

CONTRACT DOCUMENTS FOR THE

**7700 SOUTH 700 EAST
WELL PUMP REPLACEMENT**

**PROJECT #: 4421
SEPTEMBER 2026**

BID DOCUMENTS & SPECIFICATIONS

OWNER

Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah
(801) 565-4300

TABLE OF CONTENTS

VOLUME 1

<u>Bidding Documents</u>	<u>Page</u>
Notice Inviting Bids.....	A-1
Instructions to Bidders.....	B-1
Bid	C-1
Bid Bond.....	D-1
Information Required of Bidder	E-1
 <u>Contract Documents</u>	
Agreement.....	F-1
Performance Bond	G-1
Payment Bond.....	H-1
Notice of Award	I-1
Notice to Proceed.....	J-1
Payment Application and Certificate.....	K-1
Change Order	L-1
Contractor's Certificate of Substantial Completion	M-1
Contractor's Certificate of Final Completion	N-1
Consent of Surety for Final Payment.....	O-1
Affidavit of Payment	P-1

GENERAL CONDITIONS OF THE CONTRACT

Article

1 - Definitions	1-1
2 - Preliminary Matters	2-1
3 - Contract Documents: Intent, Amending, Reuse	3-1
4 - Availability of Land; Physical Conditions: Reference Points.....	4-1
5 - Bonds and Insurance	5-1
6 - Contractor's Responsibilities	6-1
7 - Other Work.....	7-1
8 - Owner's Responsibilities	8-1
9 - Engineer's Status During Construction	9-1
10 - Changes in the Work.....	10-1
11 - Change of Contract Price	11-1
12 - Change of Contract Time	12-1
13 - Warranty and Guarantee; Tests and Inspections; Correction, Removal, Or Acceptance of Defective Work	13-1
14 - Payments to Contractor, Liquidated Damages and Completion.....	14-1

15 - Suspension of Work and Termination	15-1
---	------

GENERAL CONDITIONS OF THE CONTRACT

16 - Miscellaneous	16-1
--------------------------	------

SUPPLEMENTAL GENERAL CONDITIONS

<u>Article</u>	<u>Page</u>
17 - General	17-1
18 - Amounts of Liquidated Damages, Bonds, and Insurance	18-1
19 - Physical Conditions and Weather Delays	19-1
20 - Subcontract Limitations.....	20-1
21 - Miscellaneous	21-1

TECHNICAL SPECIFICATIONS

<u>Section</u>	<u>Page(s)</u>
----------------	----------------

DIVISION 01 – GENERAL REQUIREMENTS

01 11 00 Summary of Work.....	7
01 20 00 Measurement and Payment	5
01 25 10 Products, Materials, Equipment, and Substitutions	8
01 29 73 Schedule of Values	2
01 31 30 Safety	3
01 33 20 Submittal Procedures	8
01 35 53 Security	2
01 71 30 Site Conditions Surveys	2
01 77 00 Closeout Procedures	5
01 78 39 Project Record Documents	3
01 91 14 Equipment Testing and Startup.....	5

DIVISION 02 – EXISTING CONDITIONS

02 32 30 Special Conditions for Well Work.....	21
02 67 60 Well Disinfection	2

DIVISION 33 – SITE WORK

33 20 00 2015 Mobilization/Demobilization/Cleanup.....	3
33 20 00 2070 Video Camera Survey	2
33 20 00 2071 Well Cleaning	3
33 20 00 2080 Disinfection Treatment	2
33 20 00 2094 Development Fluids and Pumped Water Disposal.....	2

DIVISION 43 – GAS, LIQUID, AND STORAGE

43 20 10 Pumps, General	7
-------------------------------	---

43 24 03 Vertical Turbine Pumps5

FIGURES

- 1 Well Location Map
- 2 7700 South 700 East Site Layout

ATTACHMENTS

- A Noise Ordinance Information
- B Well Driller’s Report
- C Standard Requirements and Citations & UDWQ Water Discharge Fact Sheet

END OF SECTION

NOTICE INVITING BIDS

PROJECT NAME: 7700 South 700 East Well Pump Replacement

DESCRIPTION OF WORK: The pumping equipment at the 7700 South 700 East well experienced mechanical damage resulting in failure and is currently in need of replacement. Work shall include but is not limited to the following: removal of the motor and pump, inspection and reconditioning of the motor, well video survey, brushing and bailing of well, furnish and installation of new pumping equipment, well disinfection, testing, restoration of the site and facility to its preconstruction condition, and performing all work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents.

