

BEAUMONT-CHERRY VALLEY WATER
DISTRICT WELL 26 PUMPING UNIT REPAIR AND
WELL REHABILITATION
CONTRACT FOR PUBLIC WORK

1. Parties and Date

This Contract is entered into this ____ day of _____, 2018, between the BEAUMONT-CHERRY VALLEY WATER DISTRICT, a California Irrigation (Special) District ("District"), and Southwest Pump & Drilling, Inc. ("Contractor"), for the Work described as follows: Removing, Refurbishing, Furnishing, and Installing Well 26 Pumping Unit Repair and Well Rehabilitation.

2. Consideration

In consideration of the mutual covenants hereinafter contained, District and Contractor agree to comply with the terms of this Contract and to faithfully perform their duties hereunder.

3. Duties of Contractor

3.1 Contractor agrees to furnish all labor, tools, and equipment necessary to complete the work hereinafter described. Contractor hereby guarantees that all work to be performed by it hereunder will be performed in a good and workmanlike manner. The Work to be performed by Contractor is described on Exhibit "A" attached hereto and by this reference incorporated herein. Pursuant to Public Contract Code Section 3300, Contractor shall possess an active and current Contractor's License, Class A or C-57, which shall be maintained throughout the term of this Contract.

3.2 Contractor shall complete all work required herein on or before **June 1, 2018**

3.3 Contractor shall furnish District with labor and material releases from all subcontractors performing work on, or furnishing materials for, the job prior to final payment by District.

3.4 Contractor hereby guarantees that all materials and workmanship furnished by him under the Contract will meet fully all requirements thereof as to quality or workmanship and of materials furnished by him. Contractor hereby agrees to replace all materials and pay for all installation costs made necessary by defects in materials or workmanship supplied by him that become evident within thirty (30) months after the date of final payment and to pay for all work necessary to remove, restore, and replace the materials to full serviceability and to full compliance with the requirements of the Contract, including the test requirements for any part of the materials furnished hereunder which, during said thirty (30) month period, are found to be deficient with respect to any provision of the Contract. Contractor also agrees and does hereby hold District harmless from claims of any kind which may arise from injury or damage due to said defects. Contractor shall replace all defective materials promptly upon receipt of written orders for same from District.

3.5 Copies of the prevailing rate of per diem wages for each craft, classification or type of worker needed to execute this Contract are available to interested parties upon request. If the total amount of this Contract is \$1,000 or more, Contractor agrees to pay such prevailing rates to each workman needed to execute the work required under this Contract and further agrees to comply with the penalty provisions of Section 1775 of the Labor Code in the event of its failure to pay prevailing rates. Pursuant to Section 1727 of the Labor Code, all wages and penalties withheld for failure of Contractor to pay such per diem wages shall be transferred by District to the State Labor Commissioner for disbursement, should Contractor fail to bring suit for recovery within ninety (90) days after completion of the Contract or acceptance of the work.

3.6 Contractor shall pay travel subsistence payments to each workman needed to execute the work, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with Section 1773.8 of the Labor Code.

3.7 When Contractor employs workmen in an apprenticeable craft or trade, Contractor shall comply with the provisions of Section 1777.5 of the Labor Code with respect to the employment of properly registered apprentices upon public works. The primary responsibility for compliance with said section for all apprenticeable occupations shall be with Contractor.

3.8 Contractor is advised that eight (8) hours labor constitutes a legal day's work. Pursuant to Section 1813 of the Labor Code, Contractor shall forfeit a penalty of \$25.00 per worker for each day that each worker is permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week, except when payment for overtime is made at not less than one and one-half (1-1/2) times the basic rate for that worker.

3.9 In accordance with the requirements of Labor Code Section 1776, Contractor shall keep accurate payroll records on forms provided by the Division of Labor Standards Enforcement, or keep payroll records containing the same information required by such forms, and shall make any such records available for inspection.

3.10 Contractor shall keep himself fully informed of all laws and regulations in any manner affecting the performance of the Contract work, and shall indemnify District and District's agents against any liability arising from violation of any such law or regulation.

3.11 Contractor shall at its own expense maintain at least the following insurance coverages throughout the performance of this Contract:

(a) Worker's compensation insurance coverages for all persons employed or to be employed in the performance of this Contract, which insurance shall at all times be maintained in strict accordance with the requirements of the current California Worker's Compensation Insurance Laws.

(b) General commercial liability insurance coverage of at least \$1,000,000 per occurrence and \$2,000,000 general aggregate insuring Contractor and naming District as an additional insured for all claims for bodily injury, personal injury and property damage, arising out of or in connection with any operations under this Contract.

(c) Automobile liability insurance coverage with a limit of liability of \$1,000,000 per accident Combined Single Limit.

(d) Course of construction insurance with a limit of liability equal to the full contract amount, unless waived in writing by District.

Prior to commencement of any work under this Contract, Contractor shall obtain and furnish to District a Certificate of Insurance as to each type of insurance required, which certificate shall be on the form provided to Contractor by District.

3.12 Contractor shall be responsible for all loss and damage which may arise out of the nature of the work agreed to herein, or from the action of the elements, or from any unforeseen difficulties which may arise or be encountered in the prosecution of the work until same is fully completed and accepted by District. However, Contractor shall be responsible for damage proximately caused by an act of God within the meaning of Section 4150 of the Government Code only to the extent of five percent (5%) of the contract amount.

3.13 Contractor shall indemnify and hold harmless District, its agents and employees, from and against all claims, damages, losses and expenses, including attorney's fees, arising out of or resulting from performance of work under this Contract and which are attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, caused in whole or in part by any negligent or willful act or omission of the Contractor or anyone directly or indirectly employed by him or for whose acts he may be liable.

3.14 Contractor shall be responsible for securing and paying for all permits and licenses necessary to perform the work described herein.

3.15 If the work entails trenching of five (5) feet or more in depth, Contractor shall make adequate provisions for shoring, bracing, sloping, or other protection from the hazard of caving ground.

3.16 As required by Public Contract Code Section 7104, Contractor shall promptly, and prior to disturbance of conditions, notify District of (a) any material discovered in excavation that Contractor believes to be a hazardous waste that is required to be removed to a Class I, Class II, or Class III disposal site; (b) subsurface or latent physical conditions at the site differing from those indicated by District; and (c) unknown physical conditions of an unusual nature at the site, significantly different from those ordinarily encountered in such contract work. Upon notification, District will promptly investigate the conditions to determine whether a change order is appropriate. In the event of a dispute, Contractor shall not be excused from any scheduled completion date but will retain all rights provided by the Contract or by law for resolving the dispute.

4. District's Responsibilities

4.1 As consideration for performance of the work required herein, District agrees to pay Contractor the total contract amount of _____, (\$ _____), provided that such amount shall be subject to adjustment pursuant to written change orders signed in advance by District.

4.2 Contractor shall submit progress payment invoices to District at the end of each calendar month during the term of the Contract. All progress payment invoices shall be subject to approval by the District prior to payment by the District. Such progress payment invoices shall be made in accordance with Section 20104.50 of the California Public Contract Code, requiring District to make a determination of suitability of the payment request within seven (7) days of receipt of such request and further requiring District to make payment on properly submitted progress payment invoices within thirty (30) days in order to avoid interest payments to the Contractor upon such amounts.

4.3 When the Contractor determines that he has completed the work required herein, Contractor shall so notify District in writing and shall furnish all labor and material releases required by Section 3.3 of this Contract. District shall thereupon inspect the work and, if acceptable, shall pay to Contractor the contract price, less any amount which District may be authorized or directed by law to retain. Payment of retention proceeds due to Contractor shall be made no later than sixty (60) calendar days after such final acceptance by District, in accordance with Section 7107 of the California Public Contract Code. Contractor is hereby alerted to provisions of Section 7107 of the California Public Contract Code, requiring Contractor to pay each of its subcontractors from whom retention has been withheld, each subcontractor's share of the retention received, within ten (10) calendar days from the time that all or any portion of such retention proceeds are received by Contractor from District. District will allow Contractor to substitute qualified securities, deposited with District or a qualified escrow agent, in lieu of contract retentions in accordance with provisions of California Public Contract Code, Section 22300. The escrow agreement used in such instance shall be substantially similar to that form set out in Section 22300 of the Public Contract Code. District will provide this form to the Contractor upon request.

4.4 To the extent required by Section 4215 of the Government Code, District shall compensate Contractor for the costs of locating and repairing damage to underground utility facilities not due to the failure of Contractor to exercise reasonable care, and removing or relocating underground utility facilities not indicated in the construction drawings and for equipment necessarily idled during such work. Contractor shall not be assessed liquidated damages for delay caused by failure of District to provide for removal or relocation of such utility facilities.

5. Contractual Relationship

It is expressly agreed that Contractor is an independent contractor, and neither Contractor nor any of its employees shall be deemed employees of District. Contractor shall have full supervision over all workers on the job, including equipment, drivers, and operators, and neither District nor any of District's agents shall be held responsible for any action of Contractor under this Contract. Should any question arise regarding the meaning or import of any of the provisions of this Contract or written or oral instructions from District, the matter shall be referred to District's General Manager, whose decision shall be binding upon Contractor.

6. Assignment Forbidden

Contractor shall not assign or transfer this Contract or any right, title or interest herein without the prior written consent of District. If contractor attempts an assignment of this Contract or any right or interest herein, District may, at its option, terminate and revoke the Contract and shall thereupon be relieved from any and all obligations to Contractor or his assignee or transferee.

7. Time of Essence

Time is of the essence in the performance of this Contract. Contractor will be assessed liquidated damages in the amount of \$200.00 per calendar day for each day of unauthorized delay in completing performance.

8. Termination

This Contract may be terminated by District at any time by giving Contractor seven (7) days advance written notice. In the event of termination by District for any reason other than the fault of the Contractor, District shall pay Contractor for all work performed up to that time as provided herein. In the event of breach of the Contract by Contractor, District may terminate the Contract immediately without notice, may reduce payment to the Contractor in the amount necessary to offset District's resulting damages, and may pursue any other available recourse against Contractor.

9. Dispute Resolution

Any separate demand by Contractor for the payment of money or damages shall be resolved in accordance with Public Contract Code Sections 20104 et seq., if they apply. Copies of those sections are available upon request and by this reference are incorporated herein.

10. Attorney's Fees and Costs

If any action is necessary to enforce or interpret the terms of this Contract, the prevailing party shall be entitled to recover from the losing party attorney's fees in an amount determined to be reasonable by the court, together with costs and necessary disbursements.

11. Notices

Any notice required to be given under the terms of this Contract shall be sufficient and complete upon depositing the same in the United States mail, with postage prepaid and addressed as follows:

DISTRICT
Beaumont-Cherry Valley Water
District
P.O. Box
2037560 Magnolia Avenue
Beaumont, CA 9223

Contractor

12. Counterparts

This Contract shall be executed in two (2) counterparts, each of which shall constitute an original.

13. Certification of License

Contractor certifies that as of the date of execution of this contract, Contractor has a current contractor's license of the classification indicated below Contractor's signature hereto.

IN WITNESS WHEREOF, each of the parties has caused this Contract to be executed on the day and year first above written.

ATTEST:

(Contractor)

By:

Title:

Contractor's License Number & Classification

Secretary

**BEAUMONT-CHERRY VALLEY
WATER DISTRICT**

By:

Daniel K. Jagers
General Manager

ATTEST:

Secretary to the Board

CERTIFICATION

LABOR CODE – SECTION 1861

I, the undersigned Contractor, am aware of the provisions of Section 3700 et seq. of the Labor Code which requires every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of the Code, and I, the undersigned Contractor, agree to and will comply with such provisions before commencing the performance of the work of this Contract.

Contractor

By:

Title:

EXHIBIT "A"**BEAUMONT-CHERRY VALLEY WATER
DISTRICT WELL PLANT 26 PUMPING UNIT
REPAIR AND WELL REHABILITATION****SCOPE OF WORK-FEE SCHEDULE**

The undersigned hereby proposes to furnish all labor, materials, equipment and methods necessary for constructing all Work specified in the Scope of Work-Fee Schedule amounts set forth below, and commence work within one (1) week of Notice to Proceed. The undersigned also acknowledges that all prices include sales tax and all other applicable taxes and fees. See attached data sheets for details related to well and pumping plant.

Item	Description	Qty	Unit	Unit Cost	Amount
101	Permits, insurance, and management.	1	L.S.	N/A	\$
102	Mobilize and demobilize well pump removal crew and equipment necessary to remove and reinstall existing well pumping unit and motor.	1	L.S.	N/A	\$
103	Remove Well 26's 400hp electric motor.	1	L.S.	\$	\$
104	Haul Well 26's 400hp electric motor to the District's electrical repair vendor Brithinee Electric, Inc. for evaluation. District will pay electrical vendor directly for motor inspection and any necessary repairs.	1	L.S.	N/A	\$
105	Remove and inspect pump column, tube, and shaft. Tag well to determine presence/amount of fill. Haul tube and shaft from the District's well 26 site to the vendor's yard for evaluation. Inspect and provide comments and/or recommendations regarding conditions and serviceability of pump column, tube and shaft.	647	L.F.	\$	\$
106	Remove pumping unit bowls, and existing 10' suction pipe (if applicable), and strainer, and all related work	1	L.S.	N/A	\$
107	Haul bowl assembly to Vendor's yard for evaluation. Disassemble and inspect pump bowl assembly. Measure and record wear and damage. Provide report and recommendations to Owner. Return disassembled bowl to contractor's yard for storage (if not rebuilt as part of the contract)	1	L.S.	N/A	\$
108	Disassemble, inspect, recondition, and reassemble 647' of 1-15/16" line shaft and 3" enclosing tube	647	L.F.	\$	\$
109	Bail well clean. Payment will be based on actual time required to remove fill.	8	Hrs	\$	\$

EXHIBIT "A"**BEAUMONT-CHERRY VALLEY WATER
DISTRICT WELL PLANT 26 PUMPING UNIT
REPAIR AND WELL REHABILITATION****SCOPE OF WORK-FEE SCHEDULE**

The undersigned hereby proposes to furnish all labor, materials, equipment and methods necessary for constructing all Work specified in the Scope of Work-Fee Schedule amounts set forth below, and commence work within one (1) week of Notice to Proceed. The undersigned also acknowledges that all prices include sales tax and all other applicable taxes and fees. See attached data sheets for details related to well and pumping plant.

Item	Description	Qty	Unit	Unit Cost	Amount
109	Clarify water in preparation for initial video log. Perform color video log of well and provide comments and recommendations to District. Camera shall be capable of lateral (side) as well as axial viewing. Provide DVD disk (2 copies) to District. (Survey shall be conducted by an independent party approved by District).	1	L.S.	N/A	\$
110	Wire brush well from ground surface to total depth of well (20" diameter from 13' to 1070' below ground surface) and bail well clean.	12	Hrs.	\$	\$
111	Mechanically develop (swab) perforated area of well from top of perforations to total depth of well (20" diameter from 520' to 640' and 650' to 1050' below ground surface) and bail well clean	12	Hrs.	\$	\$
112 (See 112 Alternative Bid Item Below)	Refurbish and rebuild existing Flowserve pump bowl assembly 14 KKH-9 stage pumping unit. Contractor shall anticipate that pumping unit rebuild will require new impellers, bearings, etc.	1	L.S.	N/A	\$
113	Inspect and refurbish existing pump discharge head as necessary and install new shaft bushing, as required	1	L.S.	N/A	\$
114	Clarify water in preparation for post brushing and development video log. Perform color video log of well and provide video inspection comments to District. Camera shall be capable of lateral (side) as well as axial viewing. Provide DVD disk (2 copies) to District. (Survey shall be conducted by an independent party approved by District).	1	L.S.	N/A	\$
115	Install pumping unit bowl assembly, including existing 10' suction pipe and strainer, and all related work	1	L.S.	N/A	\$

**BEAUMONT-CHERRY VALLEY WATER
DISTRICT WELL PLANT 26 PUMPING UNIT
REPAIR AND WELL REHABILITATION**

The undersigned hereby proposes to furnish all labor, materials, equipment and methods necessary for constructing all Work specified in the Scope of Work-Fee Schedule amounts set forth below, and commence work within one (1) week of Notice to Proceed. The undersigned also acknowledges that all prices include sales tax and all other applicable taxes and fees. See attached data sheets for details related to well and pumping plant.

Item	Description	Qty	Unit	Unit Cost	Amount
116	Install 647' of column, tube and shaft, discharge head, and appurtenances including leveling pumping unit (as required) and all related work	647'	L.F.	\$	\$
117	Pick up District's 400 hp electric motor from the District's electrical repair vendor Brithinee Electric, Inc. and install said 400 hp electric motor including leveling (centering) of motor on pump shaft, reconnection of existing motor power feed and control conductors to existing motor control equipment for the lump sum of	1	L.S.	N/A	\$
118	Provide coordination (as necessary) with District Staff of installation of District furnished and installed Baker type tank for well water clarification (prior to off site discharge). District to furnish temporary tank and piping as required	1	L.S.	N/A	\$
119	Provide start up and performance testing of all new and existing equipment, controls and instrumentation for the lump sum of	1	L.S.	N/A	\$
120	Disinfect well in accordance with Specification Section 11320, State of California Department of Health Service requirements and in accordance with AWWA procedures for the lump sum of	1	L.S.	N/A	\$

TOTAL AMOUNT (Sum of Fee Items 101 through 120:

_____ Dollars \$ _____
(words) (figures)

Vendor hereby acknowledges that all bid prices include any amounts payable by District for taxes which may result from this proposal.

Vendor's Authorized Representative

Vendor (Company Name)

Signature

Name (Print)

Title (Print)

ALTERNATIVE BID ITEM 112

Item	Description	Qty	Unit	Unit Cost	Amount
112 (See 112 Alternative Bid Item Below)	Furnish new replacement bowl assembly with ductile iron double bolted construction (as required to meet pressure ratings required in Specification Section 11320). Bowl assembly shall be Flowserve, Goulds, or District approved equal	1	L.S.	N/A	\$

ADDITIVE FEE SCHEDULE: CHEMICAL WELL REHABILITATION

Item	Description	Qty	Unit	Unit Cost	Amount
201	Provide chemical well rehabilitation in accordance with Specification Section	1	L.S.	N/A	\$

ADDITIVE FEE SCHEDULE: PROJECT BOND

Item	Description	Qty	Unit	Unit Cost	Amount
301	Project Performance Bond equal to 100% of Full Contract Amount	1	L.S.	N/A	\$
302	Project Payment Bond equal to 50% of Full Contract Amount	1	L.S.	N/A	\$
303	Project Maintenance Bond equal to 100% of Full Contract Amount for a period of 30 months	1	L.S.	N/A	\$

ADDITIVE FEE SCHEDULE: MISCELLANEOUS EQUIPMENT (TO PROVIDED AS REQUIRED)

Item	Description	Qty	Unit	Unit Cost	Amount
401	12" Column, 0.375" Wall (20' nominal length)	20	L.F.	\$	\$
502	12" Column Coupling	1	EA.	N/A	\$
403	3" Enclosing Tube (5' nominal length)	5	L.F.	\$	\$
404	1-15/16" Line Shaft, C1045	20	L.F.	\$	\$
305	Line Shaft Bearings	1	EA.	N/A	\$

EXHIBIT A

WELL 26 PUMPING UNIT REPAIR

AND WELL REHABILITATION

1. The Work

SPECIAL REQUIREMENTS

The Work shall include all labor, materials, equipment, and methods required for inspection and repair or replacement of the District's existing Well 26 domestic water well in accordance with the Scope of Work-Fee Schedule. Specific work to be performed includes removing, inspecting, rehabilitating, and refurbishing the existing well pump bowl assembly or furnishing a new bowl assembly (based upon existing equipment inspection), wire brush, mechanically develop and bail well clean, re-installing the existing or new equipment for Well 26. Bidder (Vendor) shall complete all items included in the Scope of Work Fee Schedule. The Work will include all work listed in the Scope of Work-Fee Schedule and Alternate Work-Fee Schedule and as described herein.

