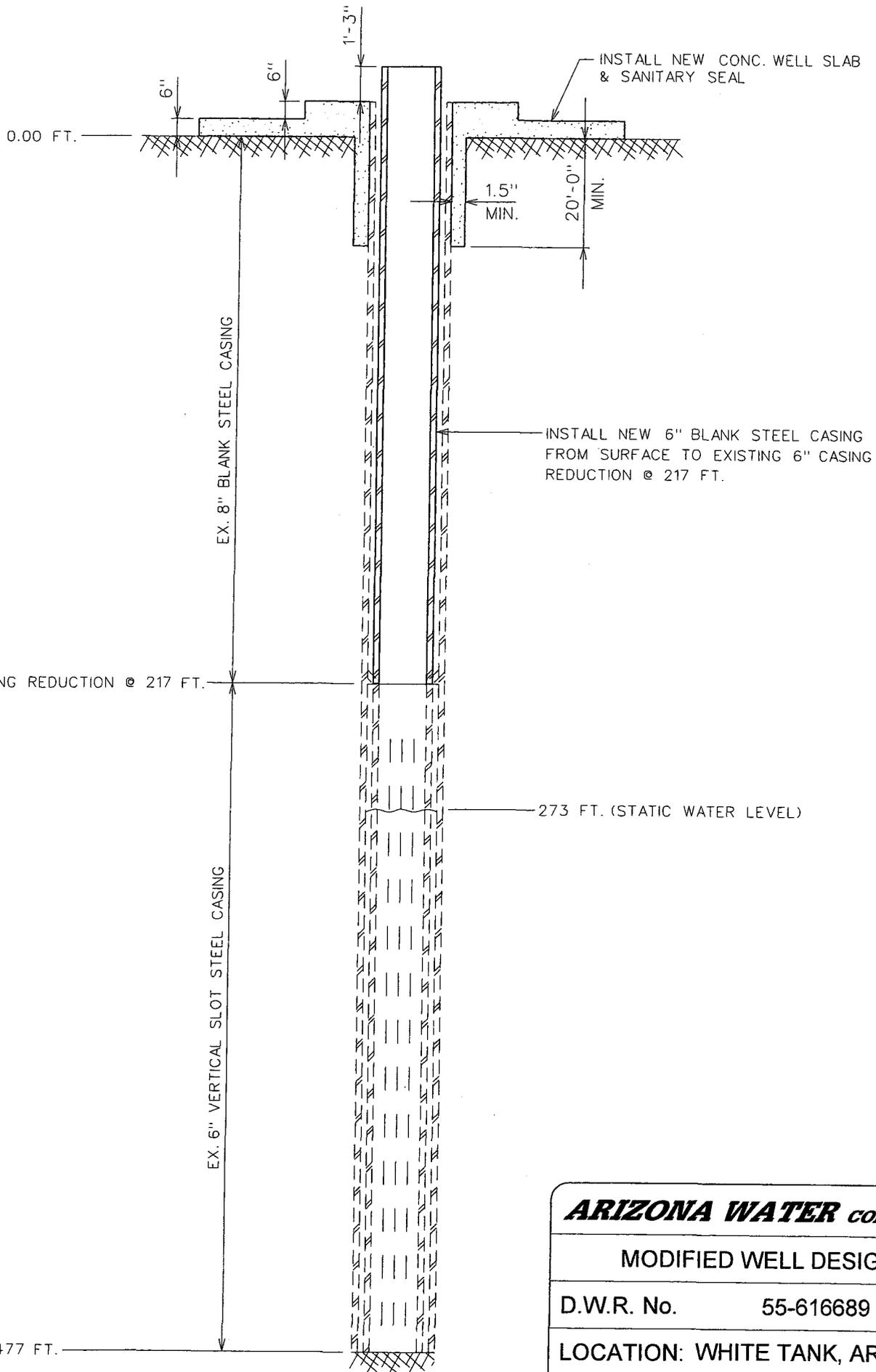
9. Deepening/Modification/Replacement Well (as applicable):

- a. Location: SE 1/4 NW 1/4 SW 1/4 Section 33 Township 2N N/S Range 2W E/W
10 Acre 40 Acre 160 Acre
- b. Position: Latitude 33 ° 28 ' 11.84 " N Longitude 112 ° 28 ' 35.29 " W
- c. Position Datum: NAD 83 NAD 27 Other: _____
- d. County: MARICOPA
- e. Parcel Number: 502 - 67 - 009-G
- f. Distance from Original Well: 0 Feet
- g. Design Pump Capacity 200 GPM
- h. Estimated total annual pumpage: 315 Acre-Feet Per Year
- i. Diameter: 6 Inches
- j. Depth: 477 Feet
- k. Type of Casing: STEEL
- l. Has the well to be replaced been physically abandoned? Yes No
- m. If no, will it be? Yes No If Yes when: _____

I state that this Notice is filed in compliance with Rules A.A.C. R12-15-809 and is complete and correct to the best of my knowledge and belief, and that I understand the conditions set forth in the general instructions and specific instructions for this application.

JAMES T. WILSON _____ ENGINEER 11/23/09
 Type or Print Name Applicant's Signature Title Date

 Type or Print Name Land Owner's Signature Title Date



ARIZONA WATER COMPANY

MODIFIED WELL DESIGN

D.W.R. No. 55-616689

LOCATION: WHITE TANK, ARIZONA

WELL No. 2 SHT. 1 OF 1

GENERAL INSTRUCTIONS

1. Complete this form and mail to P.O. Box 33589 Phoenix, Arizona 85067-3589 or hand deliver to 3550 North Central Ave, Phoenix, Arizona 85012. Pursuant to A.R.S § 45-596, the fee for this application is \$150.00.

Please include a completed Well Construction Supplement DWR Form 55-90, which is enclosed as part of your application. Completion of this form requires attachment of a detailed construction diagram. The diagram should verify consistency with minimum construction requirements specified in the Department's well construction rules found in Arizona Administrative Code (A.A.C.) R12-15-801, *et seq.* Specifically, the diagram should include an indication of perforated interval location(s) in relationship to the expected water level, depth and thickness of the surface seal, proposed grouting materials, whether or not the surface or conductor casing will extend above grade and vault details, if specified.

2. State the registration number of the original well and legal basis of entitlement to withdraw water.
3. Construction standards for replacement wells and deepening, modification, and abandonment of existing wells shall be in accordance with the Department Rules.
4. A.R.S. § 45-596(D) provides that the Director shall determine whether all information required on form has been submitted. If not, the person filing will be notified, and the drilling, deepening, or modification of the well may not proceed.

SPECIFIC INSTRUCTIONS, LIMITATIONS AND CONDITIONS APPLICABLE TO REPLACEMENT WELLS IN APPROXIMATELY THE SAME LOCATION

Upon the return of this completed notice, the owner will be provided with specific instructions relating to site verification requirements.

“Original well” means the well replaced by a replacement well in approximately the same location, except that if the replacement well is the latest in a succession of two or more wells drilled as replacement wells in approximately the same location, “original well” means the well replaced by the first replacement well in approximately the same location.

A replacement well in approximately the same location must be drilled within 660 of the original well. The replacement well must not annually withdraw an amount of water in excess of the maximum annual capacity of the original well. The Director will determine the maximum annual capacity of the original well by multiplying the maximum pump capacity of the original well in gallons per minute by 525,600, and then converting the result into acre-feet by dividing the result by 325,851 gallons. The Director shall presume that the maximum pump capacity of the original well is the maximum pump capacity of the well in gallons per minute as shown in the Department's well registry records unless: (1) The Director has reason to believe that the maximum pump capacity as shown in the Department's well registry records is inaccurate or; (2) The applicant submits evidence demonstrating that the maximum pump capacity as shown in the Department's well registry records is inaccurate.

If a well permit was issued for the original well under A.R.S. § 45-599, the replacement well must not annually withdraw an amount of groundwater in excess of the maximum annual volume set forth in the well permit.

If a recovery well permit was issued for the well to be replaced pursuant to A.R.S. § 45-834.01(B) and the permit sets forth a maximum annual volume of stored water that may be recovered from the well, the proposed well will not annually recover an amount of stored water in excess of the maximum annual volume set forth in the recovery well permit.

If the well to be replaced has been physically abandoned in accordance with R12-15-816, a notice of intention to drill the proposed well is filed no later than 90 days after the well to be replaced was physically abandoned.

After a replacement well in approximately the same location is drilled, the replacement well may be operated in conjunction with the original well and any other wells that replaced the original well if the total annual withdrawals from all wells do not exceed the maximum amount allowed.

A well may be drilled as a replacement well in approximately the same location for more than one original if the total annual withdrawals from the proposed well will not exceed the combined maximum annual amounts allowed for each original well.

Time Frames for Review of Your Application.

Within fifteen (15) days after receipt of your application, the Department will determine whether your application is administratively complete and should be granted or denied, unless this time is extended as described below. This fifteen day time frame is both the administrative completeness review time frame and the overall time frame for a Notice of Intention to Drill.

If the Department sends you a letter that your application is incomplete, the Department will include a comprehensive list of specific deficiencies. Until the missing information is received, both the administrative completeness review and the overall time frames will be suspended. When the Department receives the missing information, the administrative completeness review and overall time frames will resume. Your application will not be complete until all of the requested information is received. If you do not supply the missing information within sixty (60) days, your application may be denied.

Agency Contact

Please direct any questions, comments or requests for further assistance to one of the following Department personnel in the Active Management Area (AMA) in which the application is filed.

PHOENIX AMA	PINAL AMA	PRESCOTT AMA	SANTA CRUZ AMA	TUCSON AMA
Sharon Ward Tana Zachreson	Cynthia Pogue	Jack McCormack	Nicholas Kilb	Linda Ingraham Jeff Tannler
(602) 771-8585	(520) 836-4857	(928) 778-7202	(520) 761-1814	(520) 770-3800

JANICE K. BREWER
Governor



HERBERT R. GUENTHER
Director

ARIZONA DEPARTMENT OF WATER RESOURCES

3550 North Central Avenue, Second Floor
PHOENIX, ARIZONA 85012-2105

(602) 771-8500

December 22, 2009

Arizona Water Company
Attn: James T. Wilson
3805 North Black Canyon Highway
Phoenix, AZ 85015

RE: Notice of Intention to Modify an Existing Non-Exempt Well
Registration No. 55-616689; File No. B(2 – 2)33 CBD

Dear Mr. Wilson:

The Notice of Intention to Modify an Existing Non-Exempt Well inside the Phoenix Active Management Area has been approved. A copy of the Notice is enclosed for your records. The drilling card for the modification of the above referenced well has been forwarded to your well driller.

Within 30 days of completion of the well, the well driller is required to furnish this Department with a complete and accurate log of the well. In addition, the well owner is required to submit the enclosed Completion Report within 30 days of installation of pump equipment.

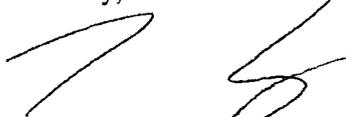
Pursuant to the provisions of A.R.S. § 45-604, any person withdrawing groundwater from a well is required to use a water measuring device to record rates of withdrawal in order to provide or allow the computation of an annual volume of pumpage from the well. The total volume of pumpage from the well shall be reported on your Annual Water Withdrawal and Use Report for calendar year 2009. Subsequent annual reporting periods shall be from January 1 through December 31.

The Department has issued the authorization to modify this well pursuant to A.R.S. §§ 45-596 and 45-597 of the Groundwater Code. The legal nature of the water withdrawn from the well may be the subject of court action in the future as part of a determination of surface water rights in your area. If there are court proceedings that could affect your well, you will be notified and be given the opportunity to participate.

Under A.R.S. § 45-593, the person to whom a well is registered must notify this Department of any changes in ownership, status or physical characteristics to keep the Well Registry records current and accurate. For future changes, a Request to Change Well Information form is also enclosed.

If you have any questions regarding the NOI to Modify, please contact Franus Darian Tomkiewicz of the Phoenix AMA at (602) 771-8648.

Sincerely,



Franus Darian Tomkiewicz
Water Resource Specialist III

Enclosures

cc: File

ARIZONA DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT DIVISION
3550 North Central Avenue
Phoenix, Arizona 85012

THIS AUTHORIZATION SHALL BE IN THE POSSESSION OF THE DRILLER DURING ALL DRILL OPERATIONS

WELL REGISTRATION NO: 55-616689

AUTHORIZED DRILLER: WEBER GROUP, L.C. LICENSE NO: 215

REMANDER: WEBER GROUP, L.C. IS RESPONSIBLE FOR CONSTRUCTING THE WELL TO CURRENT
MINIMUM WELL CONSTRUCTION STANDARDS, i.e., PROPER SURFACE SEAL PER A.A.C. R12-15-811

A NOTICE OF INTENTION TO MODIFY AN EXISTING NON-EXEMPT WELL INSIDE THE PHOENIX ACTIVE MANAGEMENT AREA
HAS BEEN GRANTED TO:

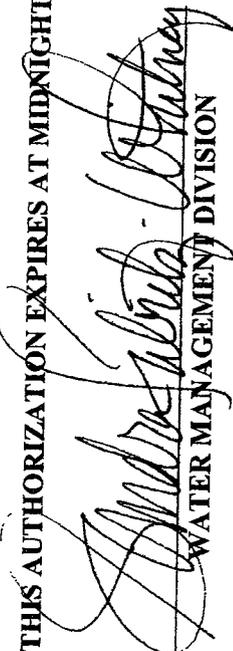
WELL OWNER: ARIZONA WATER COMPANY
3805 NORTH BLACK CANYON HIGHWAY
PHOENIX, AZ 85015

THE WELL IS TO BE LOCATED IN THE:

SE ¼ OF THE NW ¼ OF THE SW ¼ OF SECTION 33, TOWNSHIP 2 NORTH, RANGE 2 WEST

NO. OF WELLS IN THIS PROJECT: 1

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE 7TH DAY OF DECEMBER, 2010


WATER MANAGEMENT DIVISION



THE DRILLER MUST FILE A LOG OF THE WELL
WITHIN 30 DAYS OF COMPLETION OF DRILLING



Arizona Department of Water Resources
 Information Management Unit
 P.O. Box 33589 Phoenix, Arizona 85067-3589
 (602) 771-8627 • (800) 352-8488
 www.azwater.gov

Well Driller Report
 and
 Well Log

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL.
 PLEASE PRINT CLEARLY USING BLACK OR BLUE INK.

FILE NUMBER
B(2 - 2)33 CBD
 WELL REGISTRATION NUMBER
55-616689
 PERMIT NUMBER (IF ISSUED)
N/A

SECTION 1. DRILLING AUTHORIZATION

Drilling Firm

Mail To:	NAME WEBER GROUP, L.C.	DWR LICENSE NUMBER 215
	ADDRESS 16825 SOUTH WEBER DRIVE	TELEPHONE NUMBER (480) 961-1141
	CITY / STATE / ZIP CHANDLER, ARIZONA 85226-4112	FAX 480-961-0290

SECTION 2. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL
ARIZONA WATER CO

MAILING ADDRESS
3805 N. BLACK CANYON HWY

CITY / STATE / ZIP CODE
PHOENIX, AZ 85015

CONTACT PERSON NAME AND TITLE
JAMES WILSON - ENGINEER

TELEPHONE NUMBER
602

WELL NAME (e.g., MW-1, PZ-3, Lot 25 Well, Smith Well, etc.)
WHITE TANKS WELL #2

Location of Well

WELL LOCATION ADDRESS (IF ANY)
194TH AVENUE & MONTE VISTA

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
2	2	33	SW 1/4	NW 1/4	SE 1/4

LATITUDE	LONGITUDE
33 Degrees 28 Minutes 1184 Seconds N	112 Degrees 28 Minutes 3529 Seconds W

METHOD OF LATITUDE/LONGITUDE (CHECK ONE)
 GPS: Hand-Held *GPS: Survey-Grade

LAND SURFACE ELEVATION AT WELL
 Feet Above Sea Level

METHOD OF ELEVATION (CHECK ONE)
 *GPS: Hand-Held *GPS: Survey-Grade

*GEOGRAPHIC COORDINATE DATUM (CHECK ONE)
 NAD-83 Other (please specify):

COUNTY	ASSESSOR'S PARCEL ID NUMBER
MARICOPA	BOOK MAP PARCEL

SECTION 3: WELL CONSTRUCTION DETAILS

Drill Method	Method of Well Development	Method of Sealing at Reduction Points
CHECK ALL THAT APPLY <input type="checkbox"/> Air Rotary <input type="checkbox"/> Bored or Augered <input checked="" type="checkbox"/> Cable Tool <input type="checkbox"/> Dual Rotary <input type="checkbox"/> Mud Rotary <input type="checkbox"/> Reverse Circulation <input type="checkbox"/> Driven <input type="checkbox"/> Jetted <input type="checkbox"/> Air Percussion / Odex Tubing <input type="checkbox"/> Other (please specify):	CHECK ALL THAT APPLY <input type="checkbox"/> Airlift <input type="checkbox"/> Bail <input checked="" type="checkbox"/> Surge Block <input type="checkbox"/> Surge Pump <input type="checkbox"/> Other (please specify): Condition of Well CHECK ONE <input type="checkbox"/> Capped <input checked="" type="checkbox"/> Pump Installed	CHECK ONE <input checked="" type="checkbox"/> None <input type="checkbox"/> Packed <input type="checkbox"/> Swedged <input type="checkbox"/> Welded <input type="checkbox"/> Other (please specify): Construction Dates DATE WELL CONSTRUCTION STARTED 1-19-10 DATE WELL CONSTRUCTION COMPLETED 2-6-10

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.