DISTRICT WEB SITE AND PLANHOLDERS LIST: Prospective bidders must register at the District's web site (www.jvwcd.gov) under "Engineering Projects". Prospective bidders are required to check the District's web site for any addenda prior to submitting a responsive bid. The District's web site will be used to publish updated information relative to the project, including a planholders list.

RECEIPT OF BIDS: Sealed bids will be received at the office of the Jordan Valley Water Conservancy District, Owner of the Work, located at 8215 South 1300 West, West Jordan, Utah 84088, until **2:00pm, on Tuesday, September 29, 2026**, for construction of the 7700 South 700 East Well Pump Replacement. Electronic bids may also be submitted in adobe .pdf format to ellisad@jvwcd.gov. **JVWCD suggests that electronic bids be submitted 15 minutes prior to the bid opening deadline, to allow for verification of delivery.** A public bid opening will be held at the bid due time, attendance is not required.

OBTAINING CONTRACT DOCUMENTS: The Contract Documents are entitled 7700 South 700 East Well Pump Replacement. All Contract Documents may be obtained online at www.jvwcd.gov under "Engineering Projects".

SITE OF WORK: The work is located at 7692 South 700 East, Sandy, Utah.

PRE-BID MEETING: A non-mandatory pre-bid meeting will be held at **2:00pm on Tuesday, September 22, 2026**, at the Site of Work (7692 South 700 East). Prospective bidders with questions regarding the project are encouraged to attend to become familiar with the site and to ask any questions regarding the project.

COMPLETION OF WORK: All work shall be Substantially Complete within 200 calendar days from the date of the Notice to Proceed.

AWARD OF CONTRACT: An Award of Contract, if it were awarded, will be made within 60 calendar days of the opening of bids.

NOTICE INVITING BIDS

NOTICE TO PROCEED: A Notice to Proceed, if it were issued, will be made within 60 calendar days of the Notice of Award.

BID SECURITY: Each bid shall be accompanied by a certified or cashier's check, money order or bid bond in the amount of five percent of the total bid price payable to the Jordan Valley Water Conservancy District as a guarantee that the bidder, if its bid is accepted, will promptly execute the contract, provide evidence of worker's compensation insurance, and furnish a satisfactory faithful performance bond in the amount of 100 percent of the total bid price and a payment bond in the amount of 100 percent of the total bid price.

ADDRESS AND MARKING OF BID: The envelope enclosing the bid shall be sealed and addressed to the Jordan Valley Water Conservancy District and delivered or mailed to 8215 South 1300 West, West Jordan, Utah 84088. The envelope shall be plainly marked in the upper left-hand corner with the name and address of the bidder and shall bear the words "Bid for," followed by the title of the Contract Documents for the work and the date and hour of opening of bids. The certified or cashier's check, money order, or bidder's bond shall be enclosed in the same envelope with the bid. Electronic bids shall be submitted to the engineering administrative assistant, ellisad@jvwcd.gov as an email attachment with the words "Bid for," followed by the title of the Contract Documents for the work and the date and hour of opening of bids in the subject line of the email.

PROJECT ADMINISTRATION: All questions relative to this project prior to the opening of bids shall be directed to the Engineer for the project. It shall be understood, however, that no interpretations of the specifications will be made by telephone, nor will any "or equal" products be considered for approval prior to award of contract.

OWNER/ENGINEER

Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088
Telephone: (801) 565-4300
Project Manager: Kevin Rubow, PE
Email: kevinr@jvwcd.gov

OWNER'S RIGHTS RESERVED: The Owner reserves the right to reject any or all bids, to waive any informality in a bid, and to make awards in the interest of the Owner.

INSTRUCTIONS TO BIDDERS

FORM OF BID: The bid shall be made on the bidding schedule(s) bound herein. The bid shall be enclosed in a sealed envelope bearing the name of the bidder and name of the project. In the event there is more than one bidding schedule, the bidder may bid on any individual schedule or on any combination of schedules.

BID APPURTENANCES: Bidders must provide bid appurtenances including Information required of bidder and experience reference projects. Bids not including the required information may be deemed non-responsive.

DELIVERY OF BID: The bid shall be delivered by the time and to the place stipulated in the Notice Inviting Bids. It is the bidder's sole responsibility to see that his bid is received in proper time.