District will notify Vendor of acceptance of total Project Amount with a "Notice to Proceed" letter.

- A. The Vendor shall furnish all materials, labor, equipment, tools, transportation and services for the removal of the District's existing Well 26 motor driven pumping unit, inspection of said pumping unit, rehabilitation of pump bowl assembly (or re-equipping with new pump bowl assembly, as required) Well 26.

Well 26 is located within a below grade vault on the west side of Carnation Lane, in the City of Beaumont, California. The entrance to Well 26 is located west of the intersection of Carnation Lane and Snapdragon Way. Plan view of the Site and Site Photographs are attached in Appendix "B"

- B. The Work includes all work set for on the Scope of Work-Fee Schedule and generally as described in the following items:

Work to be Performed by Vendor

- Provide temporary facilities as necessary for removal of pumping facilities. In the event the Vendor proposes to land the pumping unit on the top of the below grade vault during the removal process, the Vendor shall provide a temporary support system (i.e. steel beams, etc.) which bridge the top of the vault lid to provide pumping unit support without loading said vault lid. Specifically, support shall at least reach from vault side wall to vault side wall (approximately 18'-6"6).
- Remove existing Well 26 pumping unit equipment including 400 horsepower 480 volt 3 phase electric motor, discharge head, 647'± of column, tube and line shaft (including couplings, centering spiders, and bearings) for oil lubricated pumping unit. Tag well to determine presence of fill.
- Inspect and provide comments and/or recommendations regarding serviceability of existing pump column, tube, and shaft.
- Deliver the District's existing 400 hp electric motor from the Well 26 project site to the District's electrical repair vendor, Brithinee Electric. District will arrange and

pay for Brithinee Electric to inspect and perform a full spectrum vibration analysis on the existing motor and make any repairs deemed necessary to the motor. Brithinee Electric is located at 620 South Rancho Avenue in the City of Colton, Ca.

- Haul Column, Tube, and Shaft and pump bowl assembly to Vendor yard for evaluation regarding condition and serviceability of the column, tube, and shaft.
- Recondition (as required) 647'± of existing 12" pump column.
- Disassemble and inspect pump bowl assembly. Measure and record wear and damage. Provide report and recommendations to District of bowl conditions and refurbishment options (this work is to be completed in order for the District to access the existing bowl condition only, upon completion of this work, the District will then make the decision whether to rebuild the existing bowl assembly or replace said existing bowl assembly with a new bowl assembly). In the event the District elects to replace the existing bowl assembly, said existing bowl assembly shall be delivered from the Vendors place of disassembly to the District's Well 2 site for storage subsequent to disassembly and inspection.
- Disassemble and inspect existing 647' of 1-15/16" line shaft and 3" enclosing tube removed from Well. Measure and record wear and damage. Provide report and recommendations to District of column, tube, and line shaft conditions and serviceability.
- Bail well clean.
- Clarify water in preparation for initial (pre cleaning) video log. Perform color video log of well and provide comments and recommendations to District. Camera shall be capable of lateral (side) as well as axial viewing. Provide DVD disk (2 copies) to District. (Survey shall be conducted by an independent party approved by District).
- Wire brush well from ground surface to total depth of well (20" diameter liner from 13'6" to 1070'6" below ground surface) and bail well clean. (520' of louvered casing and approximately 507' of blank casing).
- If District elects to chemically rehabilitate the well, the Vendor shall chemically and mechanically rehabilitate the well as set forth in the specifications. Fee shall be based upon actual work performed.
- Clarify water in preparation for final (post cleaning) video log. Perform color video log of well and provide comments to District. Camera shall be capable of lateral (side) as well as axial viewing. Provide DVD disk (2 copies) to District. (Survey shall be conducted by an independent party approved by District).
- If District selects to replace the pumping unit bowl assembly, the Vendor shall furnish a new replacement bowl assembly with **ductile iron double bolted** construction (as necessary). Bowl assembly shall be furnished and installed to meet pumping unit requirements set forth in Specification Section 11320. Fee shall be based upon replacing the existing Flowserve, 14KKH 9 stage bowl assembly with a new Flowserve, Goulds, or approved equal
- Refurbish existing pump discharge head as necessary, as required.
- Pick up and deliver the District's existing 400 hp electric motor from the District's electrical repair vendor, Brithinee Electric to the Well 26 project site.
- Install pumping unit including refurbished or new bowls, existing 10' suction pipe and strainer, existing 12" pump column, tube and line shaft, discharge head and 400 hp electric motor and level discharge head.

- Coordinate installation of Owner furnished and installed Baker Tank (for water clarification) directly south of well site. Tank may be installed if deemed necessary by the District. Owner will furnish and install Baker Tank and discharge piping for well startup water clarification prior to discharge to storm water channel adjacent to the west side of well site 26.
- Start up and performance test new and existing equipment, controls and instrumentation; Vendor shall operate pump as required.
- Disinfect well in accordance with Specification Section 11320, State of California Department of Health Service requirements and in accordance with AWWA procedures
- Clean up well site.

Work to be Performed by District's Staff

- District will perform bacteriological testing and assist Vendor with pumping unit startup and testing.
 - If deemed necessary by the District, the District will install a Baker Tank and associated temporary piping for rehabilitation (if performed) and for well startup and testing water clarification prior to discharge.
- C. Payment for work related to the well as well as rehabilitation and equipping of the well (as required) will be based on actual quantities furnished, installed, or constructed based upon final project negotiated prices in accordance with the prices set forth on the Scope of Work-Fee Schedule for various lump sum or unit price items. If information indicates that the completion of the work at any time is not warranted, the District reserves the right to terminate all further work. In such an event, the Vendor will be paid for the value of his work completed to that time on the basis of prices stated in the bid schedule.
- D. All materials, supplies, equipment, and labor, except those services expressly stipulated to be furnished by the District, shall be supplied by the Vendor. The Vendor shall leave the premises in a neat and orderly condition.
- E. The Vendor shall record and notify the District of the commencement and completion of each contract operation and work item.

2. Disposal of Rehabilitation (if required), Disinfection and Testing Water

Disposal of rehabilitation, chlorinated water and testing water may be through a District furnished and installed portable water tank (Baker type Tank) from the existing well site through the temporary tank and to a point of discharge into the existing storm channel directly west of the project site. It is anticipated that the water will travel along the east right of way of Cherry Avenue to an existing storm water retention pond and water quality basin located southerly of the project site and north of 8th Street in the City of Beaumont, CA. Vendor shall coordinate well discharge with the District to ensure that existing properties are protected and that well discharge does not create public safety hazards.

3. Authorization to Proceed

Owner will provide an Authorization to Proceed Letter to the Vendor. The Vendor will then be

authorized to begin Contract Work submittal document submission, material ordering, and construction scheduling.

4. Working Hours

Vendor shall perform all work between 7:00 AM and 5:00 PM, Monday through Friday. Vendor shall not work on Owner holidays. Said holidays are as follows:

New Year's Day
Martin Luther King Jr. Day
Presidents Day
Memorial Day
Independence Day
Labor Day
Veterans Day - November 11
Thanksgiving Day
Day After Thanksgiving Day
Christmas Day

When a legal holiday falls on a Saturday, it is observed on the preceding Friday, when it falls on a Sunday, it is observed on the following Monday.

5. Permits, Certificates, Laws, and Ordinances

Vendor shall, at his own expense, procure all permits, certificates, and licenses required of him by the State of California, County of Riverside, County of Riverside, California Regional Water Quality Control Board, South Coast Air Quality Management District, or any other authority or agency having jurisdiction for the execution of the Work. Vendor shall comply with all federal, state, and local laws, ordinances, or rules and regulations relating to the performance of said Work.

6. Records

The Vendor shall keep records providing the following information for those items of work that are performed:

- A. A complete daily log and record on the well shall be furnished to the District.
- B. As-Built Drawings/Submittals documenting final construction.

7. Project Completion Date

Project completion date shall be 45 days from the date of the Authorization to Proceed Letter issued by the District. The 45 day completion date will be adjusted to provide for material acquisition delays in the event the existing Flowserve pumping unit is not refurbished and a new ductile iron bowl pumping unit is required.

8. Liquidated Damages for Delay

Vendor shall pay to Owner, as fixed and agreed, liquidated damages for each calendar day's delay in the completion of all the work beyond the time agreed upon, the amount of \$200.00.

9. Contract Information/Drawings

The following Appendices are made a part of these Contract Documents:

APPENDIX LIST
(Attached in the back of these Contract Documents)

<u>Title</u>	<u>Appendix No.</u>
Specification 11320-Deepwell Vertical Turbine Pumping Unit Technical Specifications	A
Specification 11330- Technical Specifications Well Rehabilitation Specifications Rehabilitation of Well 26	
Well 26 Site Plan Image and Photos	B
Well 26 Well and Pumping Unit Information	C
Well 26 SCE Test Reports	D
Sample Maintenance Bond	E

10. Right to Change Work

District reserves the right to direct Vendor to cease work upon the well at any phase and to determine payment for work performed in accordance with the bid unit prices. District also reserves the right to either increase or decrease other related work in accordance with the aforementioned unit prices. Payment for all work shall be predicated upon work completed.

11. Payment Requests

Vendor shall submit all partial payment requests and final payment request to District. Payment requests shall be submitted by the 18th day of the month preceding the month in which payment will be made. On approval by the District, partial payments will be made by the first day of the month following the month in which request for payment is made.

All payment requests shall show all Scope of Work-Fee Items and sub items for the Contract Work. In addition, said requests shall show the percentage of completion of each Fee Item and sub item and the amount thereof, said amounts being totaled to arrive at the value of the completed Work. The net partial payment amount shall equal 95% of said total.

12. Site Maintenance

- A. The Vendor shall at all times maintain the well site and discharge site in a neat and orderly fashion, free from trash and construction waste materials. All cleared and waste material shall become the property of the Vendor and shall be disposed of by him outside the limits of the work in accordance with applicable ordinances and regulations of governmental agencies having jurisdictions.

- B. Unattended construction materials and equipment shall be left in a manner such that they do not constitute fire hazards, exposed to vandalism, or become a nuisance or danger due to forces of nature such as rain or wind.
- C. Existing improvements as designated by the District, whether on the construction site or on other property, shall be protected in place and shall be provided with adequate access.
- D. While construction is being conducted, the Vendor shall provide safety in the area of construction.
- E. Vendor shall remove any sediment deposited to city streets or storm water channels on a daily basis.

13. Data to be Submitted by Vendor

Vendor shall furnish District the following data and said data must be accepted by District prior to performing any Contract Work appurtenant to specific submittal items. Data (two copies) shall be submitted directly to the District for review and acceptance or rejection. Vendor shall submit five copies of accepted data the District for distribution of same.

A. Material and Equipment Lists with Catalogs

Pump shaft, tube, bearing, and coupling manufacturer's data sheets

B. Fabrication and Component Drawings with Diagrams

Pumping unit bowl assembly and appurtenances (only if Fee Item 111B is required)

C. Construction Schedule

Construction Schedule

D. Well Chemical Rehabilitation Materials (if required)

Materials and Proposed Methods of Well Chemical Rehabilitation and Pump Development

14. Vendor Cooperation and Coordination

Vendor shall cooperate with District and all jurisdictional agencies. Vendor shall establish a work schedule sufficiently in advance of work to permit coordination of work with District and other agencies. Owner will have representatives on site to observe and verify compliance with Contract Documents. Vendor shall not operate any existing facilities, including opening or closing of pipeline valves.

15. Construction Water and Power

Owner will provide a reasonable quantity of construction water free of charge from Owner's existing potable water system. Vendor shall apply for an Owner supplied meter. Vendor shall furnish and install Owner approved backflow device and all necessary piping and appurtenances,

including pumps and water trucks, necessary to convey water from Owner's meter to work location.

Vendor shall provide required power to perform all phases of work.

16. Specified Model Numbers

All model numbers used herein are provided for information only, to assist Vendor in selecting equipment that conforms to Specifications. In case of any conflict between model numbers given herein and the descriptive specifications or performance specified, the descriptive specifications and performance specified shall govern.

17. Well Protection

The Vendor shall protect open wells by installing a steel locking cover which shall be maintained in place at all times unless work within the well is actively in progress.

18. Well Disinfection

Unless otherwise stated, the Vendor shall use the following procedure to disinfect well and that the Vendor shall perform and assist District's Staff with disinfection and pump startup as described hereafter and as necessary to achieve well disinfection:

- A. Immediately prior to installation of permanent pumping equipment, Vendor shall disinfect pumping unit components with chlorine.
- B. Upon completion of well pumping unit installation, the Vendor shall disinfect the well and installed pumping unit with chlorine solution.
 - 1) Vendor shall dose the well by adding liquid chlorine solution to well to obtain required concentration of at least 100 parts per million.
 - 2) Immediately after dosing the well, District and Vendor shall pump water to ground surface until chlorine is detected and shall then allow the water to return into the well. Vendor shall repeat said procedure twice at one hour intervals.
 - 3) The well will then be allowed to stand without pumping or agitation for 24 hours.
 - 4) The District and the Vendor shall then pump the well to waste until chlorine is no longer evident, and shall continue to pump the well to waste for 15 minutes thereafter.
 - 5) The District and the Vendor shall then allow the well to stand without pumping or agitation for 24 hours prior to sampling.
 - 6) The District will then secure two samples of water from the well in approved containers, and have said samples analyzed by a State certified analytical laboratory for total coliform (presence/absence), fecal coliform (presence/absence), and heterotrophic plate count. The District will secure the first sample within five minutes of starting the pump at the specified pumping rate, and the second sample thirty minutes thereafter.

- 7) The well shall be deemed properly disinfected only if the sample analysis results indicate absence of total coliform bacteria, absence of fecal coliform bacteria, and a heterotrophic plate count of less than 500 colony forming units per milliliter (CFU/ml).
 - 8) If the sample analysis results do not indicate that the well was properly disinfected, the District and the Vendor shall repeat the entire disinfection procedure, including sampling, sample analysis, and reporting of sample analysis results.
- C. After 24 hours, the Vendor will assist the District, as necessary, to secure two samples of water from the well in approved sealed containers. District will have said samples analyzed by a State certified analytical laboratory for chlorine residual, total coliform (presence/absence), *e. coli* (presence/absence), and heterotrophic plate count. The District will secure the first sample within five minutes of starting the pump at the specified pumping rate, and the second sample thirty minutes thereafter.
- D. The well shall be deemed properly disinfected only if the sample analysis results indicate absence of total coliform bacteria, absence of *e. coli* bacteria, and a heterotrophic plate count of less than 500 colony forming units per milliliter (CFU/ml).

APPENDIX A

**Specification Section 11320
Deep well Vertical Turbine
Pumping Unit Technical Specification**

**Specification Section 11330
Technical Well Rehabilitation Specification
Rehabilitation of Well 26**

SECTION 11320

DEEPWELL VERTICAL TURBINE PUMPING UNIT TECHNICAL SPECIFICATIONS

PART 1 - GENERAL

1.01 Specific Project Description

Contractor shall provide a new bowl assemble in accordance with Fee Schedule Item 111 and Item 1.02, hereafter. Specific pumping unit related work to be performed as part of this project is identified in the Fee Schedule-Scope of Work, Well 26 Pumping Unit Repair Special Requirements, and generally described as follows:

- Provide temporary facilities as necessary for removal of pumping facilities. In the event the Vendor proposes to land the pumping unit on the top of the below grade vault during the removal process, the Vendor shall provide a temporary support system (i.e. steel beams, etc.) which bridge the top of the vault lid to provide pumping unit support without loading said vault lid. Specifically, support shall at least reach from vault side wall to vault side wall (approximately 18'-6"6).
- Remove existing Well 26 pumping unit equipment including 400 horsepower 480 volt 3 phase electric motor, discharge head, 647'± of column, tube and line shaft (including couplings, centering spiders, and bearings) for oil lubricated pumping unit. Tag well to determine presence of fill.
- Inspect and provide comments and/or recommendations regarding serviceability of existing pump column, tube, and shaft.
- Deliver the District's existing 400 hp electric motor from the Well 26 project site to the District's electrical repair vendor, Brithinee Electric. District will arrange and pay for Brithinee Electric to inspect and perform a full spectrum vibration analysis on the existing motor and make any repairs deemed necessary to the motor. Brithinee Electric is located at 620 South Rancho Avenue in the City of Colton, Ca.
- Haul Column, Tube, and Shaft and pump bowl assembly to Vendor yard for evaluation regarding condition and serviceability of the column, tube, and shaft.
- Recondition (as required) 647'± of existing 12" pump column.
- Disassemble and inspect pump bowl assembly. Measure and record wear and damage. Provide report and recommendations to District of bowl conditions and refurbishment options (this work is to be completed in order for the District to access the existing bowl condition only, upon completion of this work, the District will then make the decision whether to rebuild the existing bowl assembly or replace said existing bowl assembly with a new bowl assembly). In the event the District elects to replace the existing bowl assembly, said existing bowl assembly shall be delivered from the Vendors place of disassembly to the District's Well 2 site for storage subsequent to disassembly and inspection.
- Disassemble and inspect existing 647' of 1-15/16" line shaft and 3" enclosing tube removed from Well. Measure and record wear and damage. Provide report and recommendations to District of column, tube, and line shaft conditions and serviceability.
- Bail well clean.