SIGNATURE OF QUALIFYING PARTY
Ted Hegashes

DATE
3-11-10

SECTION 4: WELL CONSTRUCTION DESIGN (AS BUILT): (attach additional page if needed)

Depth:	
DEPTH OF BORING 485 Feet Below Land Surface	DEPTH OF COMPLETED WELL 485 Feet Below Land Surface

Water Level Information			
STATIC WATER LEVEL 269 Feet Below Land Surface	DATE MEASURED 2-17-10	TIME MEASURED 10:00 AM	IF FLOWING WELL, METHOD OF FLOW REGULATION <input type="checkbox"/> Valve <input type="checkbox"/> Other:

Borehole			Installed Casing														
DEPTH FROM SURFACE		BOREHOLE DIAMETER (inches)	DEPTH FROM SURFACE		OUTER DIAMETER (inches)	MATERIAL TYPE (T)				PERFORATION TYPE (T)					SLOT SIZE IF ANY (inches)		
FROM (feet)	TO (feet)		FROM (feet)	TO (feet)		STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED		IF OTHER TYPE, DESCRIBE	
0	219	8	0	219	6	✓											
219	485	6	219	485	6	✓							✓				
INSTALLED 6" CASING LINE																	

Installed Annular Material												
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)							FILTER PACK			
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	BENTONITE			IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
						GROUT	CHIPS	PELLETS				
									NONE			

ARIZONA WATER COMPANY COST ESTIMATE WORKSHEET

DATE PREPARED:

PRELIMINARY

ACTUAL

PREPARED BY:

James Wilson

SYSTEM:

SHEET

OF

PROJECT LOCATION:

DRAWING NO.

PROJECT DESCRIPTION:

Preliminary cost estimate to drill and equip a replacment well. Well drilling and equipment pricing taken directly from recently drilled wells in Casa Grande (Wells 32 & 33)

	DESCRIPTION	PLANT PROP ACCT	QUANTITY	UNIT COST	TOTAL	
C O N T R A C T W O R K	Purchase Property (1 acre)	314	1	\$ 70,000.00	\$ 70,000	
	Drill 1000' deep well and install 18" louverd casing	314	1	278,645.00	278,645	
	3-phase power to site	325	1	25,000.00	25,000	
	Install SES and MCC with SCADA controls and programing	325	1	126,680.00	126,680	
	Site grading, drainage, dry well and catch basin	314	1	55,000.00	55,000	
	Onsite underground piping and discharge header	343	1	45,000.00	45,000	
	Construct 8' block wall with rolling gate	314	1	45,000.00	45,000	
	Install pump, motor, colum pipe and discharge head	325	1	93,872.00	93,872	
	Contracting Tax (4.5%)			1	33,263.87	33,264
	Performance and Payment Bond (2%)			1	14,783.94	14,784
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-LONG	345				
TAXABLE SERVICE CONNECTIONS COMPLETE: SINGLE-SHORT	345					
TOTAL CONTRACT WORK					\$ 787,245	
M A T E R I A L S	Cla-Valve	325	2	\$ 4,500.00	\$ 9,000	
	8" Meter	325	1	5,057.00	5,057	
	Miscelaneous Materials	325	1	15,000.00	15,000	
	SERVICE CONNECTIONS: DOUBLE-LONG	345				
	SERVICE CONNECTIONS: DOUBLE-SHORT	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345				
	TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345				
	TAXABLE METERS	346				
	METERS	346				
TOTAL MATERIALS					\$ 29,057	
L A B O R						
	TESTING FEE	343	1	\$ 5,000.00	5,000	
	PERMIT FEE	343	1	15,000.00	15,000	
	SURVEY FEE	343	1	4,500.00	4,500	
	FIELD INSPECTION	343	1	5,500.00	5,500	
	INSTALL SERVICE CONNECTIONS: DOUBLE-LONG	345				
	INSTALL SERVICE CONNECTIONS: DOUBLE-SHORT	345				
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-LONG	345					
INSTALL TAXABLE SERVICE CONNECTIONS: SINGLE-SHORT	345					
TOTAL LABOR					\$ 30,000	
SUBTOTAL - CONTRACT WORK, MATERIALS, AND LABOR					\$ 846,302	
OVERHEAD					203,112	
TOTAL	REFUNDABLE PORTION <input type="checkbox"/>	NON-REFUNDABLE PORTION <input type="checkbox"/>	COST ESTIMATE		\$ 1,049,414	

2029092

RECEIVED

NOV 12 2009



ARIZONA WATER COMPANY

WEBER GROUP, LC

CONTRACT

CONTRACTOR: Weber Group LC DATE OF CONTRACT: November 4, 2009

Address: 16825 S. Weber Drive SYSTEM: White Tank

Chandler, AZ 85226 W.A. #: 1-4682

DESCRIPTION OF WORK: Video well, pull and replace the pump, motor and cable at White Tank Well #2 as per the attached proposal dated November 3, 2009.

WORK SHALL BE COMPLETED ON OR BEFORE 30 CALENDAR DAYS AFTER COMMENCEMENT NOTICE IS ISSUED.

(See Paragraph 4, below).

TOTAL COST	7087. ⁰⁰
(excluding taxes):	\$8,707.00

THIS CONTRACT is made by and between ARIZONA WATER COMPANY, an Arizona corporation, (hereinafter referred to as the "Company"), and the CONTRACTOR named above.

- The Contractor hereby certifies that it has read the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* ("AWC Specifications") and related construction drawings, and understands that all provisions of said AWC Specifications, and related construction drawings, apply to work covered under this Contract, and which, by this reference, are incorporated herein.
- The Contractor agrees, as an independent contractor, to furnish all of the labor, tools and certain materials required to perform the work described above for the Company, in accordance with the General Conditions of Contract and related construction drawings.
- The Company agrees to furnish to the Contractor, without any cost to Contractor, certain equipment and materials necessary to be used or expended in the performance of said work, as follows: NONE.
- Work shall not commence upon this Contract until a written Commencement Notice has been given to the Contractor by the Company. In the event the Commencement Notice is not given to the Contractor by the Company within ninety (90) calendar days from the date of this Contract, the Contractor has the option to cancel the Contract by giving written notice of cancellation to the Company.

Upon the satisfactory completion of the work within the Contract time limit, the Company agrees to pay, in cash, to the Contractor the total cost of the work, including all taxes.

SPECIAL CONDITIONS:

THIS SIGNED CONTRACT TO SERVE AS THE COMMENCEMENT NOTICE

ARIZONA WATER COMPANY
 Company _____ 11-10-09
 By: James T. Wilson
 Title: Senior Engineer
 AFH

WEBER GROUP LC
 Contractor _____
 By: Fred Negashkes
 Title: PRESIDENT

PROPOSAL
INCLUDING LABOR AND MATERIALS

In response to the Invitation To Bid from Arizona Water Company (the "Company"), and in accordance with the Company's most recent *General Conditions of Contract* (copy attached), *Construction Specifications* and *Standard Specification Drawings* (the "AWC Specifications") thereto, and all applicable plans, the undersigned Contractor hereby proposes and agrees to furnish and to do everything required by the terms and conditions of the Company's standard construction contract (the "Contract") to pull and replace the pump and motor at White Tank Well #2, Maricopa County, Arizona, at the following unit and/or total prices for the work described:

ITEM	WORK	QUANTITY & UNIT PRICE	TOTAL
1.	Labor to pull and replace the pump and motor, test and inspect the cable and air line and dispose of scrap materials.	1 ea. \$ 1950 ⁰⁰	\$ 1950 ⁰⁰
2.	Grundfos 230S300-9 30-HP pump assembly.	1 ea. \$ 4962 ⁰⁰	\$ 4962 ⁰⁰
3.	All miscellaneous materials including buckles, bandits and tape.	Lot. \$ 175 ⁰⁰	\$ 175 ⁰⁰
4.	#6 Submersible pump cable.	4101 \$ 2 ⁰⁰	
4.	Video well with downward and side scan, provide log and one VHS or DVD copy	1 ea. \$ 850 ⁰⁰	
5.	Brush and Ball with cable tool rig (per hour price only)	1 hr. \$ 190 ⁰⁰	
6.	4" x 20' Column (price only)	1 ea. \$ 200 ⁰⁰	
7.			
8.			

NOTE: PUMP COLUMN 4"X21' T&C GALVANIZED IS PRICED

Subtotal \$ 7087⁰⁰
 Taxes _____
 Subtotal \$ 7087⁰⁰
 100% Performance & Payment Bonds _____ %
 Total \$ 7087⁰⁰

The prices submitted in this Proposal are good for ninety (90) calendar days from the date of this Proposal. The work shall be completed within Forty Five (45) calendar days after the Commencement Notice is issued.

At the sole discretion of the Company, the 100% performance and payment bonds may not be required.

The Contractor represents that this Proposal, in all respects, is fair and honest and is submitted in good faith, and is not submitted in collusion with any other company, firm or individual. The Contractor represents that it is not in debt or default to the Company. The Contractor further represents that it has visited the site of the work and is knowledgeable of its environment. Within five (5) days of the Contractor receiving the Contract for the performance of this work, the Contractor will execute the Contract and return it to the appropriate Company office.

The Contractor agrees to provide the Company with a current Certificate of Insurance with coverage in the minimum amounts required by the General Conditions of Contract, before this Proposal will be accepted for consideration. It is understood and agreed that, if a claim is received by the Company in connection with the work performed under the Contract with the Company, the claim will be referred to the insurance carriers of the Contractor and the Company in accordance with the General Conditions of Contract.

The Contractor is the holder of Arizona State Contractor's License No. _____ Classification _____

Contractor's Complete Business Address: WEBER GROUP LC
11825 S. WEBER DR
CHANDLER, AZ
85224
 Contractor: WEBER GROUP LC
 By: [Signature]
 Title: RESIDENT
 Date: 11-3-09

ARIZONA WATER COMPANY

E-4-1

GENERAL CONDITIONS OF CONTRACT

DEFINITIONS

- A. Company. The words "Company" or "Arizona Water Company" mean Arizona Water Company, and where applicable, any division of Arizona Water Company, whose principal place of business is located at 3805 North Black Canyon Highway, Phoenix, Arizona 85015-5351 (Post Office Box 29006, Phoenix, Arizona 85038-9006).
- B. Company's Authorized Representative. The words "Company's Authorized Representative" mean any officer of the Company, and any of the Company's Engineers, any Division Manager or Superintendent of the Company and/or such other person(s) designated in writing as the "Company's Authorized Representative" by the President or any Vice President of the Company.
- C. Contractor. The word "Contractor" means either an individual or other entity employed to do the work as shown on the Construction Drawings and as specified herein.
- D. Construction Drawings. The words "Construction Drawings" mean plans prepared by or on behalf of Arizona Water Company.
- E. Invitation to Bid. The term "Invitation to Bid" means the current copy of Arizona Water Company's Form E-3-11-4 Request for Proposal/Contract or Form E-3-12-2 Invitation to Bid.
- F. Contract. The word "Contract" means the written document titled "Contract" or "Proposal/Contract" when such document has been signed by an officer or other authorized representative of both the Contractor and the Company.
- G. Inspector. The word "Inspector" means the Company's Authorized Representative or a person designated in writing by the Company's Authorized Representative.

GENERAL CONDITIONS OF CONTRACT

1. GENERAL

These General Conditions of Contract govern all works of installation and construction unless deviations are provided for on the Construction Drawings or in the Contract.

2. BONDS

The Contractor shall, upon request by the Company, furnish a performance bond and a material payment bond in the amount of 100% of the Contract price, in a form and from a surety acceptable to the Company.

3. LABOR AND/OR MATERIAL RELEASES

The Contractor shall supply labor and/or material releases satisfactory to the Company when requested to do so. Forms will be provided by the Company.

4. LICENSE

The Contractor shall have, as may be required by law, a valid license applicable to the work to be performed.

5. INSURANCE

The Contractor shall maintain in full force and effect insurance at no less than the following minimum amounts:

<i>WORKER'S COMPENSATION</i>	In accordance with requirements of the laws of the State of Arizona.
<i>COMPREHENSIVE GENERAL LIABILITY</i> (Including contractual liability covering death, bodily injury and property damage)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>AUTOMOTIVE LIABILITY</i> (Including owned, non-owned and hired vehicles)	Combined single limit of not less than \$1,000,000 for each occurrence.
<i>SUBCONTRACTOR'S PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE AND VEHICLE LIABILITY INSURANCE</i>	Contractor shall either require each of its subcontractors to procure and to maintain Subcontractor's Public Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in this Section 5 or insure the activities of its subcontractors in Contractor's own policy, in like amounts.

Such insurance shall name the Company, its officers, agents, and employees as additional insured and be primary for all purposes.

The Company will at all times have the right to require that all of such insurance be placed with insurance companies that are satisfactory to it. The Contractor shall file with the Company a certificate evidencing that each policy of insurance for the above coverages in the minimum amounts specified has been purchased and is in good standing.

Such certificate shall provide that notice be given to the Company at least thirty (30) days prior to cancellation or material change in the form of such policies or any of them. Such certificates shall be kept on file by the Company and the Company must have current certificates on file, or a certificate must accompany any bid proposal, before that proposal will be accepted by the Company.

6. CONTRACTOR UNDERSTANDS WORK AND WORKING CONDITIONS

By executing a Contract with the Company, the Contractor warrants that it has, by careful examination, satisfied itself as to the nature and location of the work, including soil conditions, the character, quality and quantity of the materials to be encountered, the character of the equipment and facilities needed preliminary to and during prosecution of the work, the general and local conditions, and all other matters which can in any way be expected to affect its work under the Contract. Verbal agreements or conversations with any officer, agent or employee of the Company, either before or after the execution of the Contract, are not binding upon the Company and shall not affect or modify any of the terms or obligations herein contained.

7. SPECIFICATIONS AND DRAWINGS

The Contractor shall keep on the job a complete copy of all drawings and specifications furnished by the Company which are applicable to the Contract with the Company. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications shall be of like effect as if shown or mentioned in both. In case of a discrepancy between the figures, drawings or specifications and physical conditions of the job, the matter shall be immediately submitted to the Company's Authorized Representative for decision as to adjustments, if any, because of the discrepancy; without a decision from the Company's Authorized Representative no discrepancy shall be adjusted by the Contractor, save only at its own risk and expense. Any deviation from the specifications must be approved in writing by the Company's Authorized Representative.

8. PROPERTY PROTECTION

Trees, fences, poles, underground structures and all other property shall be protected unless their removal is authorized on the Construction Drawings. Any property damaged shall be restored by the Contractor, at its expense, to the owner's satisfaction.

9. SPECIAL PERMITS, LICENSES AND INSURANCE

The Company shall obtain all permits for railroad, county, state, city and irrigation district rights-of-way as well as Forest Service, State Land Department and Bureau of Land Management permits. (Pipeline Contractors)

Whenever blasting is required, the Contractor shall obtain all permits, licenses and insurance required at its expense. (All Contractors)

The Contractor will be required to obtain, and shall certify in writing to the Company that it has obtained, all additional permits required to perform the work including, but not limited to, a National Pollution Discharge Elimination System Permit and/or an Aquifer Protection Permit as those permits relate to disposal of drilling, development and test waters and/or any other discharge or similar activity. (Well Drilling Contractors)

10. SURVEYS

The Company shall be responsible, or arrange, for all surveys required for the work covered in the Contract, unless otherwise specified.

11. BENCH MARKS, PROPERTY STAKES AND SURVEY STAKES

Bench marks, property stakes and survey stakes shall be preserved by the Contractor; in case they are destroyed or removed by Contractor or its employees, the Company will replace them at the Contractor's expense, and the Contractor and its sureties shall be liable therefore.

12. TOOLS, EQUIPMENT AND MATERIALS

The Contractor shall furnish all of the necessary tools, equipment, and pipeline materials required for the work. All material furnished by the Contractor shall be of the quality specified by the Company in its Construction Specifications (E-8-1).

13. SUPERINTENDENCE BY CONTRACTOR

The Contractor shall assure adequate superintendence of the work by a competent foreman or superintendent (with full authority to act on behalf of Contractor) satisfactory to the Company, who will be on the job at all times when work is in progress.

14. ORDER AND DISCIPLINE

The Contractor shall at all times enforce strict discipline and good order among its employees.

15. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and any provisions in the Contract, the specifications, or these General Conditions of Contract and Arizona Water Company's Construction Specifications which may appear to give the Company the right to direct the Contractor as to the details of the doing of any work to be performed by the Contractor, or to exercise a measure of control over said work, shall be deemed to mean and shall

mean, that the Contractor shall follow the desires of the Company in the results of the work only and not in the means whereby said work is to be accomplished, and the Contractor shall use its own discretion and shall have complete and authoritative control over the work and as to the details of the doing of the work.

16. PUBLIC SAFETY AND CONVENIENCE

Contractor shall at all times conduct its work so as to ensure the least possible obstruction to traffic and other inconvenience to the general public and the residents and businesses in the vicinity of the work, and to ensure the protection of persons and property.

To protect persons from injury and to avoid property damage, Contractor shall provide and maintain adequate barricades as required during the progress of the work and until it is safe to use the property for its intended purpose. The rules and regulations of the local governmental agencies and specific permit requirements respecting safety provisions shall be observed at all times.

In the case of blasting, the Contractor shall exercise extreme caution to protect the general public and personal and public property from harm or damage.

17. PROPERTY PROTECTION

Trees, fences, poles, and all other property shall be protected unless their removal is authorized by the Company. Any property damaged shall be restored by Contractor, at his expense, to Company's satisfaction.

18. RESPONSIBILITY OF CONTRACTOR

The work shall be under Contractor's responsible care and charge. Contractor shall bear all loss and damage whatsoever and from whatsoever cause, except that caused solely by the act of Company, which may occur on or to the work during the fulfillment of the Contract. If any loss or damage occurs, Contractor shall immediately make good any such loss or damage, and in the event of Contractor refusing or neglecting to do so, Company may, or by the employment of some other person, make good any such loss or damage, and the cost and expense of so doing shall be charged to Contractor.