WITHDRAWAL OF BIDS: Bids shall be unconditionally accepted without alteration or correction, excepting that bidder may by means of written request, signed by the bidder or his properly authorized representative withdraw his bid. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of bids prior to the scheduled closing time for receipt of bids.

OPENING OF BIDS: The bids will be publicly opened and read at the time and place stipulated in the Notice Inviting Bids.

MODIFICATIONS AND ALTERNATIVE BIDS: Unauthorized conditions, limitations, or provisions attached to a bid may render it non-responsive and may cause its rejection. The completed bid forms shall be without interlineations, alterations, or erasures. Alternative bids will not be considered unless called for. Oral, telegraphic, or telephonic bids or modifications will not be considered.

DISCREPANCIES IN BIDS: In the event there is more than one bid item in a bidding schedule, the bidder shall furnish a price for all bid items in the schedule; failure to do so may render the bid non-responsive and subject to rejection. In the event there are unit price bid items in a bidding schedule and the "amount" indicated for a unit price bid item does not equal the product of the unit price and quantity, the unit price shall govern and the "amount" will be corrected accordingly, and the Contractor shall be bound by said Correction. In the event there is more than one bid item in a bidding schedule and the total indicated for the schedule does not agree with the sum of the prices bid on the individual items, the prices bid on the individual items shall govern and the total for the schedule will be corrected accordingly, and the Contractor shall be bound by said correction.

BID SECURITY: Each bid shall be accompanied by a certified or cashier's check or approved bid bond in the amount stated in the Notice Inviting Bids. Said check or bond shall be made payable to the Owner and shall be given as a guarantee that the bidder, if awarded the work, will enter into a contract within 10 calendar days after receipt of the contract from the Owner, and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond; each of said bonds to be in the amount stated in the Notice Inviting Bids. In case the apparent low bidder refuses or fails to enter into such contract or fails to provide the required insurance and insurance certificates, the check or bid bond, as

INSTRUCTIONS TO BIDDERS

the case may be, shall be forfeited to the Owner. If the bidder elects to furnish a bid bond as his bid guarantee, he shall use the bid bond bound herein, or one conforming substantially to it in form.

BIDDER'S EXAMINATION OF CONTRACT DOCUMENTS AND SITE

It is the responsibility of each Bidder before submitting a Bid to:

1. Examine Contract Documents thoroughly.
2. Visit the site to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the work.
3. Consider federal, state and local laws and regulations that may affect cost, progress, and performance of furnishing of the work.
4. Study and carefully correlate the Bidder's observations with the Contract Documents.
5. Notify the Engineer of all conflicts, errors, or discrepancies in the Contract Documents.

Reference is made to the Supplemental General Conditions for identification of:

1. Those reports of exploration and tests of subsurface conditions at the site, which have been utilized by the Engineer in the preparation of the Contract Documents.
2. Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except underground utilities as defined in Article 1 of the General Conditions) which are at or contiguous to the site and which were utilized by the Engineer in the preparation of the Contract Documents. Copies of such reports and drawings are available for inspection at the office of the Owner.

Information and data reflected in the Contract Documents with respect to underground facilities at/or contiguous to the site are based upon information and data furnished to the Owner and the Engineer by the owners of such underground facilities or others, and the Owner does not assume any responsibility for the accuracy or completeness thereof including any damages whatsoever that may be incurred by the Bidder or the Contractor through his reliance thereon unless it is expressly provided otherwise in the Supplemental General Conditions and/or the Technical Specifications.

Before submitting a bid, the bidder shall conduct such examination, investigations, studies and tests as are necessary to satisfy himself as to: the nature and location of the physical conditions (surface, subsurface and underground facilities), the general and local conditions particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, availability of utilities, local weather conditions, the character

INSTRUCTIONS TO BIDDERS

of equipment and facilities required preliminary to and during the prosecution of the work; any and all other conditions that may in any way affect the cost, progress, performance or furnishing of materials in accordance with the Contract Documents. All such examination, investigation, studies, tests and the like shall be at the Bidder's expense.

Upon reasonable request in advance, the Owner shall provide each Bidder access to the site to conduct such explorations, examination, investigation and tests as each Bidder may determine necessary for the submission of a Bid. The Bidder shall fill all holes, clean and restore the site to its former condition upon the completion of such activities.