- Clarify water in preparation for initial (pre cleaning) video log. Perform color video log of well and provide comments and recommendations to District. Camera shall be capable of lateral (side) as well as axial viewing. Provide DVD disk (2 copies) to District. (Survey shall be conducted by an independent party approved by District).
- Wire brush well from ground surface to total depth of well (20" diameter liner from 13'6" to 1070'6" below ground surface) and bail well clean. (540' 6" of louvered casing and approximately 540' of blank casing).
- If District elects to chemically rehabilitate the well, the Vendor shall chemically and mechanically rehabilitate the well as set forth in the specifications. Fee shall be based upon actual work performed.
- Clarify water in preparation for final (post cleaning) video log. Perform color video log of well and provide comments to District. Camera shall be capable of lateral (side) as well as axial viewing. Provide DVD disk (2 copies) to District. (Survey shall be conducted by an independent party approved by District).
- If District selects to replace the pumping unit bowl assembly, the Vendor shall furnish a new replacement bowl assembly with **ductile iron double bolted** construction (as necessary). Bowl assembly shall be furnished and installed to meet pumping unit requirements set forth in Specification Section 11320. Fee shall be based upon replacing the existing Flowserve, 14KKH 9 stage bowl assembly with a new Flowserve, Goulds, or approved equal
- Refurbish existing pump discharge head as necessary, as required.
- Pick up and deliver the District's existing 400 hp electric motor from the District's electrical repair vendor, Brithinee Electric to the Well 26 project site.
- Install pumping unit including refurbished or new bowls, existing 10' suction pipe and strainer, existing 12" pump column, tube and line shaft, discharge head and 400 hp electric motor and level discharge head.
- Coordinate installation of possible Owner furnished and installed Baker Tank (for water clarification) directly south of well site. Owner may elect to furnish and install Baker Tank and discharge piping for well startup water clarification prior to discharge to storm channel adjacent to west side of well site.
- Start up and performance test new and existing equipment, controls and instrumentation; Vendor shall operate pump as required.
- Disinfect well in accordance with Specification Section 11320, State of California Department of Health Service requirements and in accordance with AWWA procedures
- Clean up well site.

Work to be Performed by District's Staff

- District will perform bacteriological testing and assist Vendor with pumping unit startup and testing.
- Baker Tank and associated temporary piping for rehabilitation (if deemed necessary) and for well startup and testing water clarification prior to discharge.

In the event the existing pumping unit is deemed non re-buildable Contractor shall provide one (1) new deepwell vertical turbine pumping unit (bowl assembly) to meet the specific project pumping unit requirements described in Section 1.02, below.

1.02 Specific Project Pumping Unit Requirements (if existing pumping unit bowl assembly is deemed non-re-buildable)

A. General

The Contractor shall provide a complete new deep well pump bowl assembly (bowls, bearings, impellers, etc) consisting of a ductile iron double bolted bowl assembly to meet pumping unit performance requirements specified herein.

The existing pumping unit consists of an oil lubricated line shaft pump. All new pumping unit components shall meet the performance requirements of this specification section, as listed below.

Bidders shall submit fabrication drawings for the new bowl assembly and certified pump performance curves per Section 1.03 herein.

B. Well No. 26 Pump

1. Performance (Pump preliminary performance criteria set forth is based on a Flowserve 14KKH - 9 stages)

Discharge Capacity (GPM)	Bowl Head (Feet)	Minimum Bowl Efficiency	Maximum Net Positive Suction Head Required (Feet)
Shutoff Head	950 (min)	NA	NA
700	825 to 850	56 %	13
1,000	800 to 810	73 %	13
1,250	730 to 760	79 %	14
1,500*	670	83 %	20
1,750	585 to	82 %	25
2,000*	480	75 %	20
2,250	350 to 380	66 %	25

* Design condition

2. Pumping unit shall be of the enclosed line shaft (oil lubricated), enclosed impeller deepwell vertical turbine unit design.

3. Maximum Horsepower - Speed – Maximum Thrust Factor: 400 hp - 1770 rpm - 12 lb/ft.

At no point on the pump curve shall the existing driving equipment be overloaded.

4. Bowl Assembly Diameter: 14" maximum, (double bolted ductile iron bowl and

discharge case assembly if required per specifications bowl pressure requirements)

5. Column Piping: Wire brush, steam clean, scrape, and reuse 647' of existing 12" diameter column piping from Well 26'. In the event some of the pump column is deemed unsuitable for service, Vendor shall contact District and District may make additional existing 12" diameter column piping, tube, and shaft available for installation. Said items are stored at the District's Well 2 site.
6. Furnish and install 647'± of existing refurbished (as necessary) 1-15/16" enclosed line shafting (oil lubricated) within 3"- schedule 80 tube. Vendor to verify dimensions. Provide all couplings, bearings, keys, bolts and nuts.
7. Discharge Head: Reuse existing cast iron discharge head. Vendor shall refurbish existing discharge head as required for reinstallation of pumping unit. Vendor shall re-plumb and reinstall pump line shaft and oil line to the discharge head.

Existing discharge head: Cast Iron

8. Pump manufacturer shall select pump and verify performance in the event the existing pumping unit is non-rebuildable. Selected pump shall be approved by District.
9. Existing pump: Flowserve – 14KKH- 9 stages (See Appendix C for specific information)

E. Existing Motor

1. Horsepower: 400 Hp

Brake Horsepower (Field) shall not exceed nameplate rating within entire operating range.
2. Power: 3 phase, 60 hertz, 460 volts.
3. Speed: 1800 RPM (no load).
4. Starting Characteristics: Solid State Motor Controller.

1.03 Pumping Unit Data to be Submitted by Bidder

Unless specified otherwise in Section 1.02 herein, bidder shall submit a certified pumping unit component drawing for each different pumping unit to be furnished and it shall show dimensions of pumping unit and its components including bowl assembly, connection to existing column assembly, tube and shaft assembly, discharge head assembly, motor, and related appurtenances.

Bidders shall submit a certified pump performance curve together with design calculations for each different pump to be furnished. Each curve shall show head versus capacity, pump bowl efficiency versus capacity, brake horsepower versus capacity, overall (wire to water) efficiency versus capacity, all for full operating range specified.

Each certified pump curve shall be continuous from zero capacity to maximum pumping unit capacity on the abscissa. It shall be furnished full size on 8-1/2 inches (ordinate) x 11 inches (abscissa) paper. Bidder shall indicate certified values on each curve for the following characteristics at all specified design points since consideration will be given thereto in selecting units to be furnished.

- A. Discharge capacity in gallon per minute.
- B. Total discharge head in feet (bowl head).
- C. Pump bowl efficiency.
- D. Brake horsepower (including losses in pump, shaft, column, and head).
- E. Wire to water efficiency (including losses in motor, pump, shaft, column, and head).
- F. Down thrust and momentary up thrust.
- G. Net positive suction head (close coupled booster application only).

Bidder shall submit a guaranteed motor performance curve together with other performance data for each different motor to be furnished. Each curve shall denote horsepower, service factor, efficiency, locked rotor current, and temperature rise and each curve shall show efficiency, power factor, speed, kilowatt input, current, and line voltage under operating range between full load and half load.

1.04 Vendor Submittals (Provide Submittals Only for New Equipment)

Complete submittals (shop drawings) showing performances, fabrication, assembly, and installation, together with detailed specifications and data covering performance and materials of construction, power drive assembly, parts, devices, wiring diagrams, and other accessories forming a part of the pumping units shall be submitted per Section 01300 Contractor Submittals. Submittals shall include, but shall not be limited to, the following:

- A. Submit the following minimum information for each pumping unit specified herein for the District's review and approval:
 - 1. Items as specified in Section 1.03
 - 2. Type and model number with reference to pumping units suitability for service for pumps specific intended use.
 - 3. Assembly drawing, nomenclature and material list.
 - 4. Type, manufacturer, model numbers, location and spacing of bearings.
 - 5. Impeller diameter, eye area, sphere size, and identification number.
 - 6. Maximum rotative speed.

7. Complete performance curves indicating total dynamic head, flow rate, brake horsepower, shutoff head, net positive suction head required, RPM, and efficiency.

The manufacturer shall indicate by arrows to points on the H/Q curves the limits recommended for stable operation, between which pumps are to be operated to prevent surging, cavitation, and vibration. The stable operating range shall be as large as possible and shall be based on actual hydraulic and mechanical characteristics of the units.

Provide certified performance curves prior to shipment.

8. Motor data, including the manufacturer, size, type designation, minimum guaranteed efficiency and power factor at full load, 3/4 load, and 1/2 load, locked motor current in amps, full load current in amps, the motor speed in rpm, mounting details, and other data as required in the Contract Documents.
9. Outline dimensions and weights of pumping unit components and as assembled.
10. Materials of pump construction including bowls, bowl lining, shafts bearings, impellers and castings. Written certification of pumping unit's capability to withstand specified pressures.
11. Protective coating of pumping unit.
12. Installation instructions.
13. Operation and maintenance manuals.

1.06 Quality

- A. All pumping equipment furnished under this Section shall be of a design and manufacture that has been used in similar applications. Manufacturer shall demonstrate to the satisfaction of the District that pumps of similar construction are in service and functioning properly. Manufacturers as specified herein manufacture pumping units with acceptable quality or experience. Manufacturers must, however, meet the performance requirements stated herein for the actual pumps specified. Listing of said manufacturers does not imply that said performance requirements can be met for each pumping unit specified. Contractor shall be responsible to verify that manufacturers supplying equipment meet the size and capacity requirement specified herein.
- B. Pump manufacturer shall verify applicability of pumping equipment with respect to NPSHA, suction piping, can and discharge geometry to assure prevention of cavitation, vibration, surging, overheating, corrosion, and vortexing.
- C. Pumping unit Supplier shall be an authorized distributor approved by District. Said distributor shall have adequate service facilities within a 60 mile radius of District's office and shall have a service organization, machine shop facilities, and parts inventory such that servicing or replacement of pumping units can be provided with minimum delay.

PART 2 - PRODUCTS

2.01 General

Deepwell vertical turbine pumps shall be enclosed line shaft (oil lubricated) or open line shaft (water lubricated) type, whichever is specified, with aboveground flanged discharge and enclosed impellers.

All parts of the pump exposed to water shall be of stainless steel, brass, heavy cast iron, or equivalent corrosion resistant material.

Unless otherwise specified herein, all applicable provisions of AWWA E 101 (Part A), latest, are hereby made a part of these Specifications.

Pumps shall be manufactured by Flowserve, Floway, Goulds, Peerless, or approved equal.

2.02 Pump and Components

A. Pump Bowls

Bowls shall be of ductile iron double bolted or close-grained, gray cast iron, Class 30, precision cast, free from blow holes, sand pockets, and other detrimental defects as required by pump working and shutoff pressures specified under Item 1.02. Water passageways in said bowls shall be smooth so as to allow freedom from cavitation and permit maximum efficiency. Each bowl shall have end or side seal (or both) to prevent slippage of water between bowl and impeller.

Bowls shall be lined with vitreous porcelain enamel, or equal, to produce long effective life (said lining shall not be applied for the purpose of short time gain in efficiency). Lining, identical to that furnished hereunder, shall have been used in the field under similar conditions with satisfactory results for at least a five-year period.

Bowls shall be of such size to fit the well casing with proper clearance (net clearance of 2 inches or more). Bowls shall be capable of withstanding 1-1/2 times the pump shut-off head pressure (zero discharge) or twice the rated capacity pressure, whichever is greater. Bowl materials shall have a minimum tensile strength of 30,000 psi. Bowl assembly shall be provided with ductile iron double bolted construction (as necessary) to meet specific requirements set forth in Section 1.02, herein.

B. Pump Impellers

Impellers shall be of the enclosed type, constructed of SAE 40 bronze. They shall be balanced hydraulically and dynamically to prevent vibration and shall be smoothly finished on all surfaces for minimum friction. Impellers shall be accurately fitted and securely locked to the pump shaft. Vertical adjustment of impellers shall be possible by adjusting top shaft nut. Impellers in multi-stage pumps shall all have the same diameter and trim.

C. Pump Shaft

Pump shaft shall be constructed of AISI-410 or 416 stainless steel and shall be accurately machined to provide smooth operation. It shall easily withstand torsional loads and other stresses encountered within the pump. Pump shaft shall have adequate bearing support at every bowl section and at top bottom and case section, and shall be equipped with a suitable steel coupling for connection to the line shaft.

D. Pump Bearings

Pump bearings shall be sleeve type constructed of SAE 40, 64, 67, or 660 bronze, or approved equal. Bearing area, bearing cooling, and bearing lubrication shall be ample for long, trouble-free operation.

E. Discharge Case

Discharge case shall securely fasten the pump bowl assembly to the column piping. It shall be heavily reinforced with streamlined fluid passages and it shall contain sleeve bearings for the pump shaft. Discharge case shall be provided with a means of reducing to a minimum the leakage of water into the shaft enclosing tube. It shall have bypass ports of sufficient area to permit the escape of water that leaks through the seal bushing.

F. Suction Case

Suction case shall securely fasten the suction piping to the bowl assembly. It shall be heavily reinforced with streamlined fluid passages and it shall contain a sleeve bearing for the pump shaft which is effectively plugged at the bottom to form a grease container. A sand collar shall prevent sand from entering the suction case bearing.

G. Suction Pipe and Strainer

Unless specified otherwise, the suction pipe shall be 10 feet in length and comprised of the same material and diameter as the column piping. A cone type strainer shall be provided for attachment to the suction pipe. The strainer shall be galvanized steel, bronze, or equivalent and shall have a net inlet area of at least four times the suction pipe area. The maximum strainer opening shall not be more than 75% of the minimum opening of the water passage through the bowl or impeller.

H. Column Piping

Column piping shall be threaded pipe conforming to the following diameters and weights per foot, unless specified otherwise.

Nominal Size (Inches)	Outside Diameter (Inches)	Weight Per Foot (Pounds)
6	6.625	18.97
8	8.625	24.70
10	10.750	34.24
12	12.750	43.77
14	14.000	54.57
16	16.000	62.58

Pipe shall be furnished in interchangeable sections of 20-foot nominal length for enclosed line shaft and 10-foot length for open line shaft, with the exception of the top column section which shall be of 5-foot nominal length and the bottom column section which may be of shorter length. Column pipe sections shall be connected with threaded steel sleeve type couplings. Ends of each pipe section shall be faced normal to section axis and machined with threads to permit ends to butt to ensure proper alignment when assembled. Coating of the column piping, either interior or exterior, is not required.

I. Line Shaft

Line shaft shall be comprised of AISI C-1045 material, or approved equal. Line shaft sections excluding top and bottom sections shall match column sections (10-foot or 20-foot nominal length). Top and bottom shaft sections shall match top and bottom column sections. Unless specified otherwise, top shaft shall be two (2) piece with coupling within discharge head.

Shaft enclosing tubing shall be Schedule 80 extra heavy steel pipe, maximum 5-foot lengths. Enclosed line shafting shall be supported by bronze bearings which shall also join tube sections. Open line shafting shall be supported by rubber bearings with bronze retainers which shall also join column sections.

When enclosed line shaft is specified, molded rubber stabilizing spiders that will deform to permit proper alignment of the shafting and tubing assembly within the column shall be furnished and spaced every 40 feet maximum throughout the column length.

2.03 **Discharge Head (Not Required)**

Discharge head shall be constructed of high grade cast iron or fabricated steel as shown on the Drawings as specified in Section 1.02, and shall be capable of withstanding all loads imposed during normal operation. Discharge head shall be furnished with a tube tension and seal assembly, as approved by District, for enclosed line shaft and a stuffing box assembly for open line shaft.

Discharge head shall be suitably enclosed to prevent the entrance of dust and foreign material. Access to the tube tension and seal or stuffing box assembly shall be ample. Drain plugs shall be provided at the bottom. Unless specified otherwise, discharge head shall accommodate two (2) piece top shaft with coupling.

Discharge head shall have a standard flanged outlet of the size specified except where otherwise permitted. If the discharge flange is not the size specified, an adapter consisting of a smooth eccentric increaser (with bottoms level) or reducer (with tops level) shall be provided. Said adapter

shall be flanged to mate the discharge head at one end and as specified at the other.

Discharge head assembly shall be capable of withstanding 1-1/2 times the pump shut-off head pressure (zero discharge) or twice the rated capacity pressure, whichever is greater.

Motor base, column flange face, and discharge flange face shall be accurately machined, faced, and drilled to NEMA and ASA Standards. Upon assembly, motor and discharge head shall form an integral unit.

2.04 Lubrication System (Not Required)

Oil lubrication system shall be automatic gravity feed and it shall consist of an oil reservoir, solenoid control valve, sight feed valve, and appurtenant supports and oil lines. It shall be furnished with sight glass or other plainly visible oil indicator device.

Unless specified otherwise, oil reservoir shall have a capacity of two gallons and it shall be Peerless or approved equal. It shall be mounted on the pump discharge head unless specified otherwise.

Oiler solenoid control valve shall open or close upon command of control system and it shall be ASCO 826111, or approved equal. It shall automatically start or stop the flow of lubricating oil to the bearings. It shall also permit manual operation upon control system failure. It shall be rated 120 psi minimum, 120 volt, 60 hertz, unless specified otherwise.

Oil piping shall be sized according to the viscosity of the oil recommended by the pump manufacturer and ambient temperature at the pumping unit. Said piping shall permit conveyance of full oil supply required by pumping unit.

Water lubrication system shall be automatic unless specified otherwise. It shall consist of piping or tubing from a source of water pressurized when pump is off, solenoid control valve, and appurtenant piping supports. System shall comply with pump manufacturer's recommendations for flow.

Water solenoid control valve shall open or close upon command of control system. It shall automatically start or stop the flow of water to the shaft bearings. It shall also permit manual operation upon control system failure.

2.05 Nameplate (Required)

Nameplate, easy to read and corrosion resistant, shall be provided with each pump and shall contain complete pump information including manufacturer, serial number, model number, capacity in gallons per minute, total dynamic head in feet, and pump speed, all at specified design point. Said nameplate shall be mounted on pump head.

2.06 Vertical Hollow Shaft Electric Motor (Not Required)

A. General

Vertical hollow shaft electric motors shall be Design B, high thrust, squirrel cage, induction type having NEMA weather protected Type I enclosures unless specified otherwise. Motors shall be built to form an integral part of pump head assembly and shall be suitable electrically and mechanically to efficiently and effectively drive pumps specified. Motors

shall operate in accordance with these Specifications.

Motors shall be manufactured by General Electric Corporation, U.S. Electrical Motors Division Emerson Electric Co., or Westinghouse Electric Corporation, or approved equal. Unless specified otherwise all materials, workmanship, and tests shall conform with the applicable specifications of the National Electrical Manufacturers Association (NEMA), Institute of Electrical and Electronic Engineers (IEEE), and American Standards Association (ASA), and the Anti-Friction Bearing Manufacturers Association (AFBMA).

B. Power

Unless specified otherwise, motors shall be nameplate rated, 3 phase, 60 hertz, 460 volts.

C. Speed

Unless specified otherwise, motors shall be 4 pole and shall have no load speed of 1800 rpm.

D. Starting Characteristics

Motors rated 200 hp and smaller shall be full voltage line start and motors rated 250 hp and larger shall be part winding increment start, unless specified otherwise.

E. Efficiency

All motors shall be rated premium efficiency, unless specified otherwise. Rated efficiencies shall be based on NEMA Standard MG1-12.536. Guaranteed efficiencies shall be determined in accordance with IEEE #12, Test Method B and E, latest revision.

F. Service Factor

Rated service factor shall be 1.15 or greater.

G. Insulation System

All motors shall be provided with Class "F" or better insulation systems except that motor lead insulation may be Class "B" or better. Impregnating materials shall be rated Class "F" (155 degrees C) minimum. Completed windings, when tested in accordance with IEEE #57, latest revision, shall show a thermal rating of not less than 150 degrees C for 30,000 hour's life.