The mention of any specific responsibility or liability imposed upon Contractor shall not be construed as a limitation or restriction of any general liability or duty imposed upon Contractor by the Contract. The reference to any specific duty or liability being made herein is merely for the purpose of explanation.

Contractor alone shall at all times be responsible for the safety of Contractor, Contractor's employees, and its subcontractors' employees, and for Contractor and its subcontractors' plant and equipment and the method of performing the work.

19. ERRORS AND OMISSIONS

If Contractor, in the course of the work, becomes aware of any errors or omissions in the Contract Documents or in the instructions, or if Contractor becomes aware of any discrepancy between the Contract Documents and the physical conditions of the site of

the work, Contractor shall immediately inform Company in writing. Any work done by Contractor after such discovery, until authorized by Company, will be done at Contractor's risk.

20. LAWS, REGULATIONS

Contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations, including, but not limited to, all applicable federal, state, local and other legally required health and safety standards, orders, rules, regulations or other laws, pertaining to the conduct of the work. Contractor shall be liable for, and shall defend and indemnify Company against and hold it harmless from, all violations of any law, ordinance, rule, regulation, standard, or order in connection with work furnished by or on behalf of Contractor. If Contractor observes that the Contract Documents are at variance with any law, ordinance, rule, regulation, standard, or order it shall promptly notify Company in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. Contractor shall not perform any work contrary to such laws ordinances, rules, regulations, standards, or orders.

21. PERMITS, FEES AND INSPECTIONS

Permits and licenses necessary for the prosecution of the work, including, but not limited to, any National Pollution Discharge Elimination Systems (NPDES) Permits required by U.S. Environmental Protection Agency or the Arizona Department of Environmental Quality shall be secured, paid for, and complied with by Contractor.

Contractor shall be responsible for its actions and shall abide by all conditions and/or restrictions set forth in the NPDES Permit and any other permit or license required for this project.

Company shall at all times have access to the work whenever it is in preparation or in progress and Contractor shall provide proper facilities for such access and for all inspections. If the Contract Documents, the General Superintendent's instructions, laws, ordinances or any public authority require any work to be inspected or approved, Contractor shall give timely notice of its readiness for inspection.

Inspection of the work shall not relieve Contractor of any of its obligations even if defective work or unsuitable materials may have been previously overlooked by Company and accepted or estimated for payment. If any work is found not in accordance with the Contract Documents, Contractor, at its sole cost and expense, shall promptly make good such defective work.

22. CONSTRUCTION MARKING (PIPELINE ONLY)

Each job shall be marked and/or barricaded by the Contractor in such a manner that the construction is clearly visible at all times.

23. EXTRA WORK AND/OR MATERIALS

Except as otherwise herein provided, no charge for any extra work and/or material will be allowed unless the same has been ordered in writing by the Company's Authorized Representative, and the price stated in such order.

24. CHANGES

The Company shall have the right to make any changes in the work that it may determine to be necessary. If such changes affect the cost of the work, an equitable adjustment shall be negotiated. Changes shall in no way affect or void the obligations of both parties under the original Contract.

25. INSPECTION

All work and material shall be open at all times to inspection and acceptance or rejection by the Company's Inspector. Any work covered up by the Contractor prior to inspection and acceptance by the Company shall be subject to being uncovered at the expense of the Contractor for inspection by the Company. The Contractor shall give the Company reasonable notice of starting new work and shall provide, without extra charge, reasonable and necessary facilities for inspection, even to the extent of taking out portions of finished work. In case any such finished work removed is found satisfactory, however, the actual direct cost of such removal and replacement, plus 15% of such cost, will be paid by the Company; in addition, if completion of the work has been delayed thereby, the Contractor shall be granted a suitable extension of time on account of the additional work involved.

26. DEFECTIVE WORK OR MATERIAL

The Contractor shall remove, at its own expense, any work or material found defective by the Company's Inspector and shall rebuild and replace the same without extra charge; in default thereof, the same may be done by the Company at the Contractor's expense.

27. ASSIGNMENT

Neither party to the Contract may assign the Contract or sublet it in whole or in part without the written consent of the other, nor shall the Contractor assign any monies due or which may become due hereunder without the previous written consent of the Company, nor shall such consent release the Contractor from any of its obligations and liabilities under the Contract.

28. RIGHTS OF VARIOUS INTERESTS

Whenever work that is being done for the Company other than by the Contractor is contiguous to work being done by the Contractor, the respective rights of the various interests involved shall be established by the Company to secure the completion of the various portions of the work in general harmony.

29. SUSPENSION OF WORK

The Company's Authorized Representative may at any time and for any reason suspend all or any portion of the work under the Contract. This right to suspend work shall not be construed as denying the Contractor compensation for actual, reasonable and necessary expenses due to suspension to which it may be entitled.

The Company's Authorized Representative may order the Contractor to suspend any work because of certain conditions, such as inclement weather, or because the

Contractor is in violation of these General Conditions of Contract or the Construction Specifications. It is understood that compensation for expenses will not be allowed for such suspension when ordered by the Company's Authorized Representative on account of such conditions.

30. PROCEDURE OF WORK (PIPELINE ONLY)

All work under the Contract shall be planned and performed so as to cause a minimum of interference with normal vehicular and pedestrian traffic. At no time shall the Contractor completely obstruct the traffic to any business establishment during normal work hours of that business. It shall be the Contractor's responsibility to maintain facilities for ingress and egress to any business establishment. When crossing any street, not more than one-half of the street may be blocked at one time. All federal, state, county and city laws, rules and regulations relating to this subject are to be obeyed.

The Contractor shall complete any portion or portions of the work in such order of time as the Company may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work. If such prior possession or use increases the cost of or delays the work, the Contractor will be entitled to extra compensation or extension of time or both, as the Company may determine.

31. DISPUTES

All questions or controversies which arise between the Contractor and the Company, under, or in reference to, the Contract, shall be decided by the Company's Authorized Representative and a representative of the Contractor, and their decision shall be final and conclusive upon both parties.

32. CONNECTION TO EXISTING SYSTEM (PIPELINE ONLY)

Unless approved in writing by the Company's Authorized Representative, no tie-in or hot tap on the existing system shall be made unless the Company's Inspector is present. When the tie-in requires the operation of an existing valve or other control equipment, the conditions of Paragraph 29 shall be complied with. The Contractor shall notify the Company twenty-four (24) hours prior to tie-in as to the exact time the Contractor plans to make tie-in so that the Company's Inspector will have sufficient time to locate valves and make necessary preliminary arrangements for shut down.

33. PLANNED INTERRUPTION OF WATER SERVICE (PIPELINE ONLY)

No valve or other control on an existing Company water system shall be operated for any purpose by the Contractor without approval of the Company's Inspector. All of the Company's water customers whose service is interrupted by a planned interruption, other than in cases of emergency, shall be notified by the Contractor at least twenty-four (24) hours before the planned interruption and advised of the probable time when the service will be restored.

34. EXISTING UTILITY FACILITIES (PIPELINE ONLY)

The Contractor shall notify all known utilities in the area of the work to be performed under the Contract and shall make arrangements to have their facilities marked in

accordance with A.R.S. 40-360.022 ("Blue Stake Law"). The Contractor shall be responsible for locating and preserving all marked facilities. Any damages to these marked facilities shall be repaired at the expense of the Contractor.

The Company will pay the cost to relocate its or other structures when such structures are found occupying the physical space of the proposed installation. It is understood that the Contractor will be reimbursed for such work only when written authorization from the Company has been obtained in advance of such work.

35. CLEANING UP

The Contractor shall remove from the Company's property and from all public and private property, at its own expense, all temporary structures, rubbish and waste materials resulting from its operations. In the event Contractor fails to do so, the Company may remove same at the expense of the Contractor.

36. WORKING HOURS (PIPELINE ONLY)

Unless stated to the contrary in the Invitation to Bid and/or so stated on the Construction Drawings, or agreed to by the Company during a Pre-Construction Conference, the Contractor shall not be permitted to perform work on Saturdays, Sundays, or Company holidays, or commence work such as tie-ins that cannot be completed during normal working hours.

37. INDEMNITY

- A. The Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, loss, actions, causes of action, expense, penalties, fines, assessments, damages and costs of every kind and nature for injury to or death of any and all persons, including, without limitation, employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, and for damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, property of the Company or of the Contractor or of any subcontractor, or of any other person or persons, and the violation of any law, ordinance, rule, regulation, standard, or order resulting from or in any manner arising out of or in connection with the performance of the work under the Contract, howsoever same may be caused, including, without limitation, the Company's active or passive negligence. The Contractor shall also, upon request by the Company, and at no expense to the Company, defend the Company in any and all suits, concerning such injury to or death of any and all persons, and concerning such damage, destruction or loss, consequential or otherwise, to or of any and all property, real or personal, including, without limitation, suits by employees or representatives of the Company or of the Contractor or of any subcontractor, or any other person or persons, or concerning any court or administrative proceeding concerning the violation of any law, ordinance, rule, regulation, standard, or order. Excluded from this paragraph are only those injuries to or deaths of persons and damage, destruction or loss, to or of property arising from the sole negligence or willful misconduct of the Company.
- B. Contractor shall indemnify the Company against, and save and hold it harmless from, any and all liability, claims, demands, damages, costs, expenses and attorney's fees, suffered or incurred on account of any breach of any obligation, covenant or other

provision of this contract, including without limitation, breach of the indemnity provisions of subsection A of this Section 36.

- C. Contractor further agrees to defend, indemnify and hold harmless the Company, its directors, officers, employees, and agents, from and against any and all costs, damages, claims, expenses, violations, notices of violations, penalties, liens, assessments, and liabilities of every kind and nature, foreseeable or unforeseeable, directly or indirectly, arising from any release, removal, generation, use, storage or disposal on, under, around, or from the well site of any material, substance, or waste, hazardous or non-hazardous, including, without limitation, drilling fluids, mud, cuttings and development and test water howsoever same may be caused, including, without limitation, the Company's active or passive negligence.

38. LIENS

If at any time there shall be evidence of any lien or claim for which the Company might become liable and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim. If the Company determines that such lien or claim is valid, the Company may pay and discharge the same, and deduct the amount so paid from any monies which may be or become due and payable to the Contractor.

39. PAYMENT

Upon completion of the installation or construction, the Company will, within thirty (30) days after receipt of proper invoice and labor and material releases, pay the amount due the Contractor. If the Company believes that additional work, such as clean up, is required, it may deduct the total cost of such additional work from the amount to be paid to Contractor.

40. COMPANY'S RIGHT TO TERMINATE CONTRACT: DAMAGES DUE TO DELAY

If the Company finds the Contractor to be in material violation of any section of these General Conditions of Contract, Construction Specifications or Standard Specification Drawings or if the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified or any extension thereof, or fails to complete said work within such time, or when any other cause exists to justify such action, the Company may, without prejudice to any other right or remedy, by written notice to the Contractor, terminate its right to proceed with the work or such part of the work as to which there has been such violation, delay or other cause.

In the event the Contractor's right to proceed is terminated, the Company may take over the work and take possession of, and utilize in completing the work, such materials as may be on the site of the work and necessary therefore and prosecute said work to completion by whatever method it may deem expedient. The Contractor and its sureties shall be liable to the Company for any excess cost caused thereby.

In the event the Contractor's right to proceed with the work is terminated, the Contractor shall not be entitled to receive any further payment until the work is completed or the job is canceled. If the unpaid balance of the Contract price exceeds the expense of finishing

the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expenses exceed such unpaid balance, the Contractor shall pay the difference to the Company.

41. GUARANTEE

The Contractor shall guarantee all labor and workmanship and any materials it installs for a period of one year following the date of completion and acceptance by the Company. If any portion of the work or any of the materials become defective within the guarantee period, the Company will notify the Contractor of such defect. The Contractor must repair any defect within fifteen (15) days of such notification. If repairs are not completed within this time period, the Company may repair the defect, or cause such defect to be repaired, and the cost of such repairs shall be paid by the Contractor. The Company reserves the right to determine which defects are the result of poor labor and workmanship and which are caused by defective materials.

42. LIQUIDATED DAMAGES FOR NON PERFORMANCE: REQUEST FOR EXTENSION(S) OF TIME

Time is of the essence in the Contract. The time period required for completion of the work will be specified in the Contract. The Contractor agrees that the Company will suffer substantial damages in the event the Contractor fails to complete the work within the agreed upon time period. The Contractor and the Company agree that since it would be impracticable or extremely difficult to precisely fix such damages, a reasonable approximation of such actual damages suffered by the Company shall be a sum equal to 0.5% of the Contract price for each working day beyond the time period for completion of the work specified in the Contract.

Request by the Contractor for extensions of the time period shall be in writing and shall not become effective until approved in writing by the Company's Authorized Representative.

43. PAYMENT FOR REQUIRED TESTING

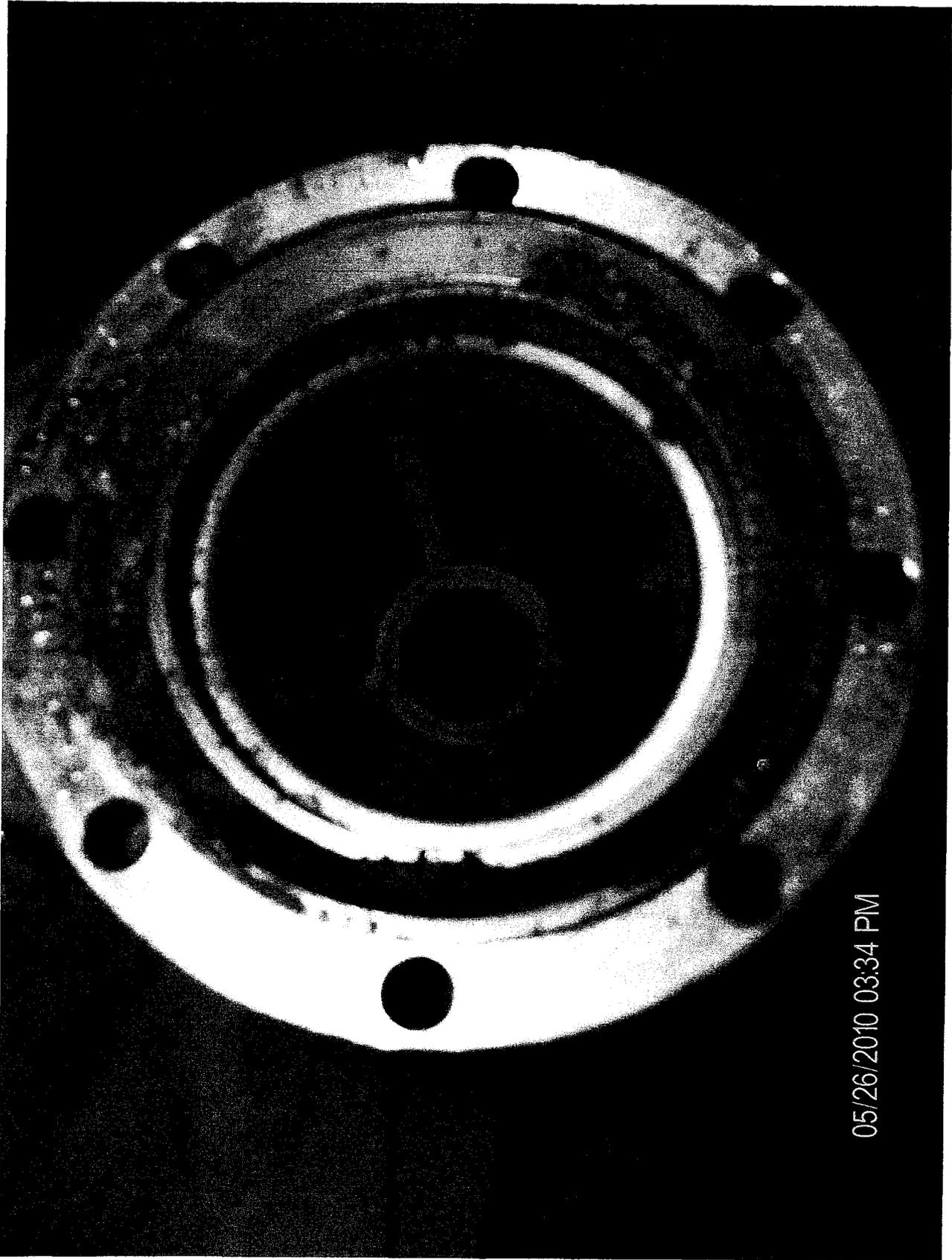
Whenever testing is required by any governmental agency or by the Company to assure conformance of the Contractor's work with the appropriate standard, it will be paid for as follows:

- a. For testing required under permits obtained by the Company or testing specifically requested by the Company, the cost of the first test will be paid for by the Company. In the event of failure of the first test, the cost of all further testing associated with the failure will be paid by the Contractor.
- b. For testing required under permits obtained by the Contractor, all costs will be paid by the Contractor. Testing of the pipeline for pressure and leakage will be included in the Contract price.