The submission of a bid hereunder shall be considered prima facie evidence that the Bidder has made such examination as is set forth in the above paragraph and is knowledgeable as to the location and site conditions surrounding the work and the conditions to be encountered in performing the work and as to the requirements, conditions and terms of the Contract and Contract Documents.

The Owner assumes no responsibility for any understanding or representations made by any of its officers or agents during or prior to the execution of this Contract, for information contained in any reports, subsurface studies, or other information which may be made available for the Contractor's information and which are not included as Contract Documents, for any understanding or representations by the Owner or by others which are not expressly stated in the Contract Documents which liability is not expressly assumed by the Owner or its representatives or Engineer in the Contract Documents. Such information shall be deemed to be for the information of the Contractor and the Contractor shall have the obligation of evaluating any such information as to its accuracy and effect the Owner will not be liable or responsible for any such information or any conclusions that may be drawn there from by the Contractor.

The lands upon which the work is to be performed, right-of-ways and easements for access thereto together with other lands designated for use by the Contractor in performing the work are identified in the Contract Documents. All additional lands and access thereto that are required for temporary construction facilities or storage of materials and equipment are to be provided by the Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the Owner unless otherwise provided in the Contract Documents.

The submission of a Bid shall constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of this Article, and that without exception the Bid is premised upon performing and furnishing the work required by the Contract Documents in compliance with such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents; and that such means, methods, techniques, sequences or procedures described in the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing the work.

INSTRUCTIONS TO BIDDERS

QUANTITIES OF WORK: The quantities of work or material stated in the Bid Schedule are supplied only to give an indication of the general scope of the work; the Owner does not expressly or by implication agree that the actual amount of work or material will correspond therewith. The Owner reserves the right after award of the Contract to increase or decrease the quantities of any unit price item of the work by an amount up to and including 25 percent of the quantity of any bid item, or to omit portions of such work as may be deemed necessary or expedient by the Engineer or Owner, without a change in the unit price. Such right to revise and omit shall include the right to delete any bid item in its entirety, or to add additional bid items in quantities up to and including an aggregate total amount not to exceed 25 percent of the total amount of the Contract.

The Bidders nor the ultimate Contractor on the Project shall at any time after the submittal of a bid make or have any claim for damages or anticipated profits or loss of profit or otherwise because of any difference between the quantities of work actually done and material furnished and those stated in said unit price items of the Bid.

COMPETENCY OF BIDDERS: In selecting the lowest responsible Bidder, consideration will be given to the general competency of the Bidder for the performance of the work covered by the Bid. To this end, each bid shall be supported by a statement of the bidder's experience as of recent date on the form entitled "Information Required of Bidder," bound herein. No bid for the work will be accepted from a contractor who does not hold an active Contractor's license in good standing applicable to the type of work bid upon at the time of opening bids.

After an award of the contract no substitution of the Project Manager or Project Superintendent will be allowed without the written approval by the Owner.

DISQUALIFICATION OF BIDDERS: More than one bid from an individual, firm partnership, corporation, or association under the same or different names will not be considered. Reasonable grounds for believing that any bidder is interested in more than one bid for the work contemplated will cause the rejection of all bids in which such bidder is interested. If there is reason for believing that collusion exists among the bidders, all bids will be rejected.

RETURN OF BID GUARANTEE: Within 10 calendar days after award of the contract, the Owner will return the bid guarantees accompanying such of the bids as are not considered in making the award. All other bid guarantees will be held until a Notice to Proceed has been issued and accepted. They will then be returned to the respective bidders whose bids they accompany.

AWARD OF CONTRACT: Award of the Contract, if it be awarded, will be based primarily on the lowest overall cost to the Owner, and will be made to a responsive and responsible bidder whose bid complies with all the requirements prescribed. Any such award will be made by written notice and within 60 calendar days after opening of the bids, unless a different waiting period is expressly allowed in the Notice Inviting Bids. Unless otherwise indicated, an award will not be made for less than all the bid items in an individual bidding schedule. In the event the entire work is contained in more than one bidding schedule, the

INSTRUCTIONS TO BIDDERS

Owner may award schedules individually or in combination. In the case of two bidding schedules which are alternate to each other, only one of such alternate schedules will be awarded.