Windings shall be held firmly in stator slots to prevent coil shift. Sharp edges and burrs shall be removed from stator slots prior to winding or inserting coils. Slot liners and coil end phase insulation, in addition to the coating, shall be provided. Stator windings shall be of high conductivity copper magnet wire.

Completed stator windings shall be provided with a properly cured, uniform impregnation for mechanical rigidity, moisture resistance, and protection against winding failures from accumulation of foreign conductive matter. The completed insulation system shall be capable of withstanding phase-to-ground rms voltage of 600 volts continuous and 2,300 volts instantaneous (surge or transient).

H. Temperature Rise

Rated temperature rise above 40 degrees C ambient temperature measured by resistance at service factor load of 1.15 shall not exceed 90 degrees C.

I. Inrush Current

Motors rated between 10 hp and 50 hp shall be rated NEMA locked rotor Code H or better and motors rated 50 hp and larger shall be rated NEMA locked rotor Code G or better except where NEMA locked rotor Code H is specifically permitted.

J. Load Conditions

Actual motor loads shall not exceed the nameplate rating (horsepower) unless specified otherwise.

K. Motor Balance

Motors shall be dynamically balanced to a maximum of .001 inches peak to peak amplitude, especially at upper bearing housing.

L. Bearings

Motors shall be equipped with anti-friction type thrust and guide bearings. Angular contact ball thrust bearings shall be used in preference to spherical roller thrust bearings wherever possible. Angular contact ball thrust bearing shall be self cooled wherever possible. Water cooled angular contact ball thrust bearings shall be used only when approved by District. Spherical roller thrust bearings shall be water cooled.

Bearings shall be of sufficient capacity to carry all static and dynamic up and down thrust loads, both momentary and continuous, imposed by the pump. Bearings shall provide minimum 3 year B10 life (26,300 hours) based on continuous design thrust load or minimum 1 year B10 life (8770 hours) based on maximum pump shutoff thrust load, whichever is greater. Bearings shall also provide for minimum momentary upthrust equal to 30% of rated downthrust.

M. Bushings

Motors shall be equipped with lower end head shaft steady bushings unless specified otherwise.

N. Lubrication System

Motor thrust bearings shall be oil lubricated; however, motor guide bearings may be grease lubricated. Oil lubrication systems shall provide optimum lubrication of bearings. Said systems shall have sufficient oil storage and oil cooling capacity to limit oil bath temperature rise to 45 degrees C above 40 degrees C ambient temperature unless temperature rise of 50 degrees C is specifically permitted. Oil lubricated motors shall have visual level indicators and accessible fill and drain plugs. Indicators and plugs shall be located 180 degrees from

pump discharge unless specified otherwise. Grease lubrication systems shall be regreasable and shall provide for automatic flushing or purging of grease cavity during regreasing.

O. Thermal Protection

Motors shall be equipped with 120 volt thermal sensors, one for each phase, affixed to or embedded in motor windings, set to open control circuit at 135 degrees C. All thermal sensor leads shall terminate in motor terminal box. Control modules and reset switches shall be furnished with the thermal sensors. The thermal sensors shall be Texas Instruments 4BA or 7BA, or approved equal. The control modules shall be Texas Instruments 50AA, or approved equal.

P. Space Heaters

Motors shall be equipped with 120 volt single phase belt type space heaters capable of raising motor temperature 10 degrees C above ambient temperature to prevent condensation. All space heater leads shall terminate in motor terminal box.

Q. Non-Reverse Protection

Motors shall be equipped with non-reverse mechanisms which shall limit maximum reversal to within 10 degrees of rotation.

R. Terminal Box

Motors shall be equipped with extra large heavy duty split type conduit boxes. Unless specified otherwise, motor terminal boxes shall be located 90 degrees from pump discharge.

S. Screens

Motors shall be equipped with suitable corrosion resistant safety and rodent screens. Said screens shall not interfere with motor cooling or motor heat dissipation.

T. Nameplates

Nameplates, easy to read and corrosion resistant, shall be provided with each motor and said nameplates shall include the following information:

1. Motor Data Nameplate - Manufacturer, serial number, model number, rated horsepower, service factor, frequency, phase, load voltage, full load current, full load speed, design designation, locked rotor-code, insulation class, temperature rise, ambient temperature, thermal sensor setting, NEMA nominal efficiency, guaranteed minimum efficiency, and full load power factor.
2. Connection Data Nameplate - Motor start, motor run characteristics, and motor connection diagram.
3. Bearing Data Nameplate - Manufacturers, bearing types (thrust and guide), bearing numbers, thrust capacity, oil type, minimum operating oil viscosity, maximum operating oil bath temperature, required cooling water flow, and maximum cooling

water pressure.

PART 3 - EXECUTION

3.01. Pumping Unit Factory Performance Test (Not Required)

Each completed pumping unit (pump bowl assembly and vertical hollow shaft motor to be furnished) shall be given a certified factory performance test by pump manufacturer prior to shipment from factory. Pumping unit shall be tested at all design points for verification of certified performance curve furnished by Bidder and approved by District.

Tests shall be performed using suitable equipment for measuring bowl capacity, bowl head, power (input, brake, and water), and speed, all as approved by District. Equipment shall include a power meter for measuring input power (wire), a dynamometer for determination of pump brake horsepower, and a water meter for measuring output power (water). Contractor shall submit three copies of each certified factory performance test for acceptance by District. District reserves the right to have a representative present during any tests and to witness same.

3.02. Pumping Unit Installation (Required)

Contractor shall bear full responsibility for the satisfactory installation and initial operation of all pumping units furnished under these Specifications and shall provide sufficient personal supervision over all installation and startup procedures accordingly, unless otherwise specified. Contractor shall also provide all test equipment necessary to determine initial operating performance.

During installation, Contractor shall disinfect all portions of the pump bowl assembly and column piping with a chlorine solution and method acceptable to District.

3.03. Pumping Unit Field Performance Test (Acceptance Test)

After equipment has been completely installed, field tests shall be performed by the Contractor which shall be witnessed by District. Each pumping unit furnished hereunder shall be operated for a period of two weeks during which time acceptance tests may be conducted. Head capacity, overall efficiency, and input and output horsepower shall be determined for at least three different operating conditions in the operating range of the pumping unit, including the specified design point, for comparison with the certified pump curves and the factory performance test results, both as approved by District.

Pumping units (pump and motor) shall perform in the field substantially in accordance with the certified pump curves and the factory performance test results as adjusted for field conditions. If, in the opinion of District, the equipment furnished does not perform in accordance with these Specifications, Contractor shall promptly make all necessary repairs or corrections so that the equipment fully complies with these Specifications. Contractor shall remove, restore, and replace the equipment if required. Factory and field performance tests shall be rerun if necessary. Pump manufacturer's field service engineer shall assist District in the proper conduct of the above field acceptance tests.

3.04. Pumping Unit Vibration

Completed pumping unit (pump and motor) shall receive a final field trim balance, as may be required, and vibration of unit shall not exceed 0.0025 inches, peak to peak amplitude when operating. Contractor shall field measure vibration with a suitable calibrated instrument and all measurements shall be witnessed by District. Vibration shall be measured at motor thrust bearing housing and at any other locations on pumping unit as directed by District.

END OF SECTION

EXHIBIT "A"

SECTION 11330

TECHNICAL WELL REHABILITATION SPECIFICATIONS REHABILITATION OF WELL 26

INCLUDES ADDATIVE BID ITEM FOR CHEMICAL WELL REHABILITATION

PART 1 - GENERAL

1.01 General

The Vendor shall furnish all labor, equipment, materials, and services to rehabilitate wells as specified in the bidding sheets (or Scope of Work, as applicable) including removal of pumping unit, inspection of pumping unit, removal of oil from the surface of the water, wire brushing, cleaning debris from the bottom of the well, chemical treatment, disinfection, and installation of pumping unit. All work will be performed during normal working hours as set forth in the Special Requirements.

PART 2 - REHABILITATION OF WATER WELL

2.01 Removal of Pumping Unit

Vendor shall furnish all labor, equipment, materials, and services to remove and reinstall the motor, pump discharge head, column pipe, tube, shaft, and pump for the Well. All connecting appurtenances and equipment removed from the Well shall be properly lubricated and sealed from dirt, dust, water, condensation, and any other form of contamination.

Vendor shall inspect and make recommendations for repair of pumping unit bowl assembly, column for cracking/defects and tubing for defects/oil leakage.

2.02 Removal of Oil from Well

- (a) Vendor shall furnish all labor, equipment, materials and services to remove the line shaft turbine pump oil from the water table surface following the completion of the pump removal. The oil shall be gently bailed from each well and placed in suitable leak proof containers.
- (b) Vendor shall properly dispose of oil removed from each well. Disposal shall be in accordance with all federal, state and local regulations.

2.03 Video Logging of Wells

The successful bidder will provide two (2) color video logs for the well; one before and one after rehabilitation. The Vendor shall provide equipment that is capable of producing a clear video image of the well casing both submerged and out of the water. The camera must be capable of providing a clear video image of the Well and must be capable of displaying a right angle, side-scan view of the Well casing at the direction of the District. The equipment shall indicate digitally on screen the depth of the camera within one (1) foot of its actual location at one-foot intervals. The District must be present during the video scan. The successful bidder will provide a written field log of the observations from each video scan. Two DVD Copies of each inspection scan shall be provided to the District upon completion of each video-logging run. The successful bidder will schedule the video loggings with the District at least two (2) Working Days in advance. Prior to performing videologs, water shall be added to the well in sufficient quantity and for sufficient duration to clarify the water in the well.

2.04 Bailing Well Clean

Vendor shall remove the debris from the bottom of the Well using a bottom bailer or an District-approved bailing method to depths specified for the Well.

2.05 Wire Brushing of Well

The well shall be cleaned using a **rotary brush method**. The brush shall be a minimum of five (5) feet in length and have 100% contact for the length of the brush with the well casing. The brush shall turn no less than ten (10) revolutions per minute. The rate of brushing shall be no more than forty (40) feet per hour. The bristle material shall be manufactured of stainless steel, low carbon steel, or nylon. Nylon bristles shall be used for wire-wrap screens. As the well casing is cleaned, the scale and encrustation being removed will be allowed to settle to the bottom of the Well. Actual method and tool must be submitted to the District for approval prior to the start of work. The successful bidder is responsible for safely controlling all fluid and debris around and exiting the site.

2.06 Chemical Treatment of Well (Additive Bid Item)

- A. At the District's discretion subsequent to performance of the first video log (pre rehabilitation) the District will determine if it will exercise the chemical treatment of the well additive bid item. Vendor shall furnish all labor, equipment, materials, and services to chemically treat the well. Care shall be taken to follow all Federal, State, and local regulations pertaining to the handling and disposal of the waste chemicals.
- B. Prior to commencing the Work, Vendor shall supply to the District a copy of the manufacturer's Material Safety Data Sheets (MSDS) for all well treatment and neutralizing chemicals for the District's approval and a shop drawing of the snug fitting double surge block assembly. A Certificate of Analysis (COA) from the

manufacturer/supplier must be provided for the acid used. In addition, the Vendor shall provide their proposed program to apply the chemicals, method of neutralizing the acid, method of disposal, Emergency Response Plan, and list of staff qualified to handle the above chemicals. Said list shall include training and certifications received by each individual pertinent to their duties.

All individuals involved in handling well treatment chemicals shall possess all certifications, authorizations and licenses required by local, state and federal authorities to perform the work.

C. Vendor shall chemically treat the well utilizing the method specified below.

1. The well shall be pretreated to disrupt the fouling mechanisms existing within the well column. Pretreatment shall consist of wire brushing of the entire wetted portion of the well as specified herein, followed by bailing the well clean.
2. A treatment solution consisting of the following chemicals shall be mixed above-ground and injected into the existing perforated sections of the casing starting from the bottom of the lower perforated casing to the top of the perforated casing using a double packer tremie method:
 - a. Hydrochloric acid (approximately 30% activity): 9% of Total Well Volume
 - b. Biodispersant (Johnson Screens NW-310 or equivalent): 3% of Total Well Volume
 - c. Nonionic surfactant (Johnson Screens NW-400 or equivalent): 0.1% of Total Well Volume
2. Total Well Volume shall mean 1.5 X the volume of standing water within the well casing.
3. Immediately following the injection of the treatment solution, the Vendor shall swab the perforated sections of the casing with a minimum 20 foot long, snug fitting double surge block. Swabbing shall begin at the bottom of the lower perforated casing and work continuously upwards to the top of the upper perforated casing. After the upper most portion of the well is swabbed, Vendor shall secure a water sample to verify the pH. The sample may be secured by air lifting, submersible pumping, or thief sampling. **If the pH is above three (3), additional treatment solution will be added to the well at the discretion of the District.** If additional treatment solution is needed, the solution will be added and swabbed into place using the double surge block. Sampling and treatment solution addition shall continue until pH is equal to three (3) or less.
4. Vendor shall then wire-brush the well as specified in Section 2.05 above.

5. The well will then be allowed to stand for 12 hours. Immediately after 12 hours the Vendor shall swab each 20 foot perforated section for 15 minutes with the double surge block. Swabbing shall begin at the top of the upper perforated casing and work continuously downward to the bottom of the lower perforated casing.
- D. Vendor shall remove and dispose of the treatment chemicals as outlined below.
1. After completion of swabbing as described above, the Vendor shall remove five (5) volumes of wastewater from the well into an above-ground portable tank, such as a Baker Tank. The wastewater will be removed continuously from the well by air lifting or pumping. Air lifting or pumping shall begin at the bottom of the well and work upward to the top of the upper perforated casing interval. The well should be continually purged until the pH has stabilized to a normal background level and the turbidity of the discharge has dissipated.
 2. At the discretion of the District, water samples will be secured from the well after removal of the treated water to determine pH after removal. The total number of samples will not exceed four (4) in order to determine pH. Should the pH be greater than nine (9) or less than six (6), the Vendor will remove additional wastewater from the well at the direction of the District and dispose of same.
 3. After removal of the wastewater, and at the direction of the District, Vendor shall bail the well clean.
 4. Prior to disposal, Vendor shall neutralize the pH of the wastewater in the above-ground tank by adding sufficient soda ash (powder), magnesium hydroxide (slurry), potassium hydroxide (liquid), or other pre-approved neutralizing agent. **Neutralization will not be allowed in the well casing.**
 5. All wastewater and residual solids from chemical treatment shall be disposed of by the Vendor in a manner and at the facility designated by the Vendor and approved by the District, in accordance with the attached Scope of Work.
 6. Vendor shall discharge the neutralized wastewater onsite at a controlled rate to avoid erosion, as directed by District.
- E. Vendor has the option of submitting in writing to District alternative methods of chemically treating the well, such as the use of available proprietary chemical well treatment systems. Alternative methods may only be used if approved by District in advance of bid opening by issuance of a Contract Addendum.

- F. All chemicals used in treating the well shall be of food-grade quality. All biodispersants, surfactants and additives, both proprietary and non-proprietary, shall be NSF approved for potable well use.

2.07 Well Disinfection

After wire brushing and removal of debris, the well shall be disinfected with a chlorine solution. Unless otherwise permitted, Vendor shall use the following procedure to disinfect the well:

- a. Before dosing, the Vendor shall check the pH of the well to determine if buffering of the chlorine will be necessary. If the pH is above 7.5 a chlorine enhancing chemical such as Johnson Screen's "NW-410," Layne-Christensen's "Oximate," or other District pre-approved equivalent must be used to lower the pH and enhance the effectiveness of chlorination. The chlorine enhancing chemical shall be used at a rate of 1.5 gallons per 1,000 gallons of disinfectant solution for a target pH of 6.5 to 7.5 during chlorination.
- b. Vendor shall prepare a disinfectant solution consisting of water, sodium hypochlorite solution, and, if necessary, chlorine enhancing chemical, above-ground for addition to the well. The disinfectant solution shall have a free chlorine concentration of 300 parts per million (ppm). To achieve 300 ppm of chlorine, approximately 2.4 gallons of 12.5% Sodium Hypochlorite solution will be required per 1,000 gallons of disinfectant solution. The sodium hypochlorite solution used shall not have been stored more than 60 days.
- c. Vendor shall dose the well by adding two times the Well Casing Volume of disinfectant solution to the well. The method used to introduce the disinfectant solution into the well shall ensure that the disinfectant solution reaches all portions of the well in which contamination might have occurred during construction.
- d. Immediately after dosing the well, Vendor shall agitate the chlorinated water within the well by swabbing the well.
- e. After the well has been swabbed, Vendor shall secure a water sample to verify the chlorine concentration. The sample may be secured by air lifting, submersible pumping, or thief sampling. If the chlorine concentration is less than 100 ppm, additional disinfectant solution will be added to the well, at the discretion of the District. Sampling and disinfectant solution addition shall continue until the chlorine concentration is between 100 and 300 ppm. **A chlorine concentration of greater than 500 ppm is not permitted.**
- f. Vendor shall repeat the agitation, sampling, and disinfectant solution addition procedure twice at one hour intervals.

- g. Vendor shall then allow the well to stand without pumping or agitation for at least 6 hours.
- h. Vendor shall then reinstall the permanent pumping unit into the well, and shall pump the chlorinated water from the well into an above-ground portable tank, such as a Baker Tank until chlorine is no longer evident and shall continue to pump until 15 minutes thereafter.
- i. Vendor shall then allow the well to stand without pumping or agitation for 24 hours prior to sampling.
- j. District will then secure two samples of water from the well in approved containers, and have said samples analyzed by a State Certified analytical laboratory for total coliform (presence/absence), fecal coliform (presence/absence), and heterotrophic plate count. District will secure the first sample within five minutes of starting the pump at the specified pumping rate, and the second sample thirty minutes thereafter. District will furnish results of said analyses to Vendor within 48 hours of sampling.
- k. The well shall be deemed properly disinfected only if the sample analysis results indicate absence of total coliform bacteria, absence of fecal coliform bacteria, and a heterotrophic plate count of less than 500 colony forming units per milliliter (CFU/ml).
- l. If the sample analysis results do not indicate that the well was properly disinfected, the Vendor shall repeat the entire disinfection procedure, including sampling, sample analysis, and reporting of sample analysis results. Vendor shall continue to repeat the entire disinfection procedure until sample analysis results indicate that the well has been properly disinfected.
- m. The chlorinated water shall be dechlorinated to less than 0.1 ppm of chlorine prior to disposal. Dechlorination shall take place within the above-ground portable tank. The dechlorinated water shall be discharged off site at a controlled rate to avoid erosion, as directed by District.

PART 3 - CLEANUP

3.01 Cleanup

Vendor shall clean and restore all areas occupied by him in connection with the Work to preconstruction condition. Cleanup shall include, but shall not be limited to, removal and disposal of equipment, rubbish, excess materials, temporary structures, deposited sediments, and excavated materials and restoration of equipment, fences, pavements, trees, shrubs, piping, and ground surface. All parts of work site shall be left in a neat and presentable condition, all to satisfaction of District.