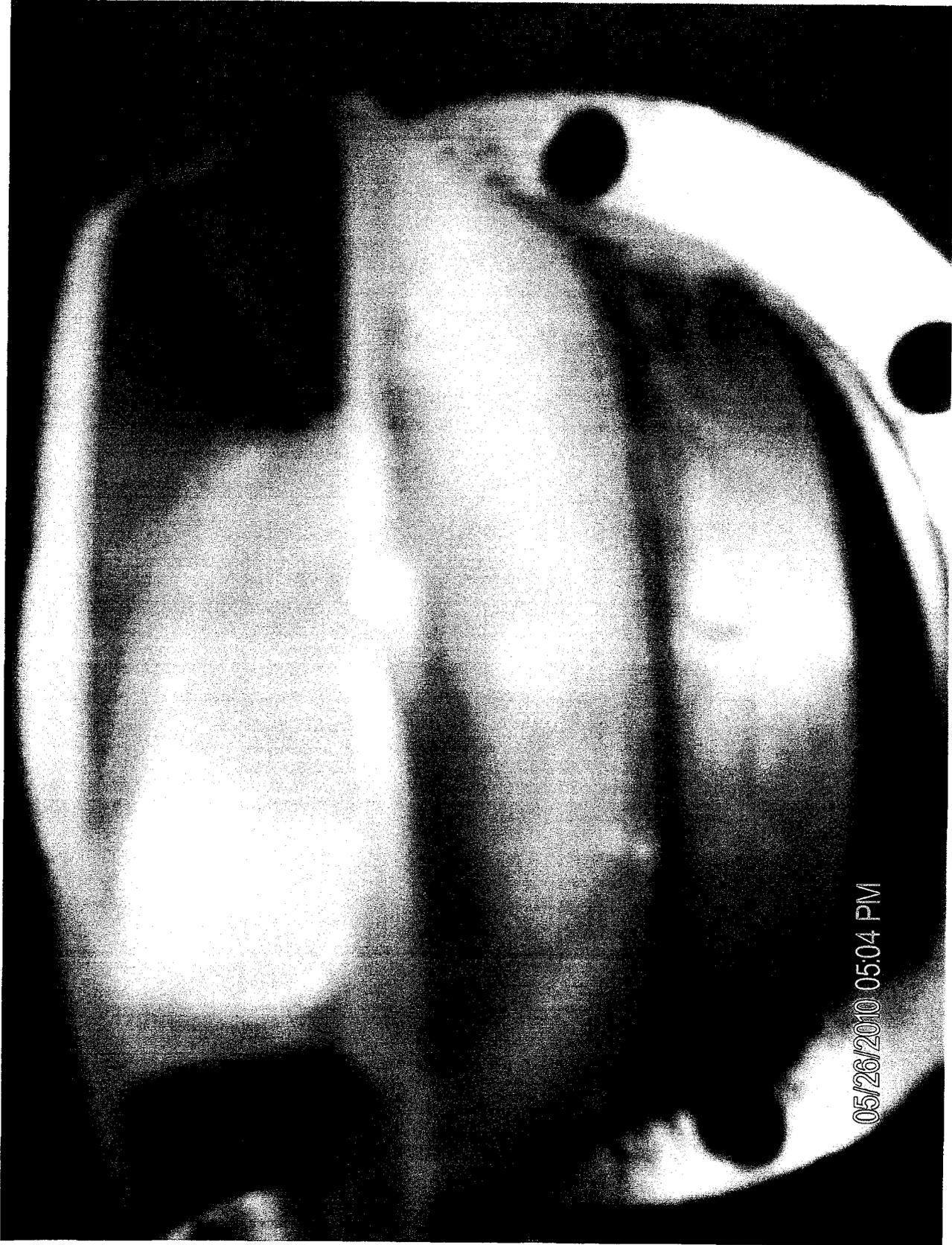
44. CONTRACT DEADLINES AND BONDS REQUIREMENTS

The time limits to be allowed for the completion of any work covered in the Contract shall be established as follows: In the proposal submitted to the Company, in response to the Invitation to Bid, the Contractor shall state the number of calendar days required for completion of the work. The time required will become a part of the Contract. When the Company is ready to proceed with the work, a Commencement Notice will be issued by the Company to the Contractor by mail. The Commencement Notice will allow the time required in the Contract plus ten (10) calendar days and will indicate the final day of the time allowed. The work cannot begin until the Company has received a performance bond and materials payment bond for the Contract price unless the bonds have been waived under the special conditions section of the Contract. The additional ten (10) days is the allowance for time to deliver the Commencement Notice to the Contractor and for the Contractor to return the performance bond and materials payment bond to the Company. Time extensions will be granted if warranted, and only at the time of the delay, thus extending the final day of the time allowed.

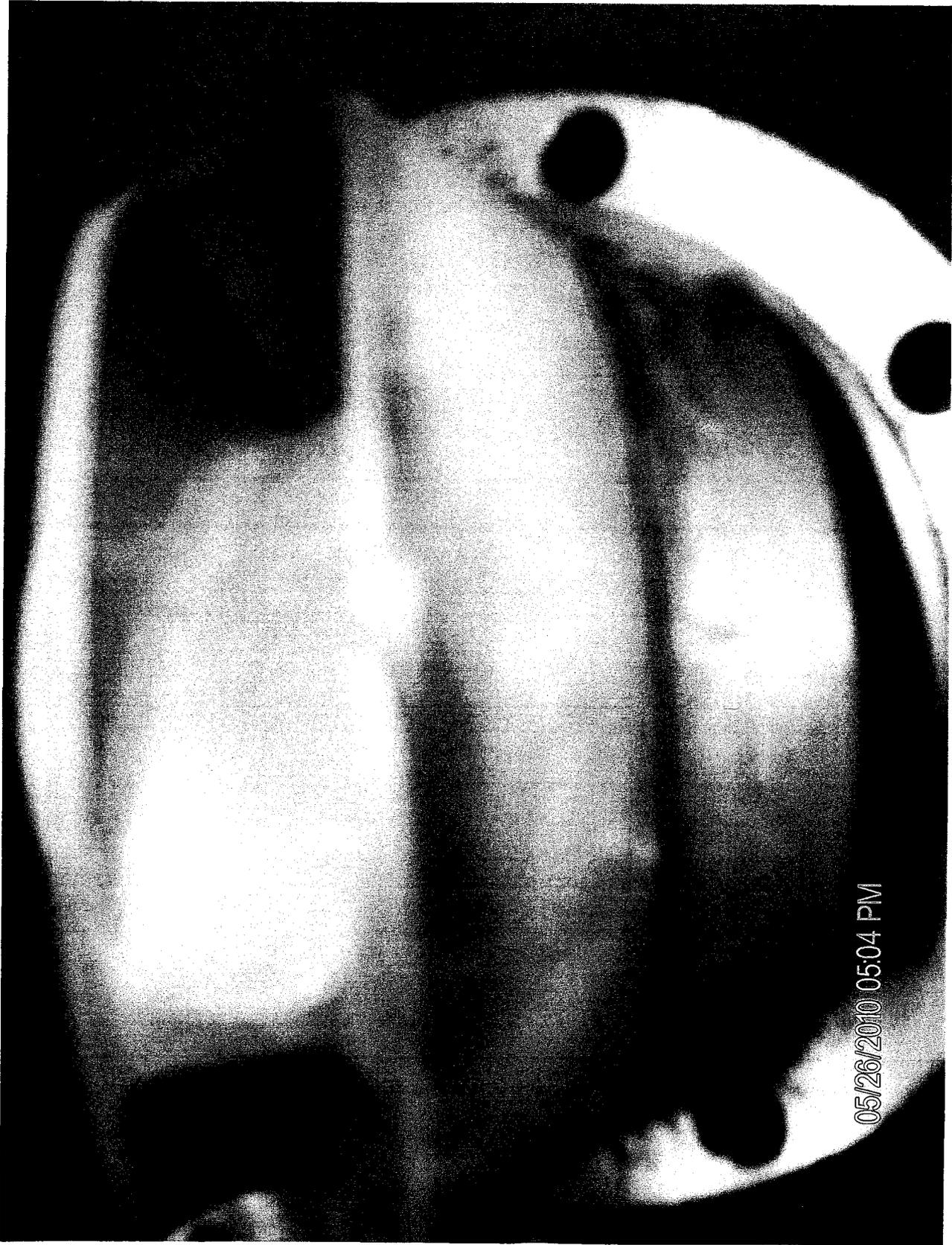
If the Company elects not to require a performance bond and a material payment bond for the work, the cost of the bonds will be deducted from the proposed total cost and the Contract will reflect this reduced cost and the bonds requirements will be waived under special conditions of the Contract.