EXECUTION OF CONTRACT: The Bidder to whom the award is made shall secure all insurance and shall furnish all certificates and bonds required by the specifications within ten calendar days after receipt of the Notice of Award from the Owner. The Bidder to whom the award is made shall execute a written contract with the Owner on the form of agreement provided within ten calendar days after receipt of the Agreement from the Owner. Failure or refusal to enter into a contract as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and forfeiture of the bid guarantee. If the successful bidder refuses or fails to execute the contract, the Owner may award the contract to the second lowest responsible bidder, or reject all bids and re-advertise the project for rebidding. If the second lowest responsible bidder refuses or fails to execute the contract, the Owner may award the contract to the third lowest responsible bidder. On the failure or refusal of such second or third lowest bidder to execute the contract, each such bidder's guarantees shall be likewise forfeited to the Owner.

ISSUANCE OF NOTICE TO PROCEED: The Owner intends to execute the Agreement and issue the Notice to Proceed specifying the Project start date within ten calendar days after its receipt of the executed Agreement, Purchase Order Assignment(s), (if applicable), bonds and insurance certificates from the successful bidder. If the Contract Time is expressed as a specific completion date in the Notice Inviting Bids and paragraph 3.1 of the Agreement rather than a specific number of successive days following the start date identified in the Notice to Proceed, then any delay by the Owner beyond the ten days in issuing the Notice to Proceed shall extend the completion date by the number of days of the delay.

LICENSES: Contractor must be licensed as a business qualified to do business within the state of Utah prior to issuance of a Notice of Award. Contractor must hold a current contractor's license with classifications appropriate to the work being contracted.

BID

BID TO: JORDAN VALLEY WATER CONSERVANCY DISTRICT

The undersigned Bidder hereby proposes to furnish all plant machinery, labor, services, materials, equipment, tools, supplies, transportation, utilities, and all other items and facilities necessary to perform all work required under the Bidding Schedule of the Owner's Contract Documents entitled "7700 South 700 East Well Pump Replacement" drawings and all addenda issued by said Owner prior to opening of the bids.

Addenda are only delivered by e-mail and through the internet.

The undersigned bidder acknowledges receipt of the following addenda:

No.	Date Received	No.	Date Received

Bidder agrees that, within 10 calendar days after receipt of Notice of Award from Owner, he will execute the Agreement in the required form, of which the Notice Inviting Bids, Instructions to Bidders, Bid, Information Required of Bidder, Technical Specifications, Drawings, and all addenda issued by Owner prior to the opening of bids, are a part, and will secure the required insurance and bonds and furnish the required insurance certificates; and that upon failure to do so within said time, then the bid guarantee furnished by Bidder shall be forfeited to Owner as liquidated damages for such failure; provided, that if Bidder shall execute the Agreement, secure the required insurance and bonds, and furnish the required insurance certificates within said time, his check, if furnished, shall be returned to him within five days thereafter, and the bid bond, if furnished, shall become void. It is further understood that this bid may not be withdrawn for a period of 45 days after the date set for the opening thereof, unless otherwise required by law.

Dated: _____

Bidder:

By: _____
(Signature)

Title:

Bidder further agrees to complete all work required within the time stipulated in the Contract Documents, and to accept in full payment therefore the price(s) named in the above-mentioned Bidding Schedule(s).

BID

Bid Schedule A: 7700 South 700 East Well

Item No.	Description	Unit	Est. Qty	Unit Cost	Total
A1	Mobilization/Demobilization/Cleanup	Lump Sum	1		\$
A2	Remove Existing Pump Equipment	Lump Sum	1		\$
A3	Video Camera Survey	Each	3	\$	\$
A4	Mineral Oil Removal & Disposal	Gallon	200	\$	\$
A5	Well Cleaning (Brush and Bail)	Hour	40	\$	\$
A6	Bailing Sediment/Sludge Disposal	Cubic Yard	5	\$	\$
A7	Motor Reconditioning	Lump Sum	1		\$
A8	Vertical Turbine Pump, Complete	Lump Sum	1		\$
Bid Schedule A Total:					\$

Total Project Bid Price: _____

Bidder (Company name): _____

By: _____ Dated: _____
(Signature)

Name: _____ Title: _____

ATTACHMENTS TO THIS BID

The following documents are attached to and made a condition of this Bid:

1. Required Bid security in the form of Bid Bond.
2. Information Required of Bidder.

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____
as Principal, and _____
as Surety, are held and firmly bound unto the Jordan Valley Water Conservancy District
(hereinafter called "Owner") in the sum of _____
dollars, (not less than five percent of the total amount of the bid) for the payment of which
sum, will and truly to be made, we bind ourselves, our heirs, executors, administrators,
successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has submitted a bid to Owner to perform all work required under the
bidding Schedule of the Owner's Contract Documents entitled "7700 South 700 East Well
Pump Replacement (hereafter called the "Project").