APPENDIX B

Well 26 Site Plan Image and Photos

BEAUMONT-CHERRY VALLEY WELL 26 SITE PLAN IMAGES

WELL 26 FACILITIES



WELL 26 FACILITIES

BEAUMONT-CHERRY VALLEY
WELL 26 FACILITIES PHOTOS



PHOTO 1 - WELL 26
ELECTRICAL AND CHEMICAL STORAGE AND DOSING BUILDING



PHOTO 2 - WELL 26
WELL PUMP VAULT

BEAUMONT-CHERRY VALLEY
WELL 26 FACILITIES PHOTOS



PHOTO 3 - WELL 26
WELL PUMP DISCHARGE HEAD AND MOTOR IN VAULT



PHOTO 4 - WELL 26
MOTOR CONTROL EQUIPMENT ROOM

APPENDIX C

Well 26 Well and Pumping Unit Information



BAKERSFIELD WELL & PUMP CO.

7212 Fruitvale Ave. • Bakersfield, CA 93308 • (661) 393-9661 FAX (661) 393-9647

BEAUMONT-CHERRY VALLEY WATER DISTRICT

WELL NO. 26 - PUMP & MOTOR

(PACIFIC HYDROTECH CORPORATION)

**FLOWERVE PUMP BOWL 14 KKH – 9 STAGE
1500 GPM @ 670 TDH SERIAL No.0702CGC80735-1
EPOXY LINED**

14

**FLOWERVE 12WTOL20 DISCHARGE PUMP HEAD &
SOLE PLATE**

**647 FT. – 12" X 3" X 1 15/16" COLUMN PIPE, TUBE AND
SHAFT .406W PIPE / EPOXY LINED & COATED ID & OD**

12" 316 STAINLESS STEEL CONE STRAINER W/ 10' PIPE

400 US MOTOR (CUSTOMER SUPPLIED)

**By: Bakersfield Well & Pump Co.
Division of Zim Industries
7212 Fruitvale Avenue
Bakersfield, Ca. 93308
Phone 661-393-661
Fax 393-393-9647**

Global Strength. Local Commitment.

New Unit Sales

Algeria Tel: 44.64.00020 Fax: 44.64.00021	Argentina Tel: 44.64.00020 Fax: 44.64.00021	Brazil Tel: 44.64.00020 Fax: 44.64.00021	Canada Tel: 44.64.00020 Fax: 44.64.00021	Chile Tel: 44.64.00020 Fax: 44.64.00021	Colombia Tel: 44.64.00020 Fax: 44.64.00021	Czech Republic Tel: 44.64.00020 Fax: 44.64.00021	Denmark Tel: 44.64.00020 Fax: 44.64.00021	Egypt Tel: 44.64.00020 Fax: 44.64.00021	France Tel: 44.64.00020 Fax: 44.64.00021	Germany Tel: 44.64.00020 Fax: 44.64.00021	Greece Tel: 44.64.00020 Fax: 44.64.00021	India Tel: 44.64.00020 Fax: 44.64.00021	Indonesia Tel: 44.64.00020 Fax: 44.64.00021	Italy Tel: 44.64.00020 Fax: 44.64.00021	Japan Tel: 44.64.00020 Fax: 44.64.00021	Korea Tel: 44.64.00020 Fax: 44.64.00021	Malaysia Tel: 44.64.00020 Fax: 44.64.00021	Mexico Tel: 44.64.00020 Fax: 44.64.00021	Netherlands Tel: 44.64.00020 Fax: 44.64.00021	Philippines Tel: 44.64.00020 Fax: 44.64.00021	Poland Tel: 44.64.00020 Fax: 44.64.00021	Portugal Tel: 44.64.00020 Fax: 44.64.00021	Romania Tel: 44.64.00020 Fax: 44.64.00021	Russia Tel: 44.64.00020 Fax: 44.64.00021	Saudi Arabia Tel: 44.64.00020 Fax: 44.64.00021	Spain Tel: 44.64.00020 Fax: 44.64.00021	Sweden Tel: 44.64.00020 Fax: 44.64.00021	Switzerland Tel: 44.64.00020 Fax: 44.64.00021	Taiwan Tel: 44.64.00020 Fax: 44.64.00021	Thailand Tel: 44.64.00020 Fax: 44.64.00021	Turkey Tel: 44.64.00020 Fax: 44.64.00021	USA Tel: 44.64.00020 Fax: 44.64.00021	UK Tel: 44.64.00020 Fax: 44.64.00021	USSR Tel: 44.64.00020 Fax: 44.64.00021	Vietnam Tel: 44.64.00020 Fax: 44.64.00021	Yugoslavia Tel: 44.64.00020 Fax: 44.64.00021
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Ingersoll-Rand - Pacific - Worthington - Pleuger - Science - Jeumont-Schneider Pumps

FLOWERVE
Pump Division

Form YFP-QS-0086



INSTALLATION, OPERATION, AND
MAINTENANCE INSTRUCTIONS

For Vertical Turbine Pumps

Serial Number 0702.C6C.80735-1

Shop Order Number 07-001

Flowserve Order Number GC80735

NOTE: IT IS IMPORTANT THAT THE ENTIRE CONTENTS OF THIS BOOKLET
BE STUDIED BEFORE INSTALLATION.

VERTICAL TURBINE BUSINESS UNIT

HQ:
5310 Taneytown Pike
Taneytown, MD 21787
Phone: 410-756-2802
Fax: 410-756-2615

1341 West 2nd Street
Hastings, NE 68901
Phone: 402-463-6821
Fax: 402-462-8512

2349 South Orange Avenue
Fresno, CA 93725
Phone: 209-288-9243
Fax: 209-288-6709

Refer All Communications to the Nearest Branch Office
Listed on the Last Page



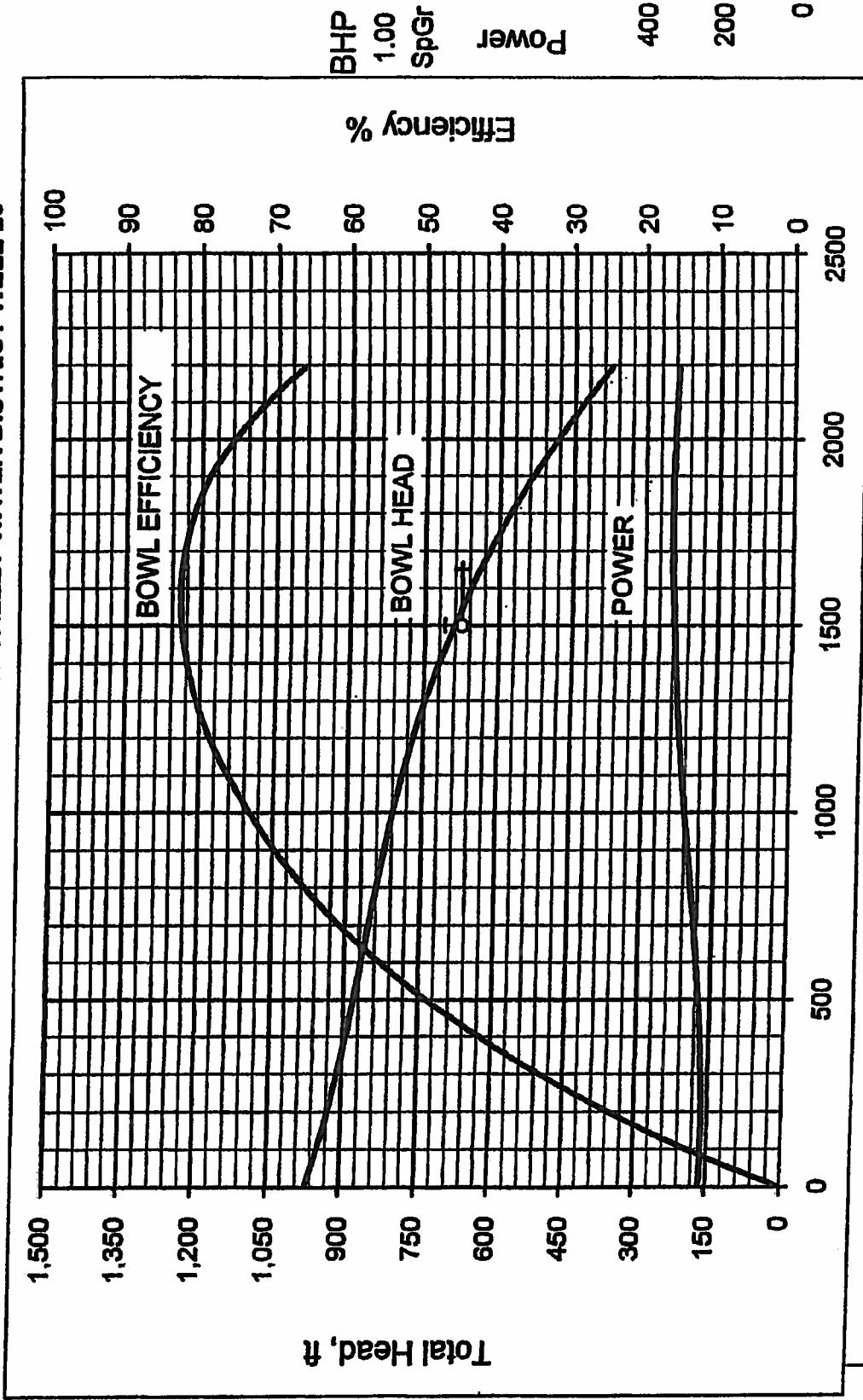
BEAUMONT CHERRY VALLEY WATER DISTRICT
WELL 28

PERFORMANCE TEST RESULTS

TEST NUMBER:	14KKHU06	BOWL SIZE/TYPE:	14KK
DATE:	4/13/2007	BOWL MATERIAL:	CAST IRON
TESTED BY:	GARY LESPREANCE	IMPELLER TYPE / DIA :	H 10 38
TESTED FOR:	BAKERSFIELD WELL	IMPELLER MATERIAL:	BRONZE
WITNESSED BY:		IMPELLER SETTING:	0.1
SERIAL NUMBER:	0702CGC80735-1	NUMBER OF STAGES:	9
S O. NUMBER:	GC80735	DESIGN FLOW, GPM:	1500
CUSTOMER MOTOR HP:	400	DESIGN HEAD, FEET:	676
TEST MOTOR:	200HP @ 1200	THRUST CONSTANT:	9.5

DATA CORRECTED TO 1775 RPM AND 1.00 S.G.					
FLOW (GPM)	HEAD (FT.)	EFF. (%)	POWER (HP)	HEAD/STAGE (FT.)	POWER/STAGE (HP)
0	970.6	0.0	218.09	107.8	24.23
738	852.0	62.5	253.80	94.7	28.20
1013	800.1	73.9	276.83	88.9	30.76
1273	747.3	79.5	302.06	83.0	33.56
1492	703.5	82.9	319.65	78.2	35.52
1660	636.7	82.7	322.77	70.7	35.86
1909	522.1	78.3	321.62	58.0	35.74
2027	468.8	75.1	319.49	52.1	35.50
2192	374.8	66.5	312.15	41.6	34.68

BEAUMONT CHERRY VALLEY WATER DISTRICT WELL 26



Design Conditions

1500 USGPM | 676 Ft.

Certified Performance Test

By: Michael A. Hansen

Date: 13-Apr-07

Capacity USGPM



MODEL 14KKH

Speed 1775

Test and Curve Number

14KKHU06



1-1

SUBMITTAL DATA

DEEP WELL VERTICAL TURBINE PUMP

BAKERSFIELD WELL and PUMP

BEAUMONT CHERY VALLEY WATER DISTRICT

WATER WELL 26

DISCHARGE HEAD - TYPE W

12" Discharge Head
 12" Discharge Flange matches 125# ANSI Dimensions
 Large holes straddle vertical centerline
 Shaft Seal
 OIL LUBE

COLUMN

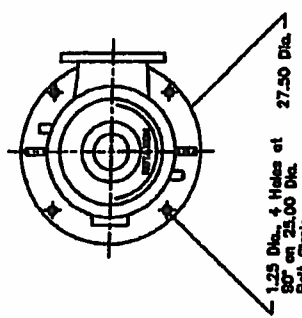
12" Column Pipe
 1.94" Diameter Endless Unshort
 3.00" Enclosing Tube

PUMP

9 Stage 1400H Beal ENCLOSED Impeller
 Strainer Type CORUSAL

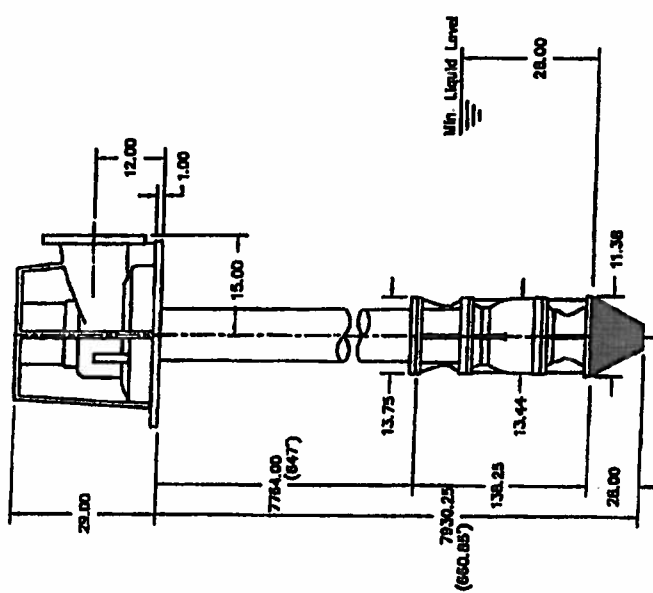
MATERIALS

Beds CAST IRON Column STEEL
 Impellers BRONZE Unshort C-1045
 Pump Shaft 418 S.S. Unshort Brgs. BRONZE
 Beal Brgs. BRONZE Enclosing Tube STEEL
 Head CAST IRON
 Strainer 316 S.S.
 Beal Wear Rings BRONZE
 Driver Weight N/A lbs. Pump Weight 53,000 lbs.
 Pump will be shipped Unassembled



TOP VIEW

NOTE: EXISTING MOTOR



Min Liquid Level

Bakersfield Well & Pump Beaumont Cherry Valley Water Dist Well 26		FLOW 1500 GPM HEAD 670'
STATUS OF APPROVAL		
ORDER NO. DRAWING BY DATE 11/20/06	CUSTOMER INFORMATION OPERATING CONDITIONS DATE TITLE 11/20/06	GENERAL ARRANGEMENT SCALE A2
SHEET NO. SHEET TOTAL SHEET NO. 1 OF 1		

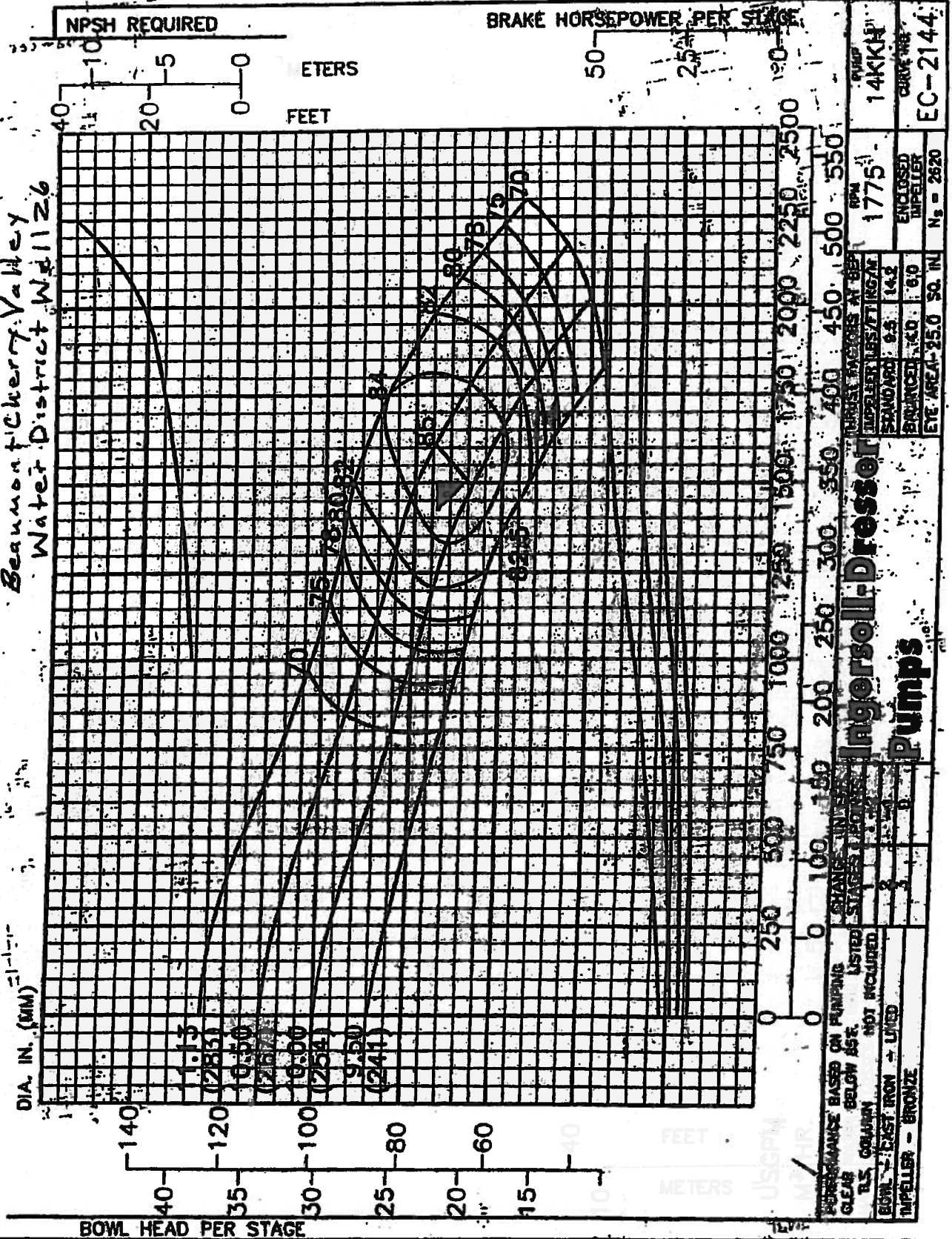


PUMP MATERIALS SPECIFICATIONS		
PART NAME	MATERIAL DESCRIPTION	
	Common Name	ASTM No.
DISCHARGE HEAD		
Cast Head	Cast Iron	A48-CL30
Tension Plate	Cast Iron	A48-CL30
Tube Tension Nut	Cast Iron	A48-CL30
Packing	Graphite Fiberglass	Graphite Fiberglass
Top Tension Tube	Steel	A120-76
Pressure Reducing (Throttle) Bearing	Bronze	B505-C84400
Bolts	316 S.S.	A193-GR B8M-CL1
Headshaft	416 S.S.	A582-Type 416
BASEPLATE		
Baseplate	Steel	A36-GR D
COLUMN ASSEMBLY		
Pipe	Steel	A53-GR B
Lineshaft	C-1045 Steel	A108-GR 1045
Enclosed Lineshaft		
Enclosing Tube	Steel	A120-76
Lineshaft Bearing	Bronze	B505-C84400
Tube Stabilizer Flanged	Cast Iron	A48-CL30
Tube Stabilizer Threaded	Rubber	Buna-N
BOWL ASSEMBLY		
Bowl (Case)	Cast Iron	A48-CL30
Bolts for Flanged Bowl Construction	316 S.S.	A193-GR B8M-CL1
Impeller	Bronze	B584-C90300
Collet	Steel	A519-GR 1020
Bowl Bearings	Bronze	B505-C84400
Protecting Collar	Bronze	B505-C84400
Grease Plug	Iron	A197
Pump Shaft	416 S.S.	A582-Type 416
Lineshaft Coupling	Steel	A108-GR 1137
Wear Rings - Bowl	Bronze	B271-C90300
Suction Strainer	316 S.S.	316 S.S.