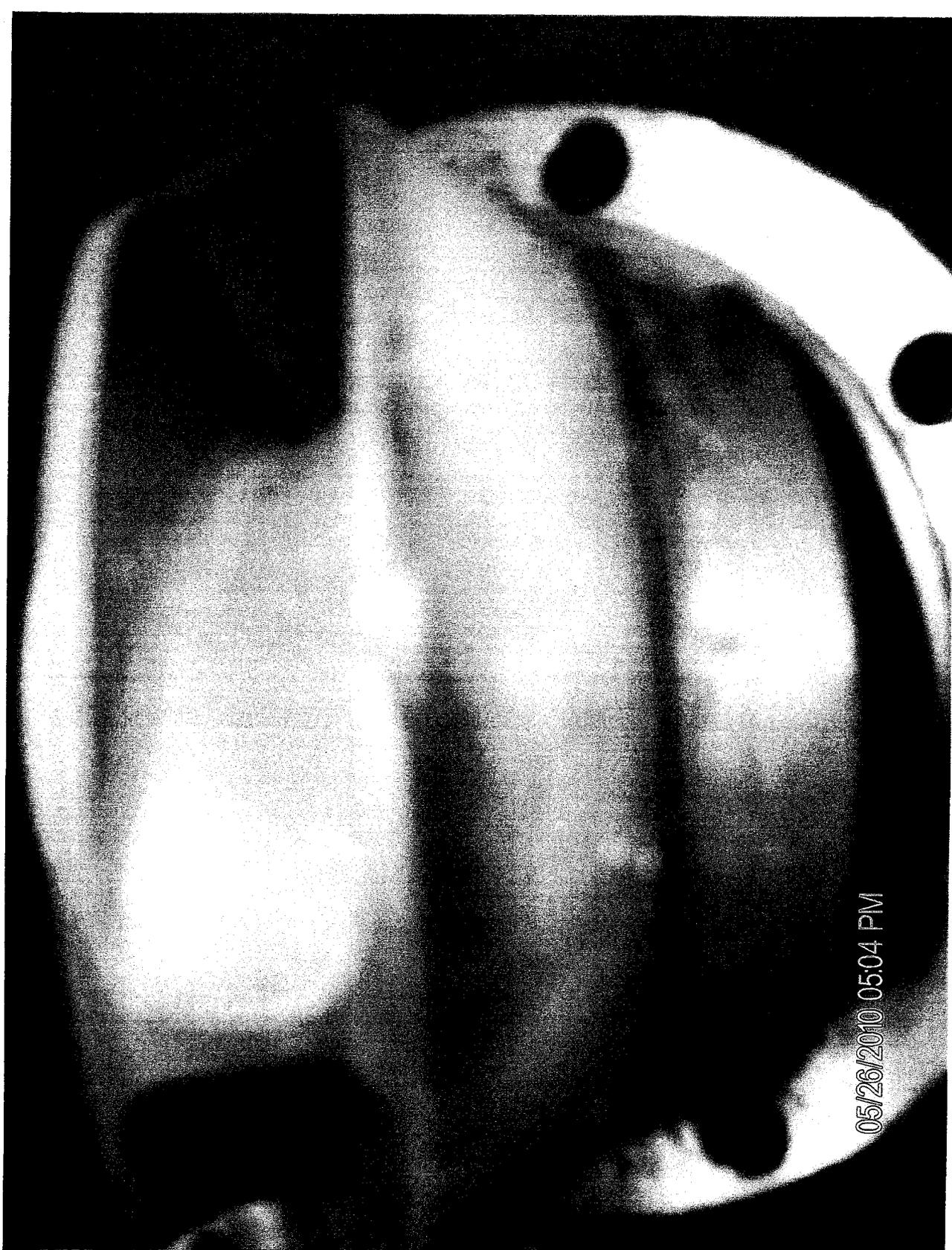
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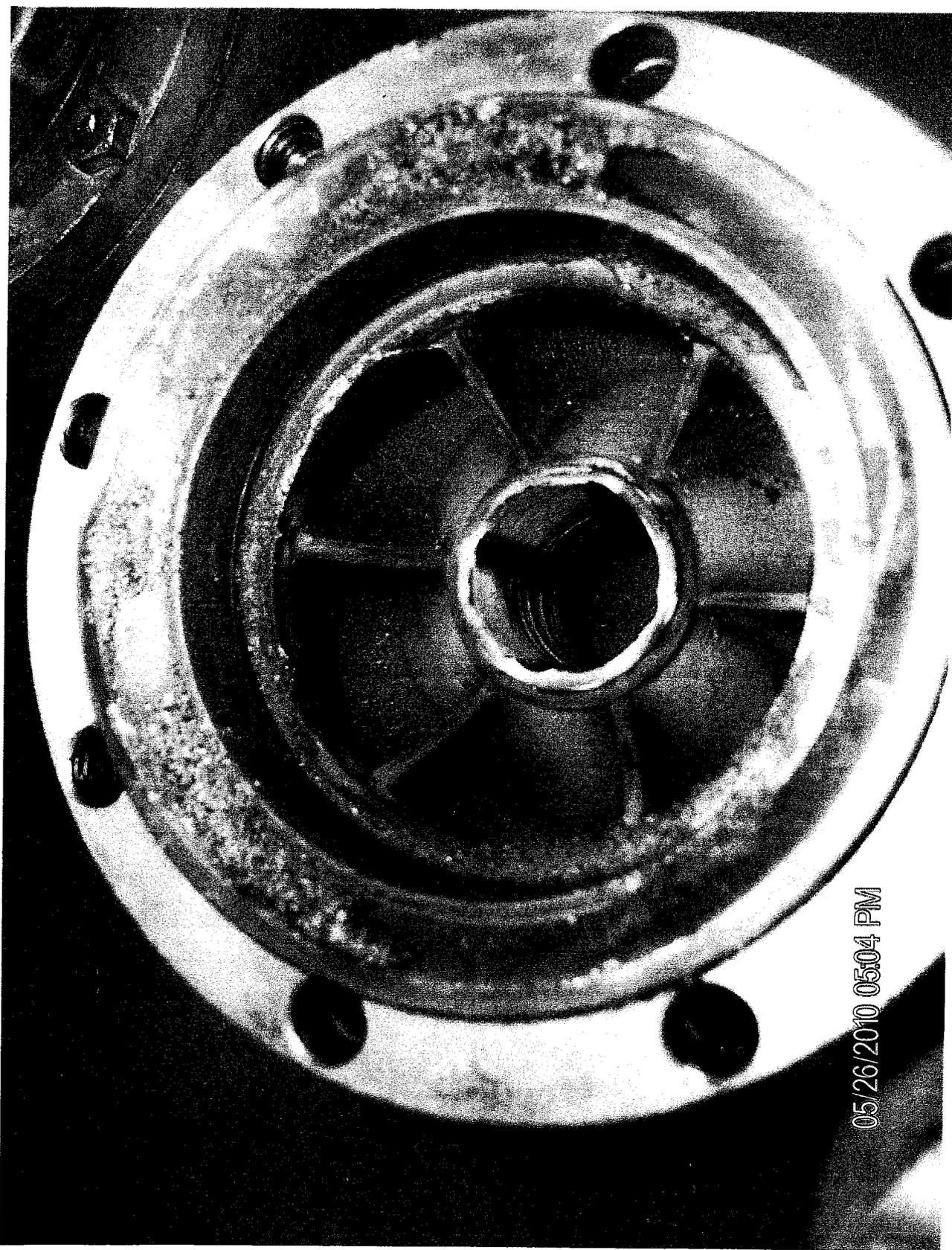
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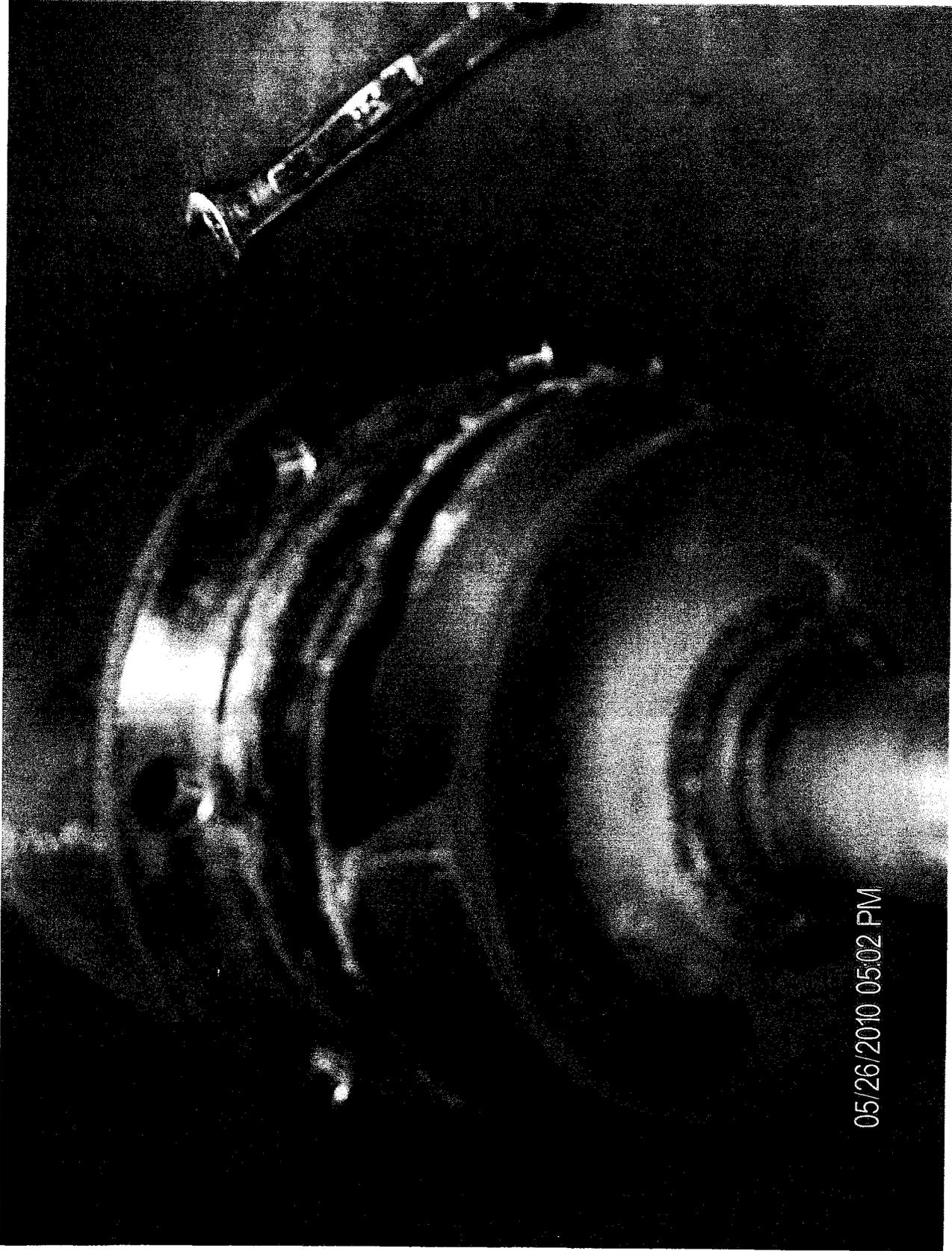
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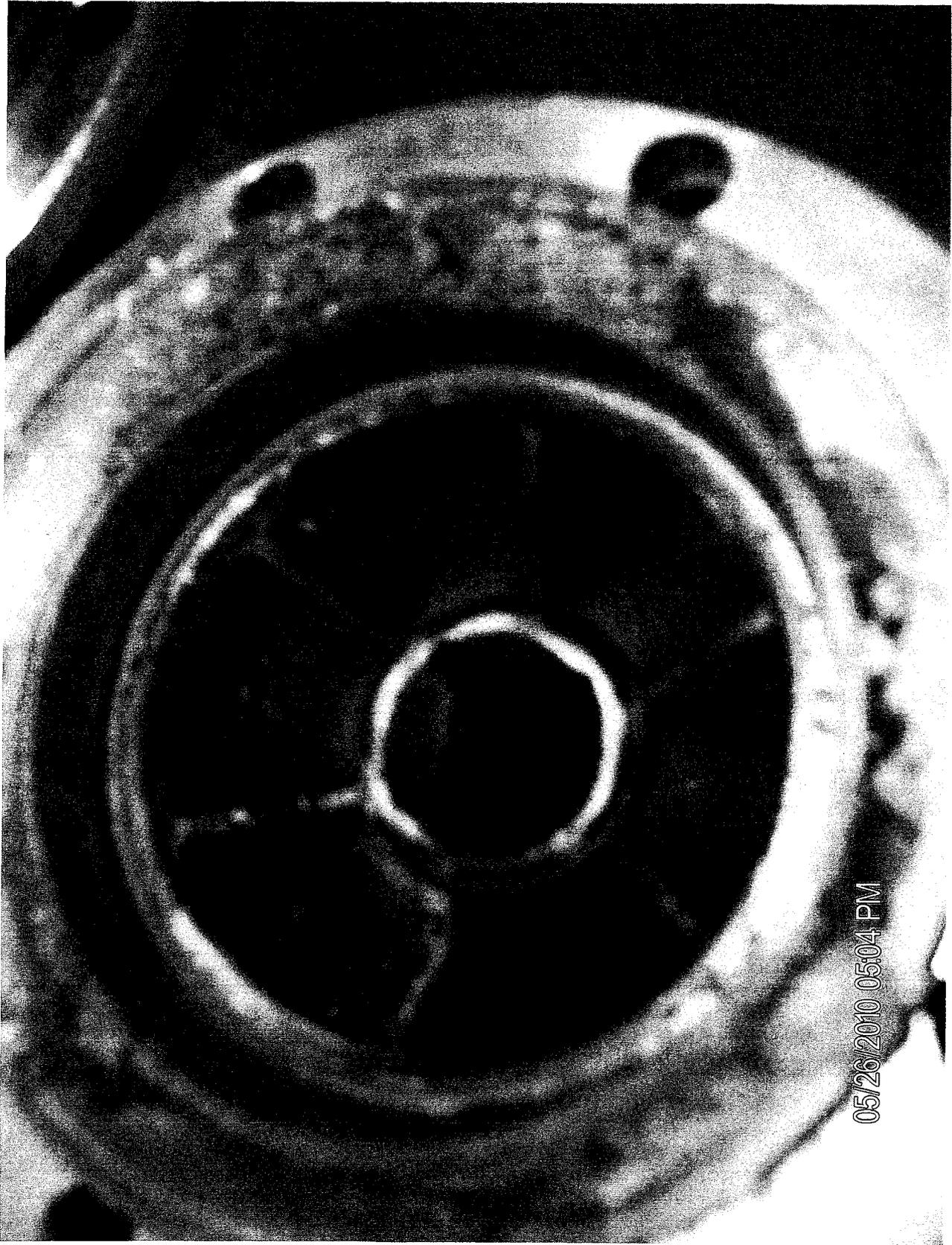
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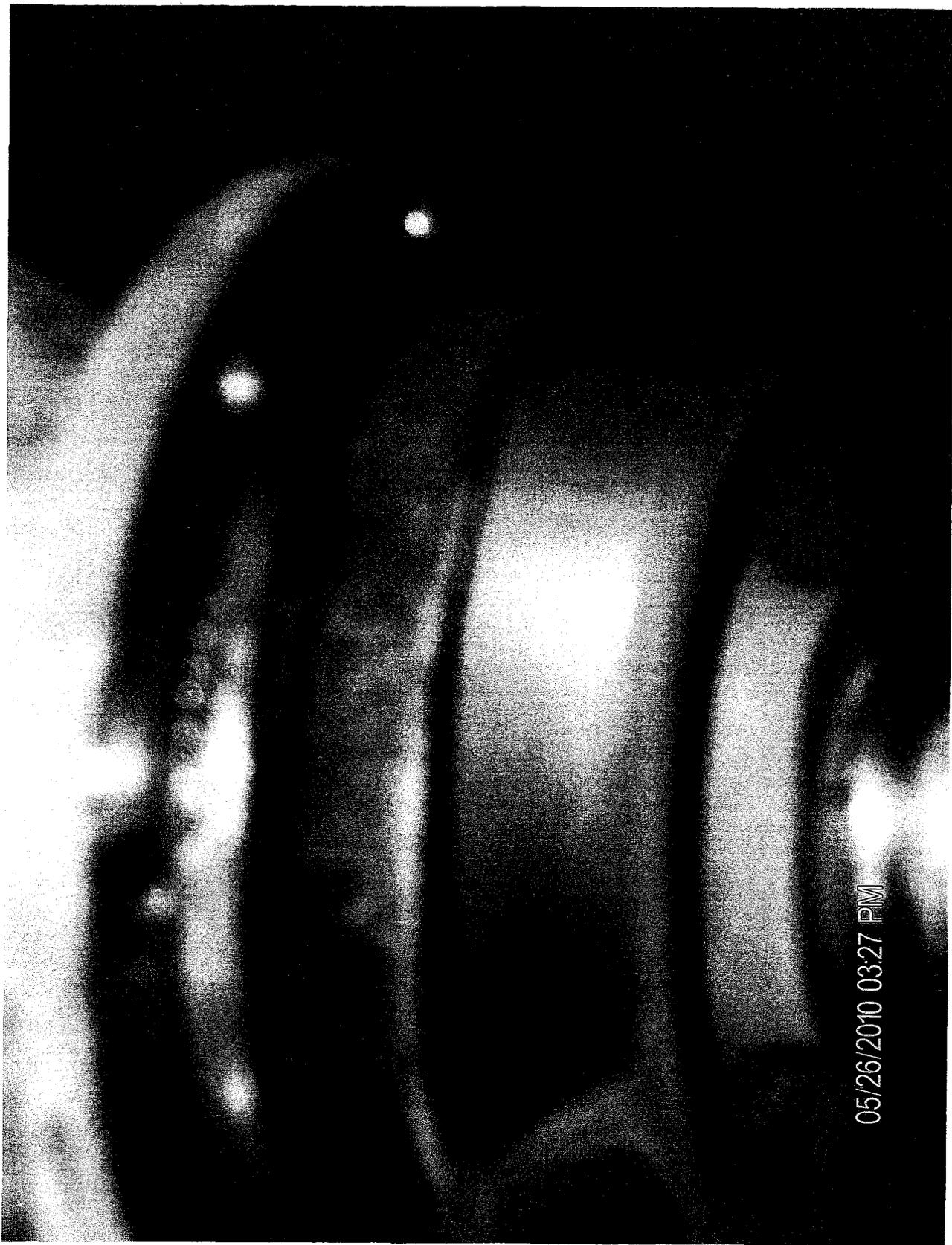
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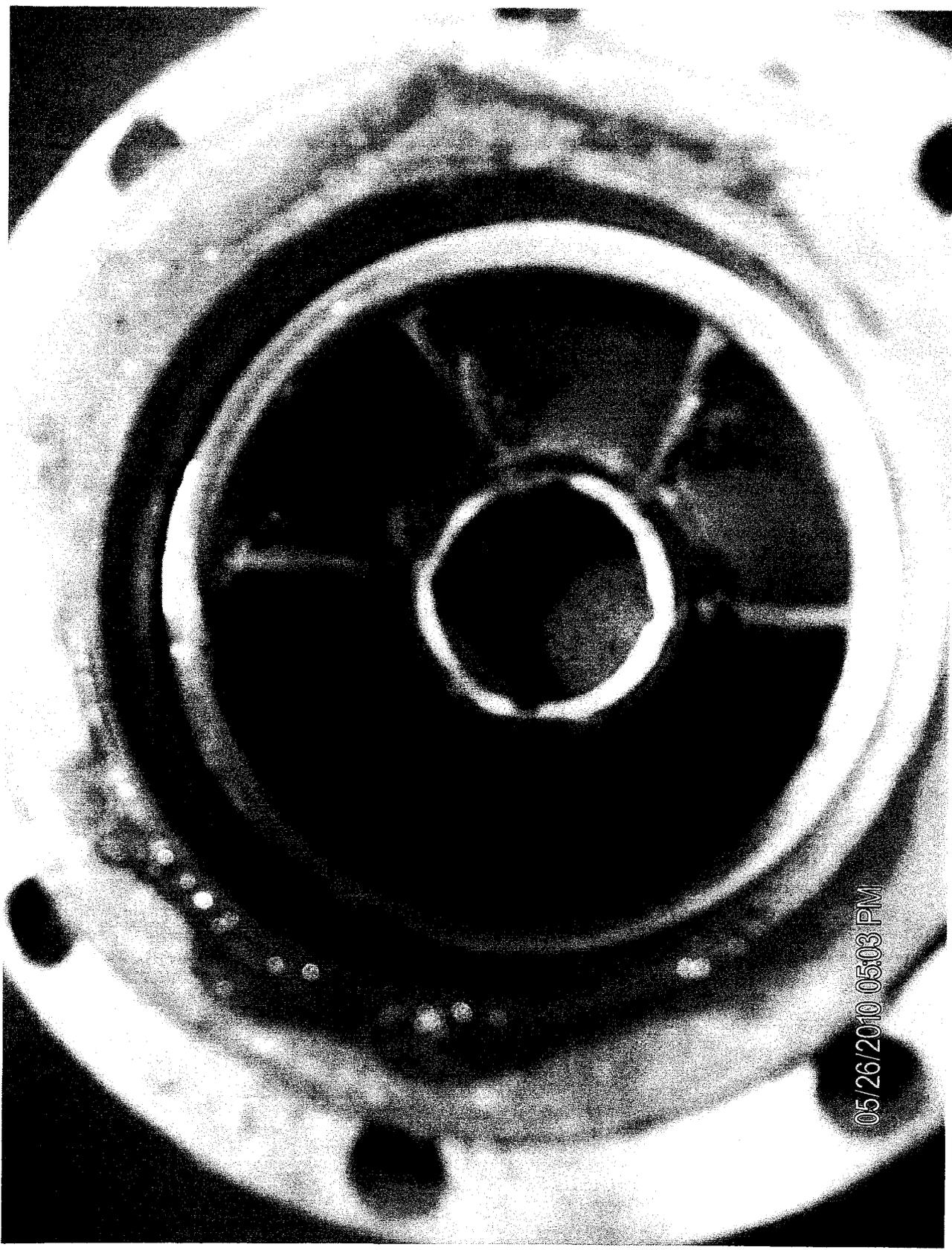
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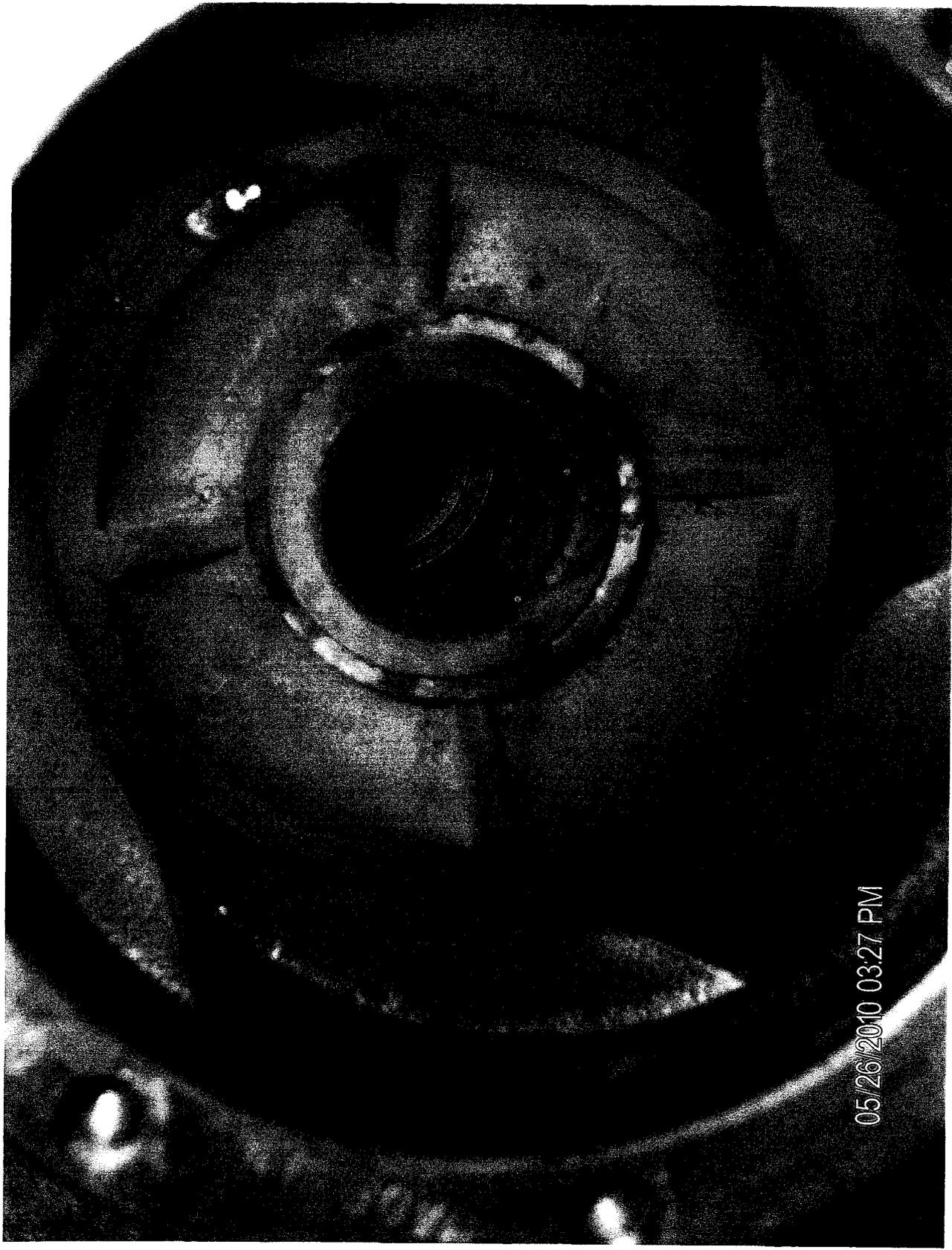
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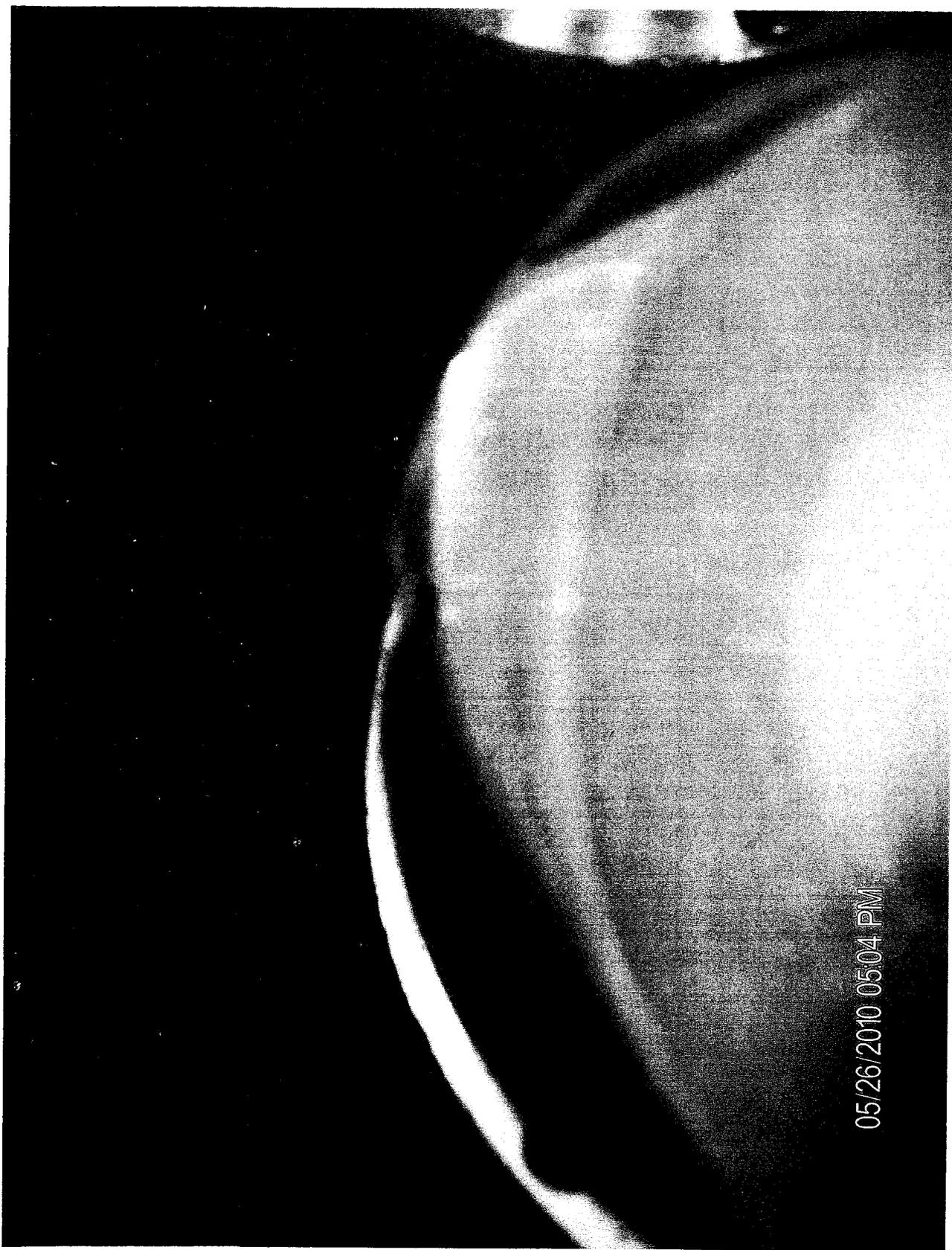
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TUCSON
2838 W. Ruthrauff Rd.
Tucson, AZ 85705
Ph: 520-887-2170

Weber Group L.C.