© 1993 Ingersoll-Dresser Pump Company.
Printed in U.S.A.

1500 GPM @ 670' TDH
95% eff 14 KKH

Beaumont Cherry Valley
Water District Wd 1126



1-5



Pump Model (06ELM or 06L6 or 10EJY if Single stage): 14KQH

Number of Stages: 9

Multi Stage Low NPSH Model (10EJY or 10KYH or NONE): NONE

S.G.: 1.00

Shop Order Number: BCVWD

Bowl Adapter 9.50 Distance to Brg 2.50 Total = 12.00 Add to bottom col critical speed calculation for prod lube

Prepared By Order Engineer:

Richard Audler

Date: 16-Nov-06

PUMP THRUST CALCULATION

DESIGN THRUST CALCULATION						
K Imp	9.50	lb/ft x Head	670.00	ft x S.G.	1.00	= 6365.00
KYH Imp	0.00	lb/ft x Head	0.00	ft x S.G.	1.00	= 0.00
Lineshaft Dia. & Weight	1.94	10.04	lbs/ft x Shaft Length in ft	645.00	=	6474.71
Impeller Wt. and Bowl Shaft Wt.			45.00	lbs x Stages	9	= 405.00
NET DOWN THRUST (lbs)						= 13244.71

71.06.21

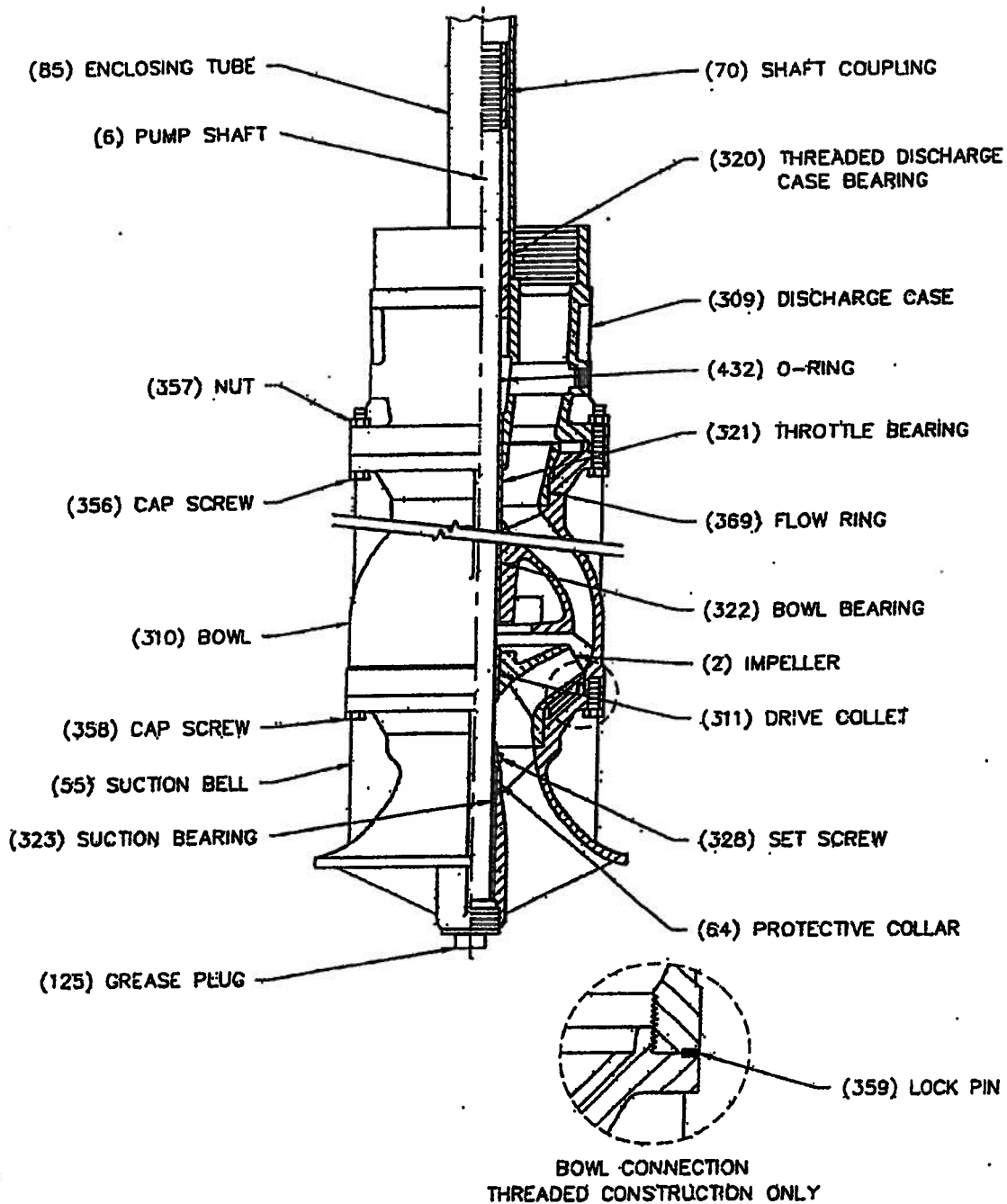
01-Apr-2001
NEW SHEET

REFERENCE DRAWING

BOWL

1-6
FLOWSERVE

**BOWL ENCLOSED DESIGN THREADED CONSTRUCTION
OIL LUBE**



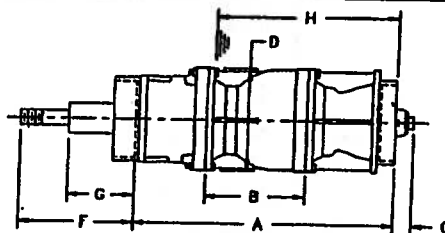
All Prices FOB Hastings, Ne and Subject to Change Without Notice.

FLOWSERVE

Groundwater Catalog

ENGINEERING INFORMATION

Bowl Assembly Dimensions for Threaded Column



BOWL TYPE	COLUMN SIZE	SUCTION SIZE	LENGTHS			DIAMETERS		BOWL SHAFT SIZE	OIL TUBE SIZE	SHAFT STICKUP	OIL TUBE STICKUP	MIN. SUB. REQ'D
			FIRST STAGE	EACH ADD'L STAGE	HUB	CENTER BOWL	MAX. O.D.					
			A	B	C	D				F	G	H
12KS	6	8	27.50	10.00	1.29	11.50	11.50	1 11/16	2 1/2	20	10	24
	8						11.75					
	10						11.50					
12H	8	10	29.75	10.50	0	11.50	11.50	1 3/4	2 1/2	20	10	24
	10						11.75					
	12						11.50					
12NK	8	8	29.50	11.50	1.90	11.50	11.50	1 11/16	2 1/2	20	10	24
	10	10	30.25		1.15		11.75					
	12	12	31.00		0		11.50					
12HH	8	10	32.19	12.00	0	11.50	11.50	1 3/4	2 1/2	20	10	24
	10						11.75					
	12						11.50					
12QK	10	10	30.25	11.50	1.15	11.50	11.75	1 15/16	3	20	10	24
12HHH	10	10	31.44	11.25	0	11.50	11.75	2	3	20	10	24
14C	8	8	39.25	11.13	0	13.38	13.38	1 1/2	2 1/2	20	10	24
	10	10					13.50					
	12	12					13.75					
14D	10	10	44.00	13.38	0	13.31	13.50	2 3/16	3 1/2	20	10	24
14JK	8	8	30.75	10.25	2.42	13.44	13.44	1 15/16	3	20	10	28
	10	10	31.50		1.67		13.44					
	12	12	32.25		0		13.88					
14M	10	10	36.12	12.12	0	13.88	13.88	2 1/4	3 1/2	20	10	28
14KK	8	10	34.25	13.00	2.42	13.44	13.75	1 15/16	3	20	10	28
	10				1.67		13.75					
	12				0		13.25					
14HH	10	12	31.25	13.31	0	13.25	13.25	1 1/2	2 1/2	20	10	28
220/276	12						13.94					
14HH	12						13.94					
250/300	12	12	36.00	13.81	0	13.25	13.94	2 1/4	3 1/2	20	10	28
14LK	8	10	28.75	10.25	1.00	13.44	13.44	1 15/16	3	20	10	28
	10						13.75					
	12						13.75					

ALL DIMENSIONS ARE IN INCHES

- Bowl Shaft Thread Specifications:
1" Diameter: 14UNS - LH Thread
1 1/4", 1 1/2" Diameter: 12UNF - LH Thread
1 11/16", 1 3/4" Diameter: 12UN - LH Thread
1 15/16", 2", 2 3/16", 2 1/4", 2 7/16"
Diameter: 10UNS - LH Thread
- Oil Tube Thread Specifications:
1 1/2", 2", 2 1/2" Diameter: 12UNS - LH Thread
3" Diameter: 12UN - LH Thread
3 1/2" Diameter: 12UNS - LH Thread
- Suction and Discharge Case Threads - 8 thd./in. RH straight threads

Table No. 1
Bowl Assembly Engineering Data

Contact the factory (CF) for data not listed.

BOWL TYPE	PUMP SHAFT DIA. (IN.)	BOWL PRESSURE RATING (PSI) (1)	END PLAY (IN.)	IMP. & BOWL SHAFT WT. PER STAGE (LBS)	EYE AREA (SQ. IN.)	MAX. SPHERE SIZE (IN.) (2)	WR ² (FT. LBS) (3)	N ₃	THRUST FACTOR (LBS)	MAX. SPEED (4)	MAX. STAGES (5)
10HH90	1.50	260	.50	16.7	22.2	.25	.49	4340	8.30	2100	20
10HH110	1.50	260	.50	16.7	22.2	.25	.49	4560	8.20	2100	20
10QKH	1.69	314	.73	18.6	26.0	1.35	.758	4820	11.00	2100	15
12BH	1.50	300	.56	16.0	26.50	C.F.	C.F.	2580	15.00	2100	17
12CM	1.50	300	.63	13.0	16.00	C.F.	C.F.	2385	11.00	2100	14
12CH	1.50	300	.56	13.0	16.00	C.F.	C.F.	2514	12.50	2100	14
12DH	1.50	300	.63	19.0	33.40	C.F.	C.F.	3940	23.00	2100	12
12XH	1.50	300	.56	16.0	30.20	C.F.	C.F.	3880	13.00	2100	18
12L40	1.75	220	.68	25.0	11.95	.31	1.25	1600	4.26	3600	15
12L54	1.75	220	.68	25.0	11.95	.31	1.25	1520	3.10	3600	15
12JKH	1.69	365	.60	29.4	14.09	.81	1.01	1765	4.40	3600	14
12M75	1.75	220	.81	25.0	16.90	.31	1.20	2510	6.29	3000	15
12M90A	1.75	220	.81	26.0	16.90	.31	1.20	2240	5.43	3000	15
12KKL	1.69	365	1.03	32.4	19.00	.90	1.32	2680	7.40	3000	12
12KKH	1.69	365	.70	32.4	19.00	.90	1.43	2535	7.00	3000	12
12KSL	1.69	365	.61	22.0	19.40	.90	.656	2720	11.80	2500	12
12KSH	1.69	365	.63	22.0	19.40	.90	.629	2550	11.00	2500	12
12H110	1.75	220	.53	25.0	21.50	.25	1.20	2970	7.74	2500	15
12H135	1.75	220	.53	26.0	21.50	.25	1.20	3010	7.48	2500	15
12NKL	1.69	365	.75	33.4	27.76	1.50	1.32	3940	11.70	2500	12
12NKH	1.69	365	.75	33.4	27.76	1.50	1.29	3490	11.00	2500	12
12HH165	1.75	220	.81	27.0	33.50	.50	1.08	4290	12.00	2100	15
12HH220	1.75	220	.81	27.0	33.50	.50	1.08	4360	11.80	2100	15
12QKH	1.94	365	.90	32.0	37.80	1.62	1.62	5590	14.00	1800	12
12HHH245	2.00	220	.80	27.0	35.80	.50	1.28	4750	13.70	1800	15
12HHH270	2.00	220	.80	27.0	35.80	.50	1.28	5040	13.40	1800	15
14CM	1.50	300	1.00	17.0	24.20	C.F.	C.F.	2510	15.50	2100	12
14CH	1.50	300	.56	17.0	24.20	C.F.	C.F.	2530	15.50	2100	12
14DM	2.19	300	1.00	39.0	43.40	C.F.	C.F.	3960	34.00	2100	9
14DH	2.19	300	1.00	39.0	43.40	C.F.	C.F.	3540	30.20	2100	9
14JKH	1.94	399	.78	42.0	18.62	.90	2.59	1700	5.40	3000	12
14M135	2.25	200	.75	37.0	25.30	.50	2.61	2320	9.19	2100	10
14M160	2.25	200	.75	37.0	25.30	.50	2.61	2450	8.41	2100	10
14KKL	1.94	381	.81	46.0	36.53	1.72	2.90	3665	14.10	2100	9
14KKH	1.94	390	.88	45.0	25.04	1.03	3.04	2500	9.00	2100	9
14HH220	1.50	200	.75	35.0	44.20	.50	1.80	4330	15.60	2100	10
14HH276	150	200	.75	35.0	44.20	.50	1.80	4370	15.30	2100	10
14HH250	2.25	200	.75	38.0	44.80	.50	2.02	4750	16.40	1800	10
14HH300	2.25	200	.75	38	44.80	.50	2.02	4510	15.90	1800	10

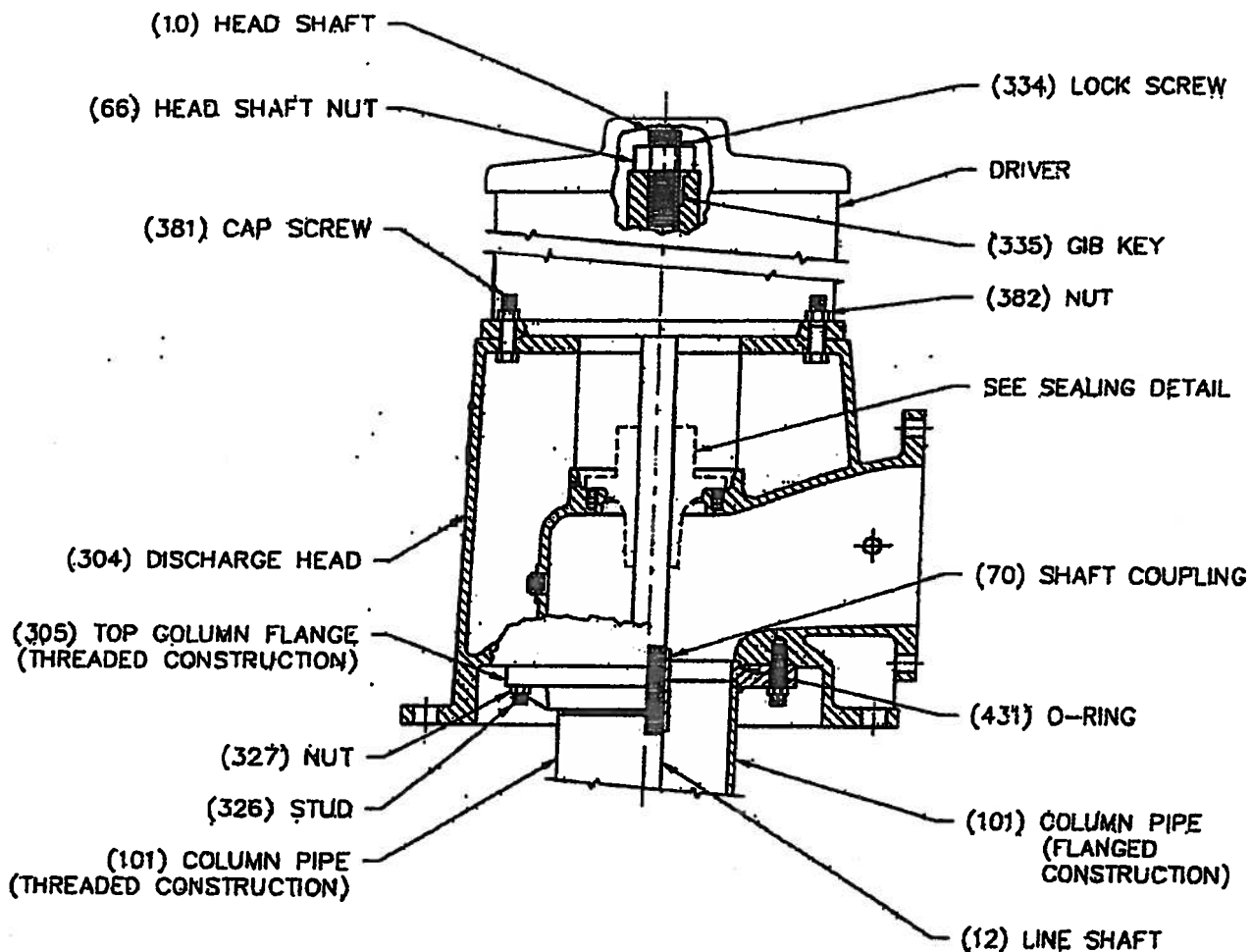
(1) Pressure rating based on Class 30 cast iron.

(2) Max. sphere sizes are indicative of water passage size. Bowl assemblies will NOT pump liquids with solids of these sizes.

(3) Based on bronze impellers.

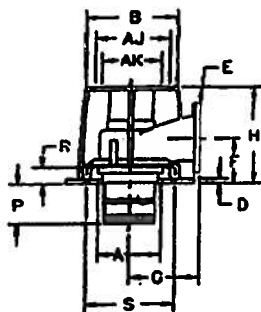
(4) Contact factory for special applications.

(5) The maximum number of stages for a given pump depends upon the following factors: horsepower, total pressure, materials, shaft size, bowl length and others. Contact the factory for specific application questions.

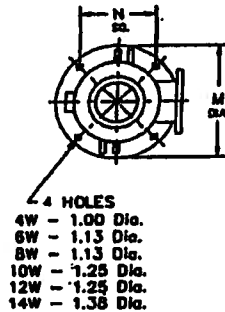


All Prices FOB Hastings, Ne and Subject to Change Without Notice.

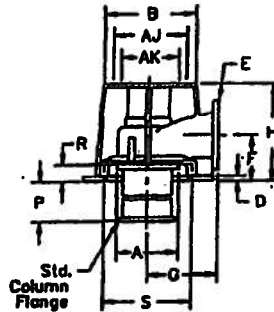
01-Apr-2001
 NEW SHEET

ENGINEERING INFORMATION
TYPE W DISCHARGE HEAD DIMENSIONS


THREADED COLUMN



TOP VIEW



FLANGED COLUMN

BOTTOM RECESS DIMENSIONS		
HEAD SIZE	DEPTH R	DIA. S
4W	3	13.25
6W	3	16.50
8W	3	16.50
10W	3	20.50
12W	2	20.50
14W	3	24.50

(1) DISCHARGE HEAD	A	B	D	E DISC. FLG.	F	G	H	M DIA.	N	P	AJ DRIVER BOLT CIRCLE	AK DRIVER FIT CIRCLE	
10WFOL-12/10FWL-12	16.75	16.5	1	10	11	15	22	27.5	17.69	2.25	9.13	8.25	
10WTOL-12/10WTWL-12		20					21.50			14.75			13.50
10WFOL-16/10FWL-16							2.25						
10WTOL-16/10WTWL-16							21.50						
10WFOL-20/10FWL-20							2.25						
10WTOL-20/10WTWL-20							21.50						
10WFOL-24/10FWL-24							2.25						
10WTOL-24/10WTWL-24		21.50											
12WFOL-16/12FWL-16	17.50	20	1	12	12	15	29	27.5	17.69		22.50	14.75	
12WTOL-16/12WTWL-16		24											
12WFOL-20/12FWL-20													
12WTOL-20/12WTWL-20													
12WFOL-24/12FWL-24													
12WTOL-24/12WTWL-24													
14WFOL-20/14FWL-20	17.25	20	1.13	14	14	18	32	32	20.86	21.00	14.75	13.50	
14WTOL-20/14WTWL-20		24											
14WFOL-24/14FWL-24													
14WTOL-24/14WTWL-24													

(1) First number is column and discharge head size.

"W" is head type.

"F" indicates flanged column.

"T" indicates threaded column.

"OL" indicates oil lubrication.

"WL" indicates water lubrication.

Last number i.e. "12" is driver B.D. size. (B) Dimension

MOTOR BD	ACCEPTABLE HEAD BD
10.00	12.00
12.00	12.00
16.50	16.50, 20.00, 24.50
20.00	20.00, 24.50
24.50	24.50

ALL DIMENSIONS ARE IN INCHES

All Specifications Subject to Change Without Notice.

71.00.05

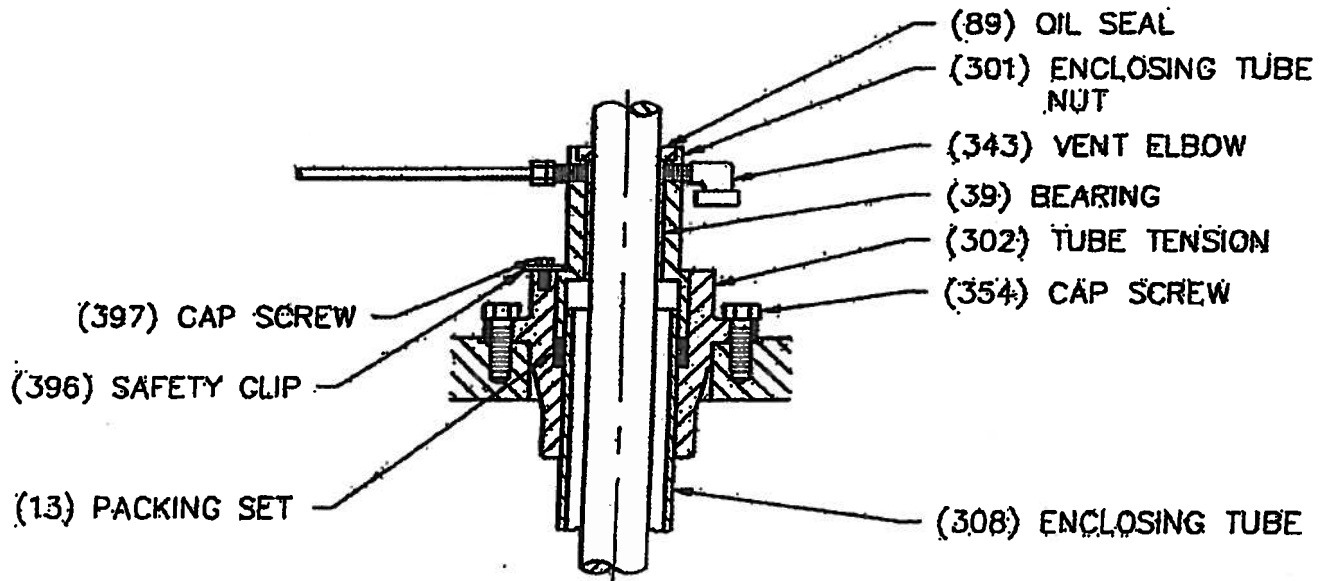
01-Apr-2001
NEW SHEET

REFERENCE DRAWING

W head

1-11
FLOWERVE

W TYPE OIL LUBE SEAL ARRANGEMENT



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FLOWERVE

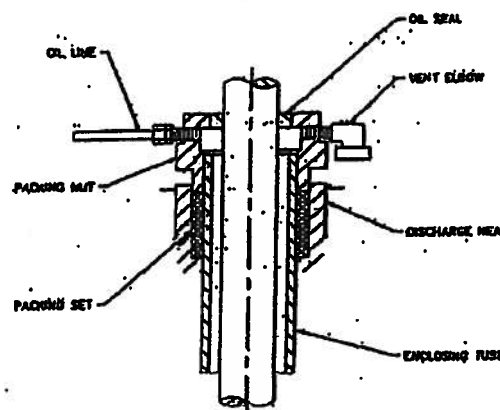
Groundwater Catalog

OIL LUBRICATED SEALING ARRANGEMENTS

Oil Lube Packing Gland

Type M Heads, Oil Lube

This oil lube packing gland provides a stationary seal between the oil tube and the discharge head. It provides the access for lubricating oil to the lineshaft bearings. Suitable for pressures up to 150 psi.

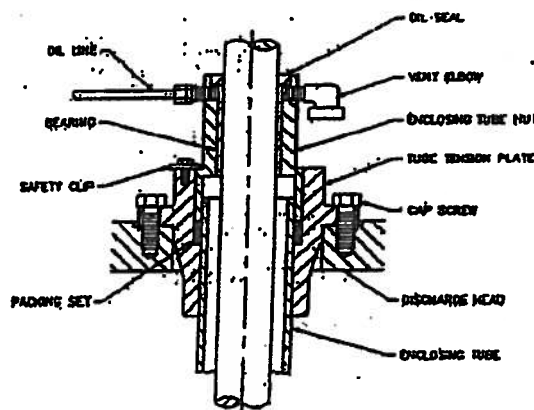


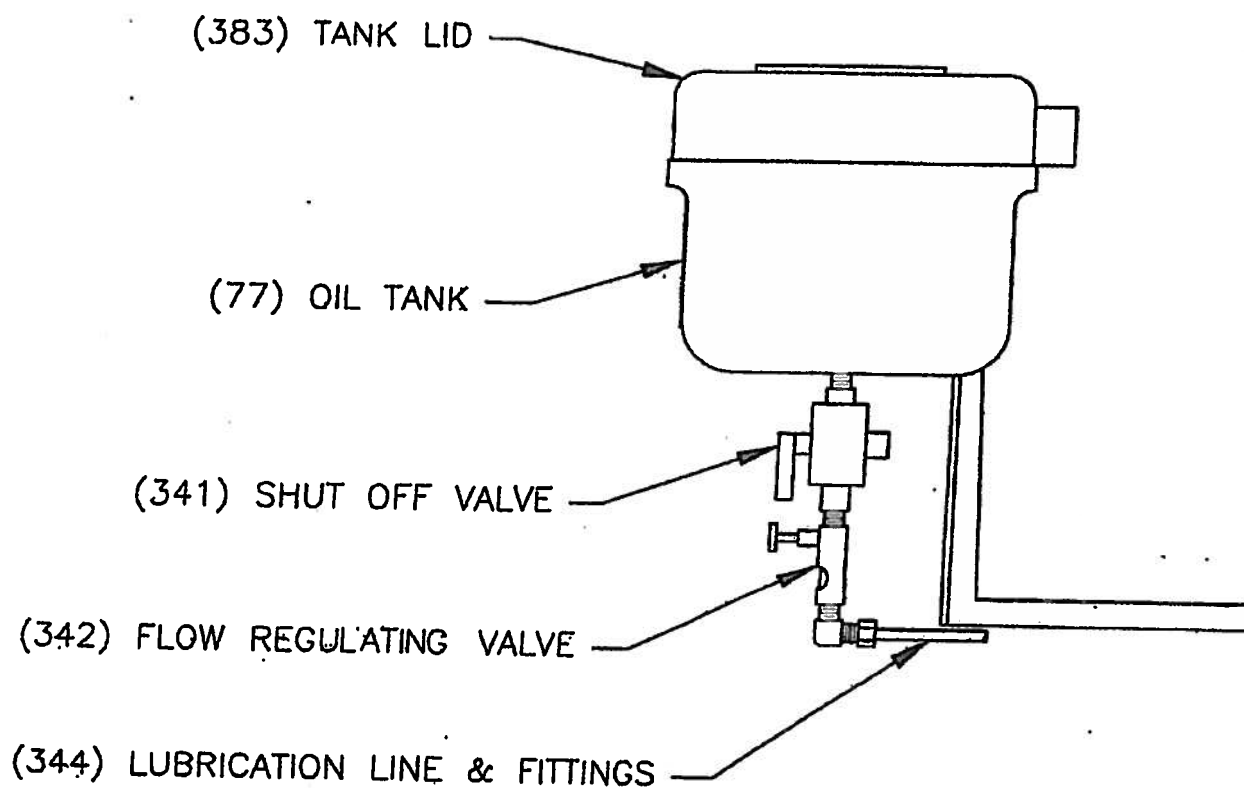
Tube Tension Assembly

Type W Heads, Oil Lube (Flanged or Threaded Column)

Proper lineshaft bearing alignment is maintained when tension is applied to the oil tube with the tension plate. A stationary seal between the oil tube and the discharge head is also accomplished.

Additional shaft support is provided by an oil lubricated bronze sleeve bearing. A lip seal in the top reduces contamination entering the oil tube. Suitable for pressure up to 175 psi.





All Prices FOB Hastings, Ne and Subject to Change Without Notice.

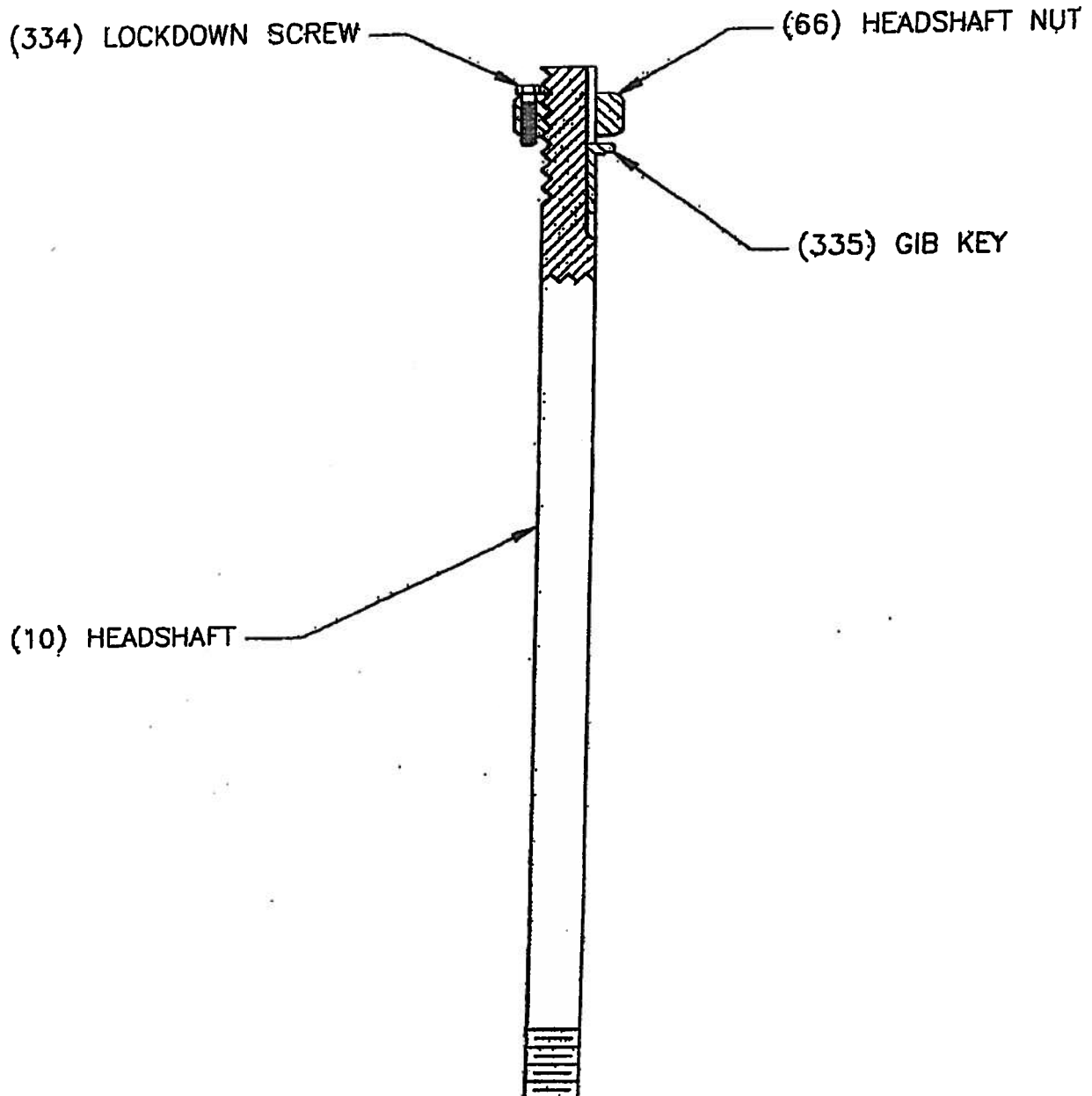
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NEW SHEET

REFERENCE DRAWING

HEAD SHAFT

1-14
FLOWSERVE



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FLOWSERVE

Groundwater Catalog

71.06.13

01-Apr-2001
NEW SHEET

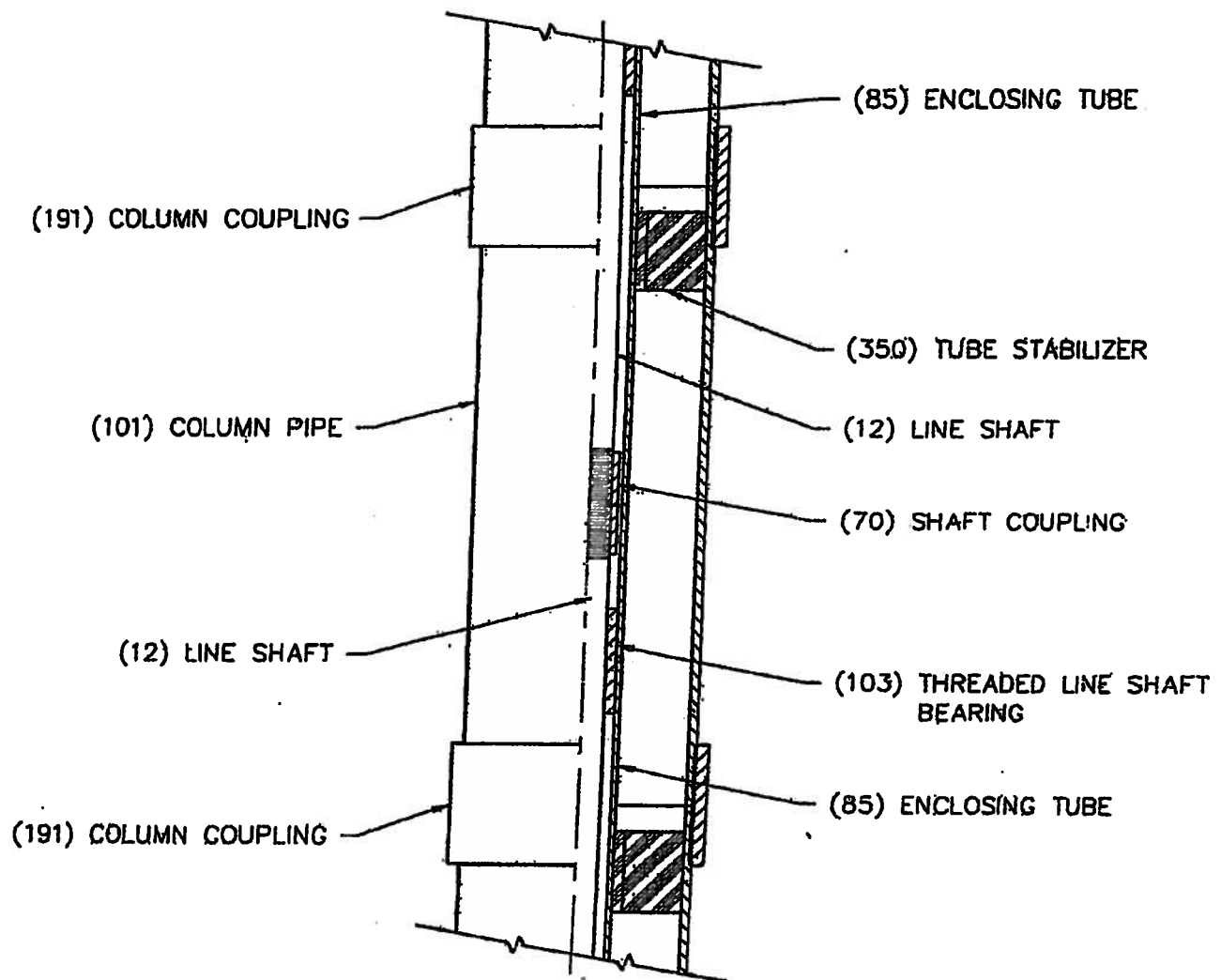
REFERENCE DRAWING

COLUMN

1-15
FLowsERVE

COLUMN THREADED CONSTRUCTION

OIL LUBE



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FLowsERVE

Groundwater Catalog



1-16

Headshaft Size:	1.94 Rationalized 10-TPI	
Pump Model (06RLM or 06L6 or 10BJY if Single stage):	14KKH	9.50 K = Imp Thrust Factor Std Imp
Bowl Head in Feet for Standard Model:	670.0	H
Multi Stage Low NPSH Model (10BJY or 10JKYH or NONE):	NONE	0.00 K _L = Imp Thrust Factor Low NPSH
Bowl Head in Feet for Low NPSH Model:	0.0	H _L
SO:	1.00	SO
Linchshaft Diameter:	1.9375	2.9483 A _s = Cross Section Area (in ²)
Largest Column Pipe Diameter & Wall Thickness:	12" Nom. X 40 Thd Wall (.330)	
Largest Column Diameter Length in Feet:	645.00	L = Length of Largest Dia Col
Enclosing Tube Diameter & Wall Thickness:	3" Nominal Tube Sch 80	
Smallest Column Pipe Diameter & Wall Thickness:	N/A	
Smallest Column Diameter Length in Feet:	0.00	L _s = Length of Smallest Dia Col
Drive Coulet or Keyed Impeller:	Drive Coulet Impeller Lateral	H _T = Total Bowl Head = 670.0

$$\text{Shaft Stretch in Inches} = \frac{[(K \times H) + (K_L \times H_L)] \times SO \times (L + L_s)}{2.5 \times 10^6 \times A_s} = -0.5570$$