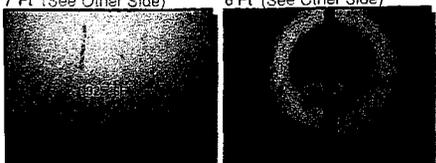
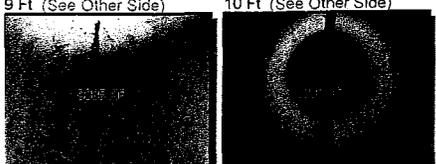
WATER RESOURCES

Corporate Headquarters 16825 South Weber Drive Chandler, AZ 85206
Ph: 480-961-1141 Fax: 480-961-0290

GOODYEAR
18403 W. McDowell Rd.
Goodyear, AZ 85338
Ph: 520-887-2170

Well Video Report

Client: Arizona Water Company Survey Date: November 12, 2009
 Address: 194th Ave. & Monte Vista Invoice: 2029092 Run: 1
 City: Buckeye State: AZ Zip: _____ Well Name: White Tank #2
 Requested By: Fred T. P.O.: _____ Well Owner: Az Water Co.
 Copy To: Az Water Co. Camera: CCV S.S. Color Camera - Short L.H.
 Reason For Survey: General Inspection Zero Datum: Top of Casing
 Location: On Monte Vista just east of 194th ave. Depth: 408 Ft Vehicle: 95
 Field: West Valley Type Perfs: Torch Cut
 Perf Intervals: 217-408
 Csg. I.D. @ Surface 8 In. I.D. Reference: Measured Casing Buildup: Moderate, Increasing W/ Depth
 Operator: Nathan Reveles Lat.: 33° 28' 12.1" Long.: 112° 28' 35.2" Sec: _____ Twp: _____ Rge: _____

Wellbore Snapshots	True Depths: (DownView-Feet)	WELLBORE / CASING INFORMATION
1 Ft (See Other Side) 2 Ft (See Other Side) 	106'	The casing is severely corroded from 0' to 150' w/ a large split in the casing from 106' to 109'.
3 Ft (See Other Side) 4 Ft (See Other Side) 	115'	There are multiple pieces of casing missing from 115' to 119'.
5 Ft (See Other Side) 6 Ft (See Other Side) 	119'	Casing severely corroded and missing.
7 Ft (See Other Side) 8 Ft (See Other Side) 	217'	6" Reduction
9 Ft (See Other Side) 10 Ft (See Other Side) 	291'	Static water level with well #4 running.
11 Ft (See Other Side) 	310.8'	Downview of the casing.
	325.6'	Torch cut perforation partially plugged.
	370'	Down view of the casing.
	385'	Torch cut perforation.
	390'	Down view of the casing.
	408'	Fill with debris in it.
		There is light to medium build up on the casing from 300' to 408'.
		The perforations appear to be plugged to mostly plugged from 217' to 300' & mostly plugged to partially open from 300' to 408'.
		The casing is severely corroded and flaking from 0' to 150'.
		GPS Elev. 1075'

Notes: There is a 6" reduction at 217'.

11 WELLBORE SHAPSHOTS

1 Ft (Enlargement)



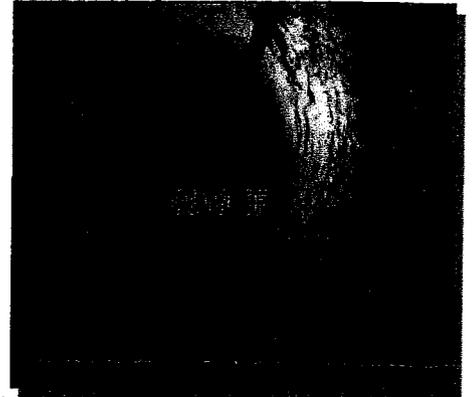
Casing split.

2 Ft (Enlargement)



Casing missing with formation visible.

3 Ft (Enlargement)



Casing severely corroded and pieces missing.

4 Ft (Enlargement)



6" Reduction

5 Ft (Enlargement)



6 Ft (Enlargement)



7 Ft (Enlargement)



8 Ft (Enlargement)



9 Ft (Enlargement)

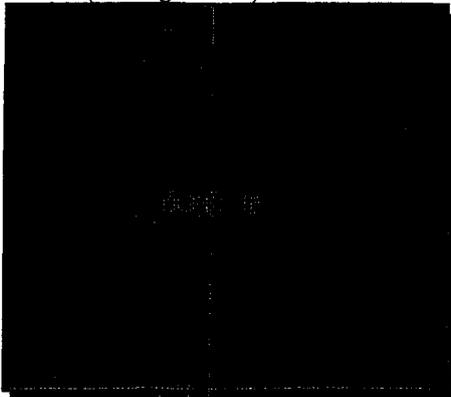


Torch Cut perforation

10 Ft (Enlargement)



11 Ft (Enlargement)

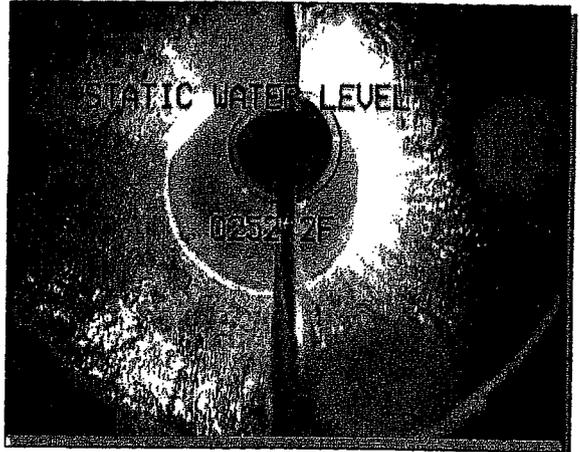


4 WELLBORE SHAPSHOTS

1 Ft (Enlargement)



2 Ft (Enlargement)



3-Ft (Enlargement)



4 Ft (Enlargement)



System: <i>White Tank</i>	Map Reference:	Well No.: <i>2</i>
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THIS SECTION TO BE COMPLETED BY A.W.C.

PUMP TEST DATA		
Test Pump By:	Date Tested:	
Static Level (feet): <i>252.2</i>	Dynamic Level (feet):	Pump Level (feet):
Pump G.P.M.:	Test Duration (hours):	
Remarks: <i>W.A.</i>		

THIS SECTION TO BE COMPLETED BY A.W.C.

PUMP DESIGN DATA		
Design: <i>175 G.P.M. @ 450 T.D.H. (feet)</i>	Static Level (feet): <i>280</i>	Dynamic Level (feet): <i>310</i>
Designed By: <i>gfw</i>	Date Designed:	
Remarks:		

System: <i>White Tank</i>	Map Reference:	Well No.: <i>2</i>
------------------------------	----------------	-----------------------

THIS SECTION TO BE COMPLETED BY A.W.C. or CONTRACTOR

COLUMN PIPE DATA		
Column Thread O.D. (inch): <i>4</i>	Length (feet): <i>399</i>	Thread Type: API <i>NPT</i>
Threads Per Inch: <i>NPT</i>	Thread Direction:	
Supplier:	Date Installed: <i>2/26/10</i>	
Remarks: <i>3" first and last joint, 3x4" reducers</i>		

THIS SECTION TO BE COMPLETED BY A.W.C. or CONTRACTOR

OIL TUBE DATA		
Oil Tube Thread I.D. (inch):	Threads Per Inch:	Thread Direction:
Supplier:	Date Installed:	
Remarks: <i>N/A</i>		

THIS SECTION TO BE COMPLETED BY A.W.C. or CONTRACTOR

SHAFT DATA		
Shaft Thread O.D. (inch):	Threads Per Inch:	Thread Direction:
Supplier:	Date Installed:	
Remarks: <i>N/A</i>		

System:

White tank

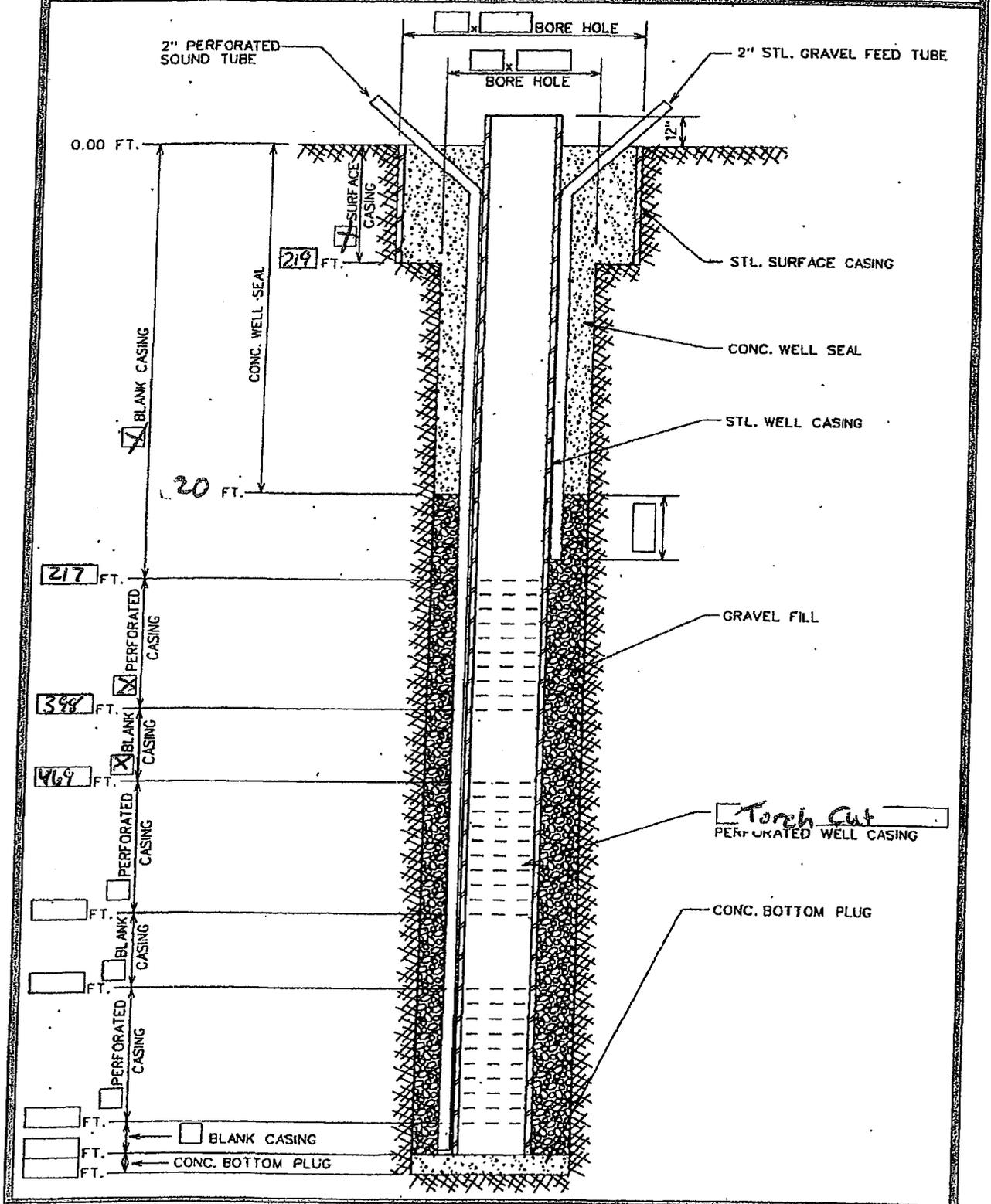
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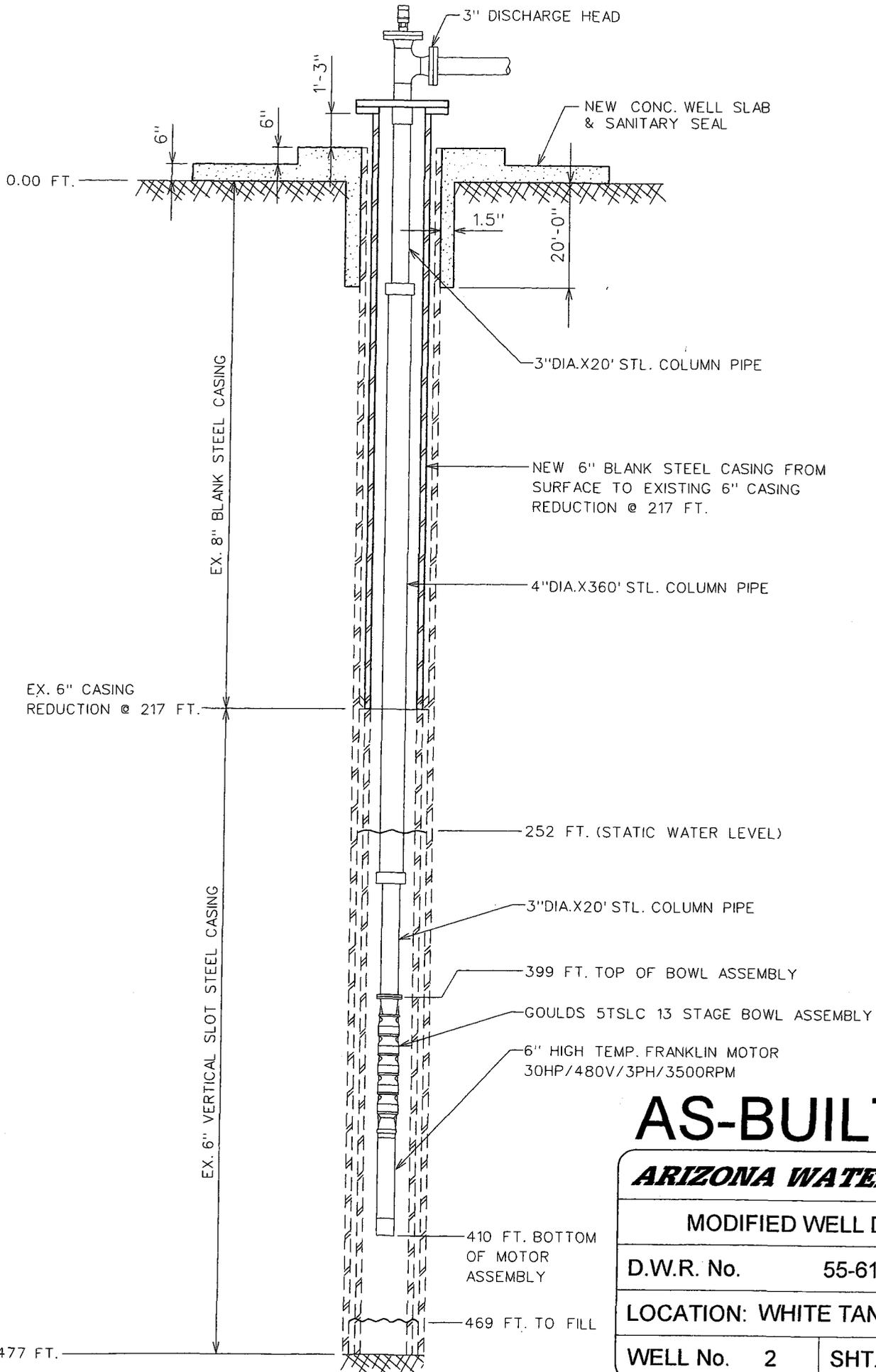
Well No.:

2

THIS SECTION TO BE COMPLETED BY A.W.C.