Largest Diameter Col			Smallest Diameter Col			Tube Area		
Pipe O.D.	12.750	D _{LCO}	Pipe O.D.	0.000	D _{SCO}	Pipe O.D.	3.500	D _{TO}
Wall	0.330		Wall	0.000		Wall	0.300	
Pipe I.D.	12.090	D _{LCT}	Pipe I.D.	0.000	D _{SCT}	Pipe I.D.	2.900	D _{TT}
Area O.D.	127.676		Area O.D.	0.000		Area O.D.	9.621	
Area I.D.	114.800		Area I.D.	0.000		Area I.D.	6.605	
X-Section Area	12.876	A _{LCT}	X-Section Area	0.000	A _{SCT}	X-Section Area	3.016	A _T
Tube/Shf Area	9.621		Tube/Shf Area	9.621				
Net Area H ₂ O	105.179		Net Area H ₂ O	0.000				
Vol H ₂ O/Pt Col	1262.147		Vol H ₂ O/Pt Col	0.000				
Lbs H ₂ O/Pt Col	45.557		Lbs H ₂ O/Pt Col	0.000				
Average K & K _L	9.50		Average K & K _L	9.50				
Lbs H ₂ O - Avg. K	36.057	K _{LC}	Lbs H ₂ O - Avg. K	0.000	K _{SC}			
Area Col + Area Tube	15.892	A _{LCT}	Area Col + Area Tube	0.000	A _{SCT}			
Head @ Base of Col	670.0	H _{LCO}	Head @ Base of Col	670.0	H _{SCO}			
Head @ Top of Col	25.0	H _{LCT}	Head @ Top of Col	670.0	H _{SCT}			

$$\text{Large Diameter Column Stretch in Inches} = \frac{(F_{LCT} - F_{LCO} + F_{LCT}) \times SO \times L}{2.5 \times 10^6 \times A_{LCT}} = -0.2389$$

$$F_{LCT} = K_{LC} \times H_{LCO} = 24158.3283$$

$$F_{LCO} = \frac{C_{LC} \times 2.5 \times 10^6 \times A_{LCT}}{L} = 10017.1376$$

Where

$$C_{LC} = \frac{.5022 (D_{LCO})^3 \times L \times (H_{LCT} + H_{LCO})}{(D_{LCO}^3 - D_{LCT}^3) \times 10^7} = 0.2007$$

$$F_{LCT} = \frac{B_T \times 2.5 \times 10^6 \times A_T}{L} = 576.3510$$

Where

$$B_T = \frac{.5022 (D_{TT})^3 \times L \times (H_{LCT} + H_{LCO})}{(D_{TO}^3 - D_{TT}^3) \times 10^7} = 0.0493$$

$$\text{Small Diameter Column Stretch in Inches} = \frac{(F_{SCC} - F_{SCC} + F_{SCC}) \times SO \times L_s}{2.5 \times 10^6 \times A_{SCC}} = -0.0000$$

$$F_{SCC} = K_{SC} \times H_{SCC} = 0.0000$$

$$F_{SCC} = \frac{C_{SC} \times 2.5 \times 10^6 \times A_{SCC}}{L_s} = \#DIV/0!$$

Where

$$C_{SC} = \frac{.5022 (D_{SCC})^3 \times L_s \times (H_{SCC} + H_{SCC})}{(D_{SCC}^3 - D_{SCC}^3) \times 10^7} = \#DIV/0!$$

$$F_{SCC} = \frac{B_{TT} \times 2.5 \times 10^6 \times A_T}{L_s} = \#DIV/0!$$

Where

$$B_{TT} = \frac{.5022 (D_{TT})^3 \times L_s \times (H_{SCC} + H_{SCC})}{(D_{TO}^3 - D_{TT}^3) \times 10^7} = 0.0000$$



1-17

IMPELLER SETTING CALCULATION

Headshaft Size = 1.94 Rationalized 10-TPI
Threads/Inch = 10
One Turn of Nut = 0.1000
Each Face of Nut = 0.0167

Relative Shaft Stretch = 0.3181

Standard Impeller Setting = +0.2500

Total Impeller Setting	=	0.5681
------------------------	---	--------

Drive Collet Impeller Lateral = 0.88

Face Turns of Headshaft Nut if Hollow Shaft Driver	=	34.08
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Shaft Critical Speed

CUSTOMER: Bakersfield Well and Pump
 JOB: Beaumont Cherry Valley Water District
 ORDER No.: Well 26
 PUMP MODEL: 14KKH

INPUT DATA

d _s	Shaft Diameter	1.94 inch
L _s	Shaft Length Between Supports	60.00 inches
w _s	Shaft Weight per inch	0.837 lbs
I _s	Shaft Moment of Inertia	0.6953 in ⁴
E	Shaft Modulus of Elasticity	3.00E+07 lbs/in ²
F	Total Downthrust	13245 lbs
N	Operating Speed	1775 RPM

CONSTANTS

g	Gravitational constant	386.4 in/sec ²
---	------------------------	---------------------------

CONSTRAINTS

End Conditions Based on Rubber Bearings (Hinged-Hinged)

CALCULATIONS

Fundamental Natural Frequency

$$f_n = (30/L_s \times (g/w_s))^{-5} \times [E \times I_s \times (p/L_s)^2 + F]^{-5}$$

From: Vertical Turbine, Mixed Flow, and Propeller Pumps
 Diczas, John L.; McGraw Hill 1987

Multipliers for Higher Order Frequencies

Second	4
Third	9
Fourth	16

From: Mechanical Vibrations
 Church, Austin H.; John Wiley and Sons 1967

RESULTS

Fundamental	2851.88	160.7%
Second	11407.53	642.7%
Third	25666.95	1446.0%
Fourth	45630.13	2570.7%

Prepared By Order Engineer:

Richard Audler

Date: 16-Nov-06

**BEAUMONT CHERRY VALLEY WATER DISTRICT
WELL 26 PUMPING UNIT REPAIR WORK**

WELL PLANT NO. 26 EXISTING WELL AND EQUIPMENT INFORMATION

Diameter: 0' – 1,070' bgs 20 inches, inside diameter, Reverse Rotary, 2006

Well Total Depth: 1,070' Below Ground Surface (bgs)
Blank Casing 0 - 520, 640 - 650, 1,050 - 1,070 ft bgs
Mill Slot Perforated Liner 520 - 640, 650 – 1,050 ft bgs (.060 Louver Opening)

Water Level Information (1):
Standing Water Level: 466.3 ft ± bgs (466.3 ft bgs from 10/22/2012 SCE Pump Test)
Pumping Water Level: 507.1 ft ± bgs (from 10/22/2012 SCE Pump Test)
Specific Capacity: 39.3 ft ± bgs (from 10/22/2012 SCE Pump Test)

Discharge Pressure Range 62.4 psi (at Well Pump Discharge Head Centerline)

Existing Pump Information: Flowserve 14KKH, 9 stage, oil lubricated cast iron bowl assembly
(installed in approximately May 2008, see Appendix C)

**Existing Column, Tube, Shaft
Information:**

Column: 12.75 inch, Outside Diameter (0.375" Wall Thickness)
Column Length: 647'
Tube: 3.0 inch, Schedule 80
Shaft: 1-11/16", C-1045 Steel
Suction Pipe: N/A
Suction Strainer: Yes

Notes: 1. See additional project information located in Appendix A through Appendix C, Attached.

(1) (Acquired from 10/22/2012 SCE pump test for Well 26)

APPENDIX D

Well 26 SCE Pump Test Data

October 22, 2012

DWAN LEE
BEAUMONT CHERRY VALLEY WATER DIST
560 MAGNOLIA AVE.
BEAUMONT, CA 92223

HYDRAULIC TEST RESULTS, Plant: WELL #26
Location: 1091 CARNATION LN HP: 400
Cust #: 0-000-0808 , Serv. Acct. #: 030-3816-45
Meter: V349N-6082 Pump Ref. #: 35500

In accordance with your request, an energy efficiency test was performed on your turbine well pump on October 18, 2012. If you have any questions regarding the results which follow, please contact MIKE POORTENGA at (909)820-5159.

Equipment		
Pump:	FLOWA	No: 80735-1
Motor:	US	No: 83011870006R04

Results	
Discharge Pressure, PSI	62.4
Standing Water Level, Feet	466.3
Drawdown, Feet	40.8
Discharge Head, Feet	144.1
Pumping Water Level, Feet	507.1
Total Head, Feet	651.2
Capacity, GPM	1,605
GPM per Foot Drawdown	39.3
Acre Feet Pumped in 24 Hours	7.094
kW Input to Motor	277.0
HP Input to Motor	371.5
Motor Load (%)	88.2
Customer Meter, GPM	1,553
kWh per Acre Foot	937
Overall Plant Efficiency (%)	71.1

RON FORD
Manager
Hydraulic Services

Pump Test Interpretation

Discharge Pressure, PSI – The pressure obtained at center line of pump discharge pipe using a calibrated gauge (psig). Discharge pressure is converted to feet and expressed as "Discharge Head."

Suction Head or Lift, Ft.* – Suction Head is calculated by obtaining the pressure at the inlet of pump (Suction Pressure) and converting it to feet and is expressed as "Suction Head" or by calculating the amount of suction lift in feet.

Standing Water Level, Feet** – The well's water level obtained when pumping plant is at rest, also referred to as Static Water Level.

Drawdown, Feet** – The measured distance, in feet, that the well's water level changes from standing/static level to operating pumping level during observed test conditions.

Discharge Head – Head (in units of feet) measured above center line of pump discharge pipe. Most often obtained with calibrated pressure gauge (discharge psig); pounds per square inch are converted to discharge head by conversion factor 2.31 ft water / p.s.i.

Pumping Water Level, Feet** – The well's operating water level below center line of discharge pipe as observed during test conditions.

Total Head, Ft. – The sum of the water head above and below the center line of the pump discharge pipe. For well applications, Total Head is the sum of the Discharge Head and the Pumping Water Level. For booster applications, the Total Head is either calculated by subtracting the Suction Head from the Discharge Head or by adding the Suction Lift to the Discharge Head. Total Head is used in calculation of water horsepower (hp). It is also useful as a comparison and evaluation of current operations to the pump's design point and/or to past pump operations/conditions.

Capacity, GPM – Flow expressed in gallons per minute. This flow is obtained through the use of SCE equipment (in most instances a Pilot tube). Capacity is used to calculate water horsepower.

GPM/Ft. Drawdown** – The ratio of capacity (GPM) to drawdown feet. GPM/Ft Drawdown is useful in determining the well's performance, trending well performance year-to-year, and may provide information to be used in designing proper pump to meet application. Factors that may affect the well's performance include (but are not limited to); aquifer conditions, well casing diameter, well screen/strainer, the gravel pack and/or the initial design of the well and pump. This reading is a measure of well performance, not pump performance.

One Acre Foot Pumped in 24 hrs – Amount of water, in Acre Feet, pumped per day at the measured Capacity, GPM. One Acre Foot of water is equivalent to 325,851 gallons of water.

Input kW to Motor – Input kW determination obtained through timing of SCE electronic meter or by calibrated handheld electronic meter. The kWh input is converted to horsepower to calculate input horsepower.

HP Input to Motor – The power input to driver, expressed in hp obtained by converting input kW to hp. (1.341 kW per 1 hp).

Motor Load (%) – The calculated motor load based on the ratio of brake hp (hp at motor output shaft obtained by factoring motor efficiency) to nameplate hp. Brake hp is the equal to hp at the output shaft of motor. The motor load should be generally between the ranges of 70% to 115%.

Measured Speed of Pump, RPM – Measured rotational speed, revolutions per minute, of pump shaft as determined by tachometer.

kWh per Acre Ft. – The amount of kilowatt hours (kWh) required to pump one Acre Foot of water. Value obtained using pump test results. Useful in determining pumping costs. Cost to pump an Acre Foot of water can be calculated by multiplying this value by the current cost/kWh.

Overall Plant Efficiency, (%) – The ratio of the water hp (the overall output of plant) to input hp (the power input). The overall output can also be defined as the amount hp required to deliver the measured capacity (water gallons per minute) at the measured total head (in feet). Overall plant efficiency is used in determining overall condition of pumping plant at observed test conditions. Two main components that contribute to Overall Plant Efficiency: Motor Efficiency and the Pump Efficiency.

Customer Meter, GPM – Flow as indicated by customer meter.

Only applies to booster pump

*Only applies to well pump



Confidential/Proprietary Information

October 22, 2012

DWAN LEE
BEAUMONT CHERRY VALLEY WATER DIST
560 MAGNOLIA AVE.
BEAUMONT, CA 92223

PUMPING COST ANALYSIS, Plant: WELL #26
Location: 1091 CARNATION LN HP: 400
Cust #: 0-000-0808 Serv. Acct. #: 030-3816-45
Meter: V349N-6082 Pump Ref. #: 35500

The following energy efficiency analysis is presented as an aid to your cost accounting. This is an estimate based on the conditions present during the Edison pump test performed on October 18, 2012, billing history for the past 12 months, and your current rate of TOU-PA-B.

Total kWh	<u>Existing</u>
kW Input	1,248,612
kWh per Acre Foot	277.0
Acre Feet per Year	937
Average Cost per kWh	1,332.2
Average Cost per Acre Foot	\$0.08
Overall Plant Efficiency (%)	\$70.30
	71.1
<hr/> Total Annual Cost	<hr/> \$93,645.90

The hydraulic test results indicate that this pump is operating in an efficient manner.

It is sincerely hoped that this information will prove helpful to you, and that your concerns over maintaining optimum pumping efficiency will be continued. If you have any questions regarding this report, please contact MIKE POORTENGA at (909)820-5159.

RON FORD
Manager
Hydraulic Services

Pump Test Interpretation

Discharge Pressure, PSI – The pressure obtained at center line of pump discharge pipe using a calibrated gauge (psig). Discharge pressure is converted to feet and expressed as "Discharge Head."

Suction Head or Lift, Ft.* – Suction Head is calculated by obtaining the pressure at the inlet of pump (Suction Pressure) and converting it to feet and is expressed as "Suction Head" or by calculating the amount of suction lift in feet.

Standing Water Level, Feet** – The well's water level obtained when pumping plant is at rest, also referred to as Static Water Level.

Drawdown, Feet** – The measured distance, in feet, that the well's water level changes from standing/static level to operating pumping level during observed test conditions.

Discharge Head – Head (in units of feet) measured above center line of pump discharge pipe. Most often obtained with calibrated Bourdon tube pressure gauge (discharge psig); pounds per square inch are converted to discharge head by conversion factor 2.31 ft water / p.s.i.

Pumping Water Level, Feet** – The well's operating water level below center line of discharge pipe as observed during test conditions.

Total Head, Ft. – The sum of the water head above and below the center line of the pump discharge pipe. For well applications, the Total Head is the sum of the Discharge Head and the Pumping Water Level. For booster applications, the Total Head is either calculated by subtracting the Suction Head from the Discharge Head or by adding the Suction Lift to the Discharge Head. Total head is used in calculation of water horsepower (hp). It is also useful as a comparison and evaluation of current operations to the pump's design point and/or to past pump operations/conditions.

Capacity, GPM – Flow expressed in gallons per minute. This flow is obtained through the use of SCE equipment (in most instances a Pitot tube). Capacity is used to calculate water horsepower.

GPM/Ft. Drawdown** – The ratio of capacity (GPM) to drawdown feet. GPM/Ft Drawdown is useful in determining the well's performance, trending well performance year-to-year, and may provide information to be used in designing proper pump to meet application. Factors that may affect the well's performance include (but are not limited to); aquifer conditions, well casing diameter, well screen/strainer, the gravel pack and/or the initial design of the well and pump. This reading is a measure of well performance, not pump performance.

One Acre Foot Pumped in 24 hrs – Amount of water, in Acre Feet, pumped per day at the measured Capacity, GPM. One Acre Foot of water is equivalent to 325,851 gallons of water.

W Input to Motor – Input kW determination obtained through timing of SCE electronic meter or by calibrated handheld electronic W meter. The kWh input is converted to horsepower to calculate input horsepower.

IP Input to Motor – The power input to driver, expressed in hp obtained by converting input kW to hp. (1.341 kW per 1 hp).

Motor Load (%) – The calculated motor load based on the ratio of brake hp (hp at motor output shaft obtained by factoring motor efficiency) to nameplate hp. Brake hp is the equal to hp at the output shaft of motor. The motor load should be generally between the ranges of 70% to 115%.

Measured Speed of Pump, RPM – Measured rotational speed, revolutions per minute, of pump shaft as determined by tachometer.

kWh per Acre Ft. – The amount of kilowatt hours (kWh) required to pump one Acre Foot of water. Value obtained using pump test results. Useful in determining pumping costs. Cost to pump an Acre Foot of water can be calculated by multiplying this value by the current cost/kWh.

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Customer Meter, GPM – Flow as indicated by customer meter.

*Only applies to booster pump

**Only applies to well pump

APPENDIX E
Maintenance Bond

MAINTENANCE BOND
FOR PUMPING EQUIPMENT
(by Supplier)

KNOW ALL MEN BY THESE PRESENTS, that we, _____,
as Surety, hereinafter called Surety, are held and firmly bound unto Beaumont-Cherry
Valley Water District, hereinafter called District, in the penal sum of \$_____, for the
payment whereof (Supplier) and Surety bind themselves, their heirs, executors,
administrators, successors, and assigns, jointly and severally, firmly by these present.

WHEREAS, Supplier has provided pumping equipment for District project _____
_____ in accordance with the Specifications.

NOW, THEREFORE, the condition of the obligation is such that, if Supplier shall
remedy any defects due to faulty materials or workmanship which shall appear within a
period of 2 years from the date the project is accepted as provided for in the
specification, then this obligation is to be void, otherwise to remain in full force and
effect.

PROVIDED, HOWEVER, that the District shall give Supplier and Surety notice of
observed defects with reasonable promptness.

Signed and sealed this _____ day of _____, 20____

Supplier (SEAL)

Surety (SEAL)

Title

Title