WELL PROFILE DATA





AS-BUILT 3-29-2010

ARIZONA WATER COMPANY	
MODIFIED WELL DESIGN	
D.W.R. No.	55-616689
LOCATION: WHITE TANK, ARIZONA	
WELL No. 2	SHT. 1 OF 1

Pump Performance Datasheet

Customer : AZ Water	Quote number :
Customer reference :	Item description : 5TSLC
Item number :	Stages : 13
Service :	Based on curve number : 5TSLC-3450
Quantity of pumps : 1	Date last saved : 29 Mar 2010 6:31 PM

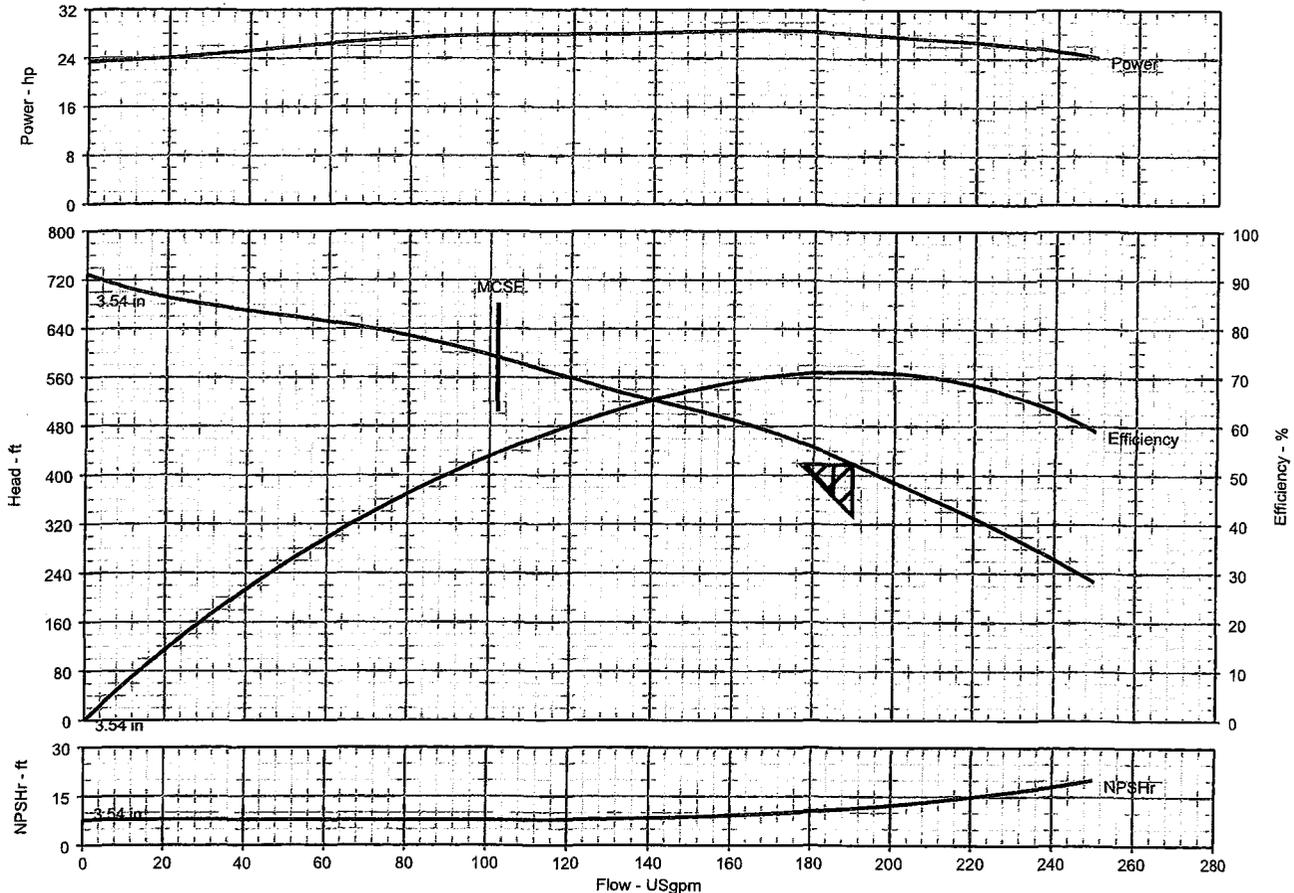
Operating Conditions		Liquid	
Flow, rated	: 189.7 USgpm	Liquid type	: Water
Head, rated (requested)	: 417.8 ft	Additional liquid description	:
Head, rated (actual)	: 417.8 ft	Solids diameter, max	: 0.00 in
Suction pressure, rated / max	: 0.00 / 0.00 psi.g	Temperature, max	: 68.00 deg F
NPSH available, rated	: Ample	Fluid density, rated / max	: 0.998 / 0.998 SG
Frequency	: 60 Hz	Viscosity, rated	: 1.00 cP

Performance		Material	
Pump speed, rated	: 3,450 rpm	Material requested	: Auto
Impeller diameter, rated	: 3.54 in	Material selected	: 316ss Bowl / 316ss impeller [standard bolting]
Impeller diameter, maximum	: 3.54 in		
Impeller diameter, minimum	: 3.18 in		

Performance		Pressure Data	
Efficiency (bowl / pump)	: 71.32 / 70.56 %	Maximum working pressure	: 315.6 psi.g
NPSH required / margin required	: 11.33 / 0.00 ft	Maximum allowable working pressure	: 590.0 psi.g
Ns (imp. eye flow) / Nss (imp. eye flow)	: 3,514 / 7,695 US Units	Maximum allowable suction pressure	: N/A
MCSF	: 102.0 USgpm	Hydrostatic test pressure	: N/A
Head, maximum, rated diameter	: 729.3 ft		
Head rise to shutoff	: 74.09 %		

Performance		Driver & Power Data	
Flow, best eff. point (BEP)	: 189.7 USgpm	Driver sizing specification	: Maximum power
Flow ratio (rated / BEP)	: 100.00 %	Margin over specification	: 0.00 %
Diameter ratio (rated / max)	: 100.00 %	Service factor	: 1.15
Head ratio (rated dia / max dia)	: 100.00 %	Power, hydraulic	: 20.04 hp
Cq/Ch/Ce [ANSI/HI 9.6.7-2004]	: 1.00 / 1.00 / 1.00	Power (bowl / pump)	: 28.10 / 28.36 hp
Selection status	: Near miss	Power, maximum, rated diameter	: 28.92 hp
		Minimum recommended motor rating	: 30.00 hp / 22.37 kW

Bowl performance. Corrected for construction and viscosity.





Pump Performance - Additional Data

Customer :	Quote number :
Customer reference :	Item description : 5TSLC
Item number :	Stages : 13
Service :	Pump speed, rated : 3,450 rpm
Quantity of pumps : 1	Intellicode :
	Date last saved : 29 Mar 2010 12:45 PM

Performance Data		Stage, Speed and Solids Limits	
Head, maximum diameter, rated flow	: 458.1 ft	Stages, maximum	: 18
Head, minimum diameter, rated flow	: 336.2 ft	Stages, minimum	: 1
Head, maximum, rated diameter	: 722.8 ft	Pump speed limit, maximum	: 3,600 rpm
Efficiency adjustment factor, total	: 1.00	Pump speed limit, minimum	: 400 rpm
Equivalent power loss	: 0.00 hp	Curve speed limit, maximum	: 3,600 rpm
Head adjustment factor, total	: 1.00	Curve speed limit, minimum	: 400 rpm
Flow adjustment factor, total	: 1.00	Solids diameter limit	: 0.22 in
NPSH required adjustment factor, total	: 1.00	Recommended Driver Data (Not applicable to actual driver)	
NPSH margin dictated by pump supplier	: 0.00 ft	Driver speed, full load	: 3,525 rpm
NPSH margin dictated by user	: 0.00 ft	Driver speed, rated load	: 3,529 rpm
NPSH margin used (added to 'required' values)	: 0.00 ft	Driver efficiency, 100% load	: N/A
		Driver efficiency, 75% load	: N/A
		Driver efficiency, 50% load	: N/A

Torque Data	
Torque, rated power	: 0.82 hp/100 rpm
Torque, maximum power	: 0.83 hp/100 rpm
Torque, driver power	: 0.87 hp/100 rpm
Torque, pump shaft limit	: 1.39 hp/100 rpm
Radial load, rated	: -
Radial load limit	: -

Various Performance Data	Flow (USgpm)	Head (ft)	Efficiency (%)	NPSHr (ft)	Power (hp)
Shutoff, rated diameter	0.00	722.8	-	-	23.16
Shutoff, maximum diameter	0.00	729.3	-	-	23.46
MCSF	101.4	587.8	54.61	7.75	27.52
Rated flow, minimum diameter	175.0	336.2	70.09	-	21.16
Rated flow, maximum diameter	175.0	458.1	70.73	-	28.57
BEP flow, rated diameter	188.1	415.8	71.19	11.17	27.70
120% rated flow, rated diameter	210.0	351.9	69.77	13.54	26.70
Maximum flow, rated diameter	248.1	224.2	58.87	19.92	23.82
Maximum flow, minimum diameter	220.3	191.2	57.82	15.16	18.36
Maximum flow, maximum diameter	250.0	226.2	58.97	20.24	24.18
Maximum value, rated diameter	-	722.8	71.19	-	28.52
Maximum value, maximum diameter	-	-	71.32	-	28.65

Differential Pressure	@ Density, rated	@ Density, max
Differential pressure, rated flow, rated diameter (psi)	195.2	195.2
Differential pressure, shutoff, rated diameter (psi)	312.8	312.8
Differential pressure, shutoff, maximum diameter (psi)	315.6	315.6

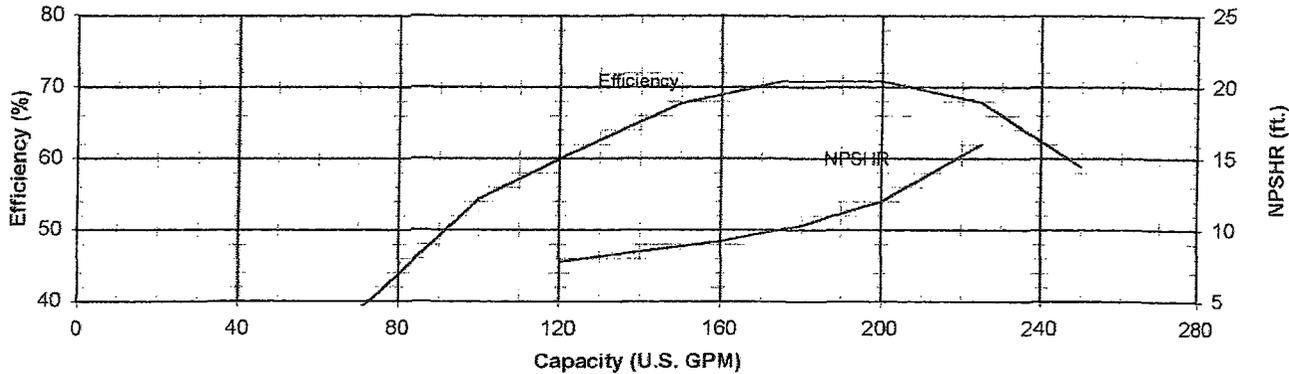
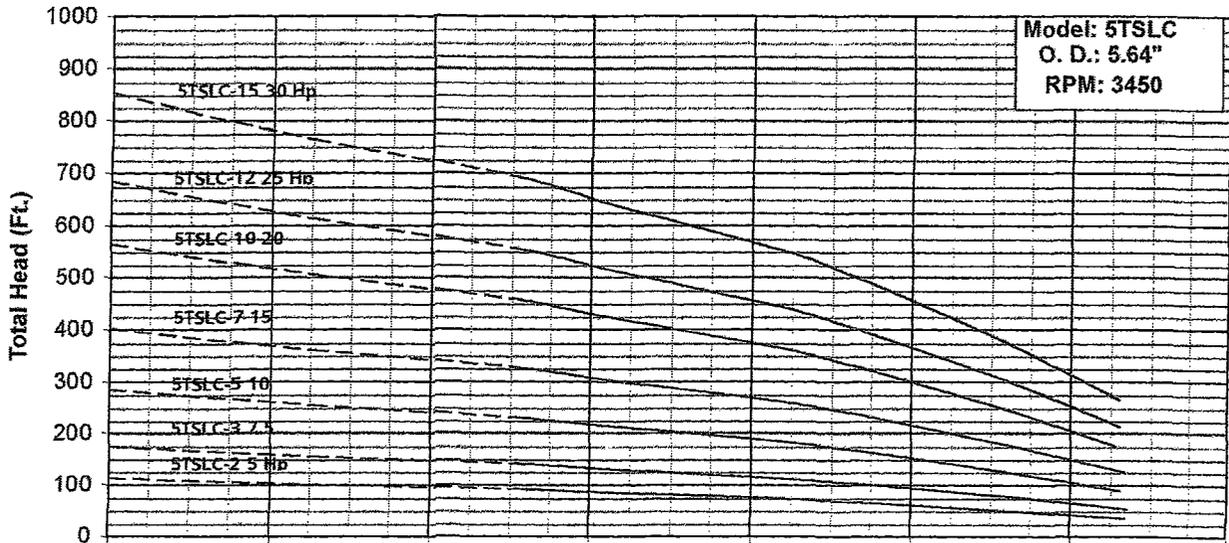
Discharge Pressure	@ Suction pressure, rated	@ Suction pressure, max	@ Suction pressure, rated	@ Suction pressure, max
Discharge pressure, rated flow, rated diameter (psi.g)	195.2	195.2	195.2	195.2
Discharge pressure, shutoff, rated diameter (psi.g)	312.8	312.8	312.8	312.8
Discharge pressure, shutoff, maximum diameter (psi.g)	315.6	315.6	315.6	315.6

Ratios	
Maximum flow / rated flow, rated diameter	:141.76 %
Head rated diameter / head minimum diameter, rated flow	:134.15 %

Pump Performance - Additional Data

Customer : Customer reference : Item number : Service : Quantity of pumps : 1	Quote number : Item description : 5TSLC Stages : 13 Pump speed, rated : 3,450 rpm Intellicode : Date last saved : 29 Mar 2010 12:45 PM
Head and Power Losses	
Friction loss rate, column : 1.61 % Friction loss, column : 0.00 ft Friction loss, discharge head : 0.00 ft Friction loss, can/barrel : - Friction loss, bowl/column adaptor : 0.40 ft Friction loss, total : 0.40 ft Power loss, lineshaft bearings : - Power loss, thrust bearing : 0.29 hp Power loss, total : 0.29 hp	Dimensions Minimum clearance below suction bell lip/case : 0.00 in Minimum well diameter : 8.00 in Suction nozzle centerline height : - Bowl assembly length, first stage (does not include motor adaptor) : 4.81 in Bowl assembly length, upper stage : 4.81 in Bowl assembly length, total : 62.56 in Suction bearing hub length : 0.00 in Strainer length : 0.00 in Bowl to column adaptor length : 0.00 in Discharge head stick-down : 0.00 in Submersible motor adaptor length : - Submersible motor length : - Column length : 0.00 ft Total pump length (does not include motor adaptor or motor length) : 5.21 ft Can / barrel length : - Headshaft sleeve diameter (if used) : - Suction bell diameter : - Minimum submergence to prevent vortexing : 13.00 in Discharge head height : 12.50 in Discharge nozzle centerline height : 8.00 in Lineshaft length : - Bowl shaft diameter : 1.00 in Bowl diameter, outside : 5.20 in Bowl diameter, exit : 2.75 in Column diameter, inside : 4.03 in Column internal obstruction diameter : - Can/barrel diameter, inside : -
Bowl vs. Pump Performance	
Head (bowl / pump) : 451.0 ft / 450.7 ft Efficiency (bowl / pump) : 70.71 % / 69.94 % Power (bowl / pump) : 28.14 hp / 28.43 hp NPSH required at first stage impeller eye : 10.12 ft	
Weights and Down Thrust	
Weight, lineshaft : - Weight, bowl assembly rotating element : 52.00 lb Thrust factor : 2.36 lb/ft Thrust, hydraulic (rated / max) : 1,062.7 / 1,703.0 lbf Thrust, bowl shaft end (rated / max) : -0.00 / -0.00 lbf Thrust, shaft step (rated / max) : 0.00 / 0.00 lbf Thrust, headshaft sleeve (rated / max) : - / - Thrust, total (rated / max) : 1,114.7 / 1,755.0 lbf	
Pressure and Torque Limits	
Maximum column pressure : 312.8 psi.g Column pressure limit : 1,316.0 psi.g Maximum discharge head pressure : 312.8 psi.g Discharge head pressure limit : 720.0 psi.g Maximum can / barrel pressure : - Can / barrel pressure limit : - Torque, lineshaft limit : -	
NPSH	
	NPSH at bowl (available / required) : Ample / 10.12 ft NPSH at low liquid level (available / required) : Ample / 4.90 ft NPSH at suction flange (available / required) : - / -
Liquid Velocities	
	Column liquid velocity : 4.41 ft/s Can liquid velocity : - Suction nozzle liquid velocity : -
Additional Conditions	
Pump type : Submersible Head measured at : Discharge nozzle centerline Length strategy : Column length Length : ft	Low liquid level : ft NPSHa measured at : Bowl Column friction rate limit : % Well diameter : in
Construction	
Discharge head size : 4 inch Discharge head design : Fabricated submersible discharge elbow	Column diameter : 4 inch Column construction : Threaded

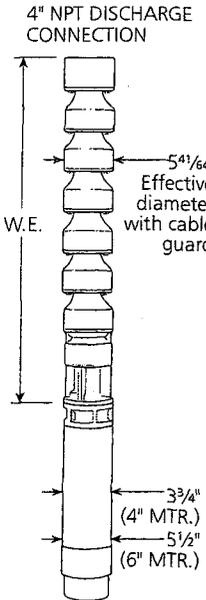
Model 5TSLC 316SS Submersible Pump



SPECIFICATIONS

- Minimum Well Size: 6"
- Available Discharge Size: 4"
- Available Motor Size: 6"
- Maximum Pressure(Std Bolting): 590 PSI
- Maximum Pressure (Double Bolting): N/A
- Thrust Factor: 2.36 lbs/ft.
- Specific Speed: 3642
- One Stage Length (6" mtr.): 18.44"
- Add stage Length: 4.81"
- One Stage Weight (6" mtr.): 49 lbs
- Add Stage Weight: 13 lbs

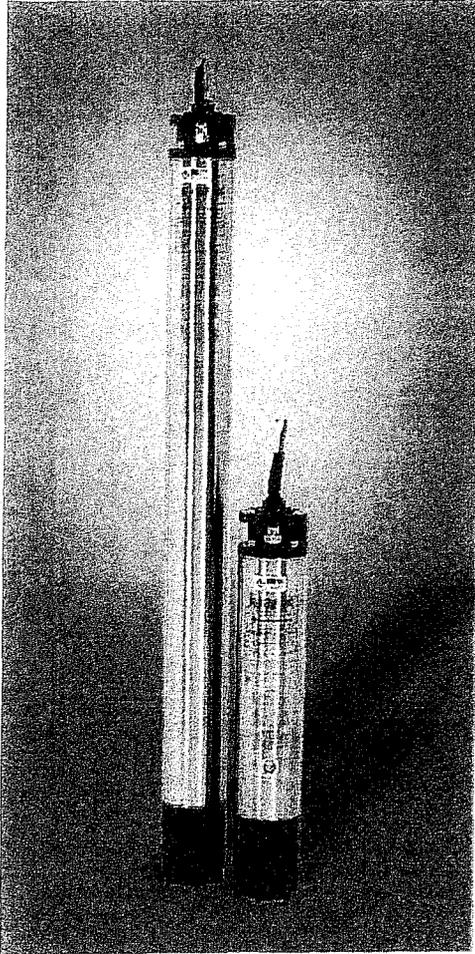
- NOTES:**
1. Solid line is recommended operating range.
 2. For intermediate horsepower pumps consult factory.



MATERIALS OF CONSTRUCTION

Part Name	Material
Shaft	ASTM A582 S31600
Coupling	ASTM A582 S31600
Suction Adapter	ASTM A744 CF8M
Suction Bearing	Thermoplastic
Impeller	ASTM A744 CF8M
Taperlock	ASTM A582 S31600
Intermediate Bowl	ASTM A744 CF8M
Intermediate Bowl Bearing	Thermoplastic
Intermediate Bowl Bearing	Rubber (Optional)
Upthrust Collar	Polyethylene
Discharge Bowl	ASTM A48 Cl. 30B
Discharge Bowl Bearing	Thermoplastic
Fasteners	ASTM F593 S31600
Cable Guard	ASTM A240 S31600
Suction Strainer	ASTM A240 S31600

6" Submersible Motors Hi-Temp 90



Applications

These motors are built for dependable operation in 6" diameter or larger water wells, in applications with higher temperature, high thrust or low flow.

Basic Features

- Able to operate in water ambients up to 194 °F (90 °C)
- In 86 °F (30 °C) ambient or less they supply 25% more downthrust and 100% more upthrust than standard product
- No flow capable when submerged in lakes or wells 12" diameter or larger and water 86 °F or less
- Double flanged NEMA mounting design
- Stainless steel splined shaft
- StatorShield™ Franklin's six feature encapsulation system
- High Capacity Kingsbury type water lubricated thrust bearing
- Factory filled with Franklin's non-toxic water soluble fill solution
- Field replaceable lead using Franklin's exclusive Water Bloc™ Technology
- Full 3450 rpm 60 Hz design point
- External sand slinger on shaft
- Sand Fighter™ mechanical face seal system at shaft exit
- Copper bar rotor
- All models variable frequency drive (VFD) approved

Special Options

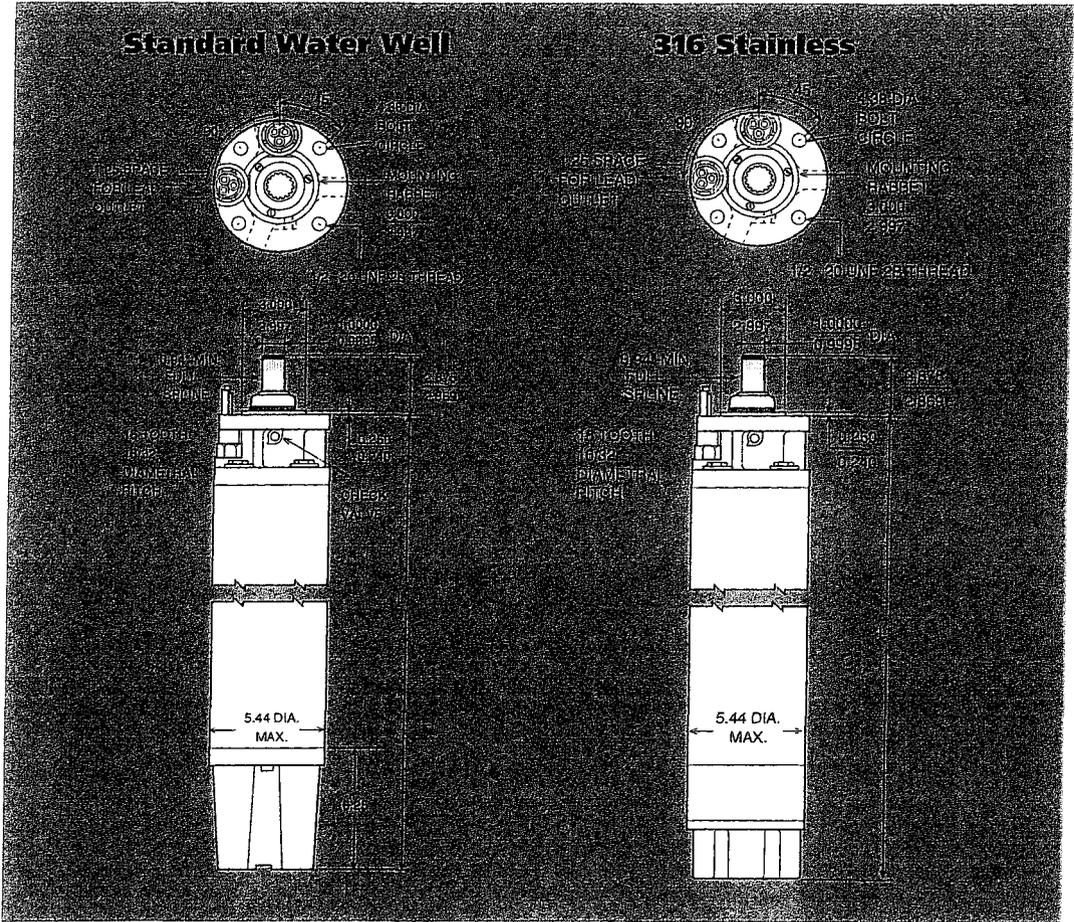
- SubMonitor™ is a state-of-the-art electronic motor overload that is sold separately.
 - Mounts in the above ground panel requiring no additional wiring to the motor.
 - User friendly, field proven.
 - Protection monitors for balanced power, overload, underload, overheating, rapid cycling and more.
 - Can be used with or without a SubTrol™ heat sensor.
 - Supplies superior heat protection when manufactured with the SubTrol heat sensor.

Consult factory for other voltage, hertz and horsepower ratings not listed in this catalog.

Specifications are subject to change without notice. Contact Franklin Electric if current materials are required for bid specifications.

6" Submersible Motors Hi-Temp 90

6-Inch Hi-Temp Dimensions and Weights



304 SS Shell 3-Lead

HP	KW	"L" (inches)	SHIPPING WEIGHT		MOTOR CARTON SIZE (in inches)
			LBS	KG	
5	3.7	26.40	116	53	8.75 x 11.25 x 34.50
7.5	5.5	28.96	129	59	8.75 x 11.25 x 37.00
10	7.5	31.52	145	66	8.75 x 11.25 x 42.25
15	11	34.09	156	71	8.75 x 11.25 x 42.25
20	15	36.65	174	79	8.75 x 11.25 x 51.25
25	18.5	41.77	202	92	8.75 x 11.25 x 51.25
30	22	56.27	300	136	8.75 x 10.50 x 71.75
40	30	62.27	330	150	8.75 x 10.50 x 71.75

316 SS Shell 3-Lead

HP	KW	"L" (inches)	SHIPPING WEIGHT		MOTOR CARTON SIZE (in inches)
			LBS	KG	
5	3.7	26.40	116	53	8.75 x 11.25 x 34.50
7.5	5.5	28.96	129	59	8.75 x 11.25 x 37.00
10	7.5	31.52	145	66	8.75 x 11.25 x 42.25
15	11	34.09	156	71	8.75 x 11.25 x 42.25
20	15	36.65	174	79	8.75 x 11.25 x 51.25
25	18.5	41.77	202	92	8.75 x 11.25 x 51.25
30	22	56.27	300	136	8.75 x 10.50 x 71.75
40	30	62.27	330	150	8.75 x 10.50 x 71.75

6-Lead Y-Δ models available. (Add 5 lbs to shipping weight.)

6" Submersible Motors Hi-Temp 90

Hi-Temp 90 6-Inch Models

HP (KW)	CONSTRUCTION	DESCRIPTION						MODEL	STOCK STATUS
		PH	VOLTS	HZ	S.F.	# LEADS	WIRE SIZE (AWG)		
10 hp 7.5 kW	WATER WELL WITH SAND FIGHTER SEAL	3P	200	60	1.15	3	#8 w/GND	276 652 00	
		3P	220	50	1.00	3	#8 w/GND	276 682 00	
		3P	220	50	1.00	6-90°	#8 w/GND	276 672 00	
		3P	230	60	1.15	3	#8 w/GND	276 602 00	
		3P	230	60	1.15	6-90°	#8 w/GND	276 722 00	
		3P	380	60	1.15	3	#8 w/GND	276 662 00	
		3P	380	60	1.15	6-90°	#8 w/GND	276 782 00	
		3P	415	50	1.00	3	#8 w/GND	276 692 00	
		3P	460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 612 00	YES
		3P	460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 712 00	
	3P	575	60	1.15	3	#8 w/GND	276 622 00		
	316 SS	3P	200	60	1.15	3	#8 w/GND	276 652 30	
		3P	220	50	1.00	3	#8 w/GND	276 682 30	
		3P	220	50	1.00	6-90°	#8 w/GND	276 672 30	
		3P	230	60	1.15	3	#8 w/GND	276 602 30	
		3P	230	60	1.15	6-90°	#8 w/GND	276 722 30	
		3P	380	60	1.15	3	#8 w/GND	276 662 30	
		3P	380	60	1.15	6-90°	#8 w/GND	276 782 30	
		3P	415	50	1.00	3	#8 w/GND	276 692 30	
3P		460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 612 30		
3P		460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 712 30		
3P	575	60	1.15	3	#8 w/GND	276 622 30			
15 hp 11 kW	WATER WELL WITH SAND FIGHTER SEAL	3P	200	60	1.15	3	#8 w/GND	276 653 00	
		3P	220	50	1.00	3	#8 w/GND	276 683 00	
		3P	220	50	1.00	6-90°	#8 w/GND	276 673 00	
		3P	230	60	1.15	3	#8 w/GND	276 603 00	
		3P	230	60	1.15	6-90°	#8 w/GND	276 723 00	
		3P	380	60	1.15	3	#8 w/GND	276 663 00	
		3P	380	60	1.15	6-90°	#8 w/GND	276 783 00	
		3P	415	50	1.00	3	#8 w/GND	276 693 00	
		3P	460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 613 00	YES
		3P	460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 713 00	
	3P	575	60	1.15	3	#8 w/GND	276 623 00		
	316 SS	3P	200	60	1.15	3	#8 w/GND	276 653 30	
		3P	220	50	1.00	3	#8 w/GND	276 683 30	
		3P	220	50	1.00	6-90°	#8 w/GND	276 673 30	
		3P	230	60	1.15	3	#8 w/GND	276 603 30	
		3P	230	60	1.15	6-90°	#8 w/GND	276 723 30	
		3P	380	60	1.15	3	#8 w/GND	276 663 30	
		3P	380	60	1.15	6-90°	#8 w/GND	276 783 30	
		3P	415	50	1.00	3	#8 w/GND	276 693 30	
3P		460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 613 30		
3P		460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 713 30		
3P	575	60	1.15	3	#8 w/GND	276 623 30			

6" Submersible Motors Hi-Temp 90

Hi-Temp 90 6-inch Models

HP (KW)	CONSTRUCTION	DESCRIPTION						MODEL	STOCK STATUS
		PH	VOLTS	HZ	S.F.	# LEADS	WIRE SIZE (AWG)		
30 hp 22 kW	WATER WELL WITH SAND FIGHTER SEAL	3P	200	60	1.15	3	#8 w/GND	276 656 01	
		3P	220	50	1.00	3	#8 w/GND	276 686 01	
		3P	220	50	1.00	6-90°	#8 w/GND	276 676 01	
		3P	230	60	1.15	3	#8 w/GND	276 606 01	
		3P	230	60	1.15	6-90°	#8 w/GND	276 726 01	
		3P	380	60	1.15	3	#8 w/GND	276 666 01	
		3P	380	60	1.15	6-90°	#8 w/GND	276 786 01	
		3P	415	50	1.00	3	#8 w/GND	276 696 01	
		3P	460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 616 01	YES
		3P	460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 716 01	
	3P	575	60	1.15	3	#8 w/GND	276 626 01		
	316 SS	3P	200	60	1.15	3	#8 w/GND	276 656 31	
		3P	220	50	1.00	3	#8 w/GND	276 686 31	
		3P	220	50	1.00	6-90°	#8 w/GND	276 676 31	
		3P	230	60	1.15	3	#8 w/GND	276 606 31	
		3P	230	60	1.15	6-90°	#8 w/GND	276 726 31	
		3P	380	60	1.15	3	#8 w/GND	276 666 31	
		3P	380	60	1.15	6-90°	#8 w/GND	276 786 31	
		3P	415	50	1.00	3	#8 w/GND	276 696 31	
3P		460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 616 31		
3P		460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 716 31		
3P	575	60	1.15	3	#8 w/GND	276 626 31			
40 hp 30 kW	WATER WELL WITH SAND FIGHTER SEAL	3P	380	60	1.15	3	#8 w/GND	276 667 01	
		3P	380	60	1.15	6-90°	#8 w/GND	276 787 01	
		3P	415	50	1.00	3	#8 w/GND	276 697 01	
		3P	460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 617 01	YES
		3P	460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 717 01	
	316 SS	3P	575	60	1.15	3	#8 w/GND	276 627 01	
		3P	380	60	1.15	3	#8 w/GND	276 667 31	
		3P	380	60	1.15	6-90°	#8 w/GND	276 787 31	
		3P	415	50	1.00	3	#8 w/GND	276 697 31	
		3P	460/380-415	60/50	1.15/1.00	3	#8 w/GND	276 617 31	
		3P	460/380-415	60/50	1.15/1.00	6-90°	#8 w/GND	276 717 31	
		3P	575	60	1.15	3	#8 w/GND	276 627 31	

NOTES:

1. All models listed above include leads (13 ft).
2. 6-Lead wye-delta models available in additional voltage ratings. Consult factory for availability.



CONSTRUCTION COMPLETION DATE:

3/1/10

WORK AUTHORIZATION NUMBER:

1-4682

PREPARED BY

THE FOLLOWING RECORD REQUIREMENTS ARE ATTACHED:

- 1. CONSTRUCTION DRAWINGS WITH "AS BUILT" LOCATION OF PIPE, FITTINGS, ETC. MARKED IN RED
- 2. VALVE CARDS
- 3. HYDRANT CARDS WITH COPY OF COVER LETTER.....
- 4. MATERIALS INSTALLED OR RETIRED LISTED ON THE REVERSE SIDE OF THE W.A. WITH R.O.S. AND P.D.R. NUMBERS
- 5. PRESSURE AND LEAKAGE TEST RESULTS:

DATE TESTED				
TIME STARTED				
TIME FINISHED				
PIPE DIAMETER				
FOOTAGE TESTED				
ALLOWABLE LEAKAGE				
LEAKAGE OBSERVED				
PRESSURE AT TEST POINT				
COMPANY EMPLOYEE OBSERVING TEST (print)				
INITIALS OF EMPLOYEE				

6. DISINFECTION SAMPLING:

INITIAL SAMPLING	DATE			
(minimum 50 ppm available chlorine)	TIME			
	PPM Cl ₂			
AFTER 24 HOURS DETENTION TIME	DATE			
(minimum 10 ppm free chlorine)	TIME			
	PPM Cl ₂			
AFTER SUFFICIENT FLUSHING	DATE			
(water is clear and system Cl ₂ residual is measured)	TIME			
	PPM Cl ₂			
BACTERIOLOGICAL SAMPLE(S)	DATE			
	TIME			

ATTACHED Yes No Yes No Yes No Yes No

I certify that construction on the above Work Authorization was completed as of the date shown above and for which all materials have been accounted. I further certify that I have inspected the work done and have found it to be satisfactory and in accordance with Company specifications.

Division Manager or Operations Superintendent (signature)

3/1/10 Date of Notice

ATTACH TO CONSTRUCTION & ENGINEERING FILE COPY OF WORK AUTHORIZATION

AFH