NOW THEREFORE, if Principal is awarded Contract by Owner for the Construction of the
Project and, within the time and in the manner required under the heading "Instructions to
Bidders" enters into the written contract entitled "Agreement" bound with said Contract
Documents, furnishes the required certificates of insurance, and furnishes the required
Performance Bond and Payment Bond within 10 calendar days after receipt of such
contract from Owner, then this obligation shall be null and void, otherwise it shall remain in
full force and effect. In the event suit is brought upon this bond by Owner and judgment is
recovered, Surety shall pay all costs incurred by Owner in such suit, including a reasonable
attorney's fee to be fixed by the court.

SIGNED AND SEALED, this ____day of _____, 20__.

By: _____ By: _____

Its: _____ Its: _____

(SEAL)

(SEAL)

INFORMATION REQUIRED OF BIDDER

The Bidder shall furnish the following information. Failure to comply with this requirement may render the Bid non-responsive and subject to rejection. Additional sheets shall be attached as required.

1. **Contractor's name:** _____

2. **Contractor's address:** _____

Contractor's Primary Contact: _____

Email address of Contractor's primary contact: _____

Contractor's telephone number: _____

3. **Contractor must be qualified and licensed to do business in Utah.**

Utah Department of Commerce Information

Business Entity Number: _____

Delinquent Date: _____

4. **Contractor must hold a current well driller's or pump installer's license.**

Contractor's Utah License Number: _____

Expiration Date: _____

5. **Key Personnel Qualifications and Experience**

List key personnel here and provide detailed information in Attachments A and B. More than one Project Manager and/or Project Superintendent may be proposed. Only personnel approved by the Owner will be allowed in the key positions.

Project Manager A: _____

Project Manager (Alternate 1): _____

Project Manager (Alternate 2): _____

Project Manager shall have:

1. At least five (5) years of construction experience.
2. Two (2) projects that included well column pipe, pump, and motor that were removed and replaced, with a motor of at least 200 horsepower or greater.

INFORMATION REQUIRED OF BIDDER

Project Superintendent A: _____

Project Superintendent (Alternate 1): _____

Project Superintendent (Alternate 2): _____

Project Superintendent shall have:

1. At least five (5) years of construction experience.
2. Two (2) projects that included well column pipe, pump, and motor that were removed and replaced, with a motor of at least 200 horsepower or greater.
3. One (1) project that included mechanical well development.

Note: A past project may be used to satisfy multiple requirements.

6. Previous Contractor Project Experience

Past project experience shall be provided for each requirement. The Owner shall be entitled to contact each and every reference listed by the contractor. The Contractor, by submitting a bid, expressly agrees that any information concerning the CONTRACTORS in possession of said entities and references may be made available to the owner. The Owner reserves the right to reject any bid based upon unsatisfactory past performance with the Jordan Valley Water Conservancy District or any of the supplied references.

Provide the information identified in Attachment C for each project listed below:

Requirements:

Contractor shall have successfully completed at least three (3) well projects which include the following:

1. Motor, column pipe, and pump were removed and replaced, with a motor of at least 200 horsepower or greater.
2. At least one (1) of the three projects shall have included mechanical well development.

Note: A past project may be used to satisfy multiple requirements.

7. Number of years as a contractor in construction work of this type: _____

8. Number of people employed full-time by the firm: _____

INFORMATION REQUIRED OF BIDDER

9. Name of person who inspected site of proposed work for your firm:

Name: _____

Date of Inspection: _____

10. Surety company who will provide the required bonds on this contract:

Agent's Name: _____

Telephone: _____

11. Workers Compensation Insurance Policy #: _____

INFORMATION REQUIRED OF BIDDER

ATTACHMENT A

(Copy as necessary – provide experience that meets the requirements listed above)

Project Manager Data Sheet

Name: _____

Years experienced as Project Manager: _____

Years of prior experience: _____ Positions: _____

Qualifying Project #1: _____

Project Summary: _____

Year Completed: _____ Column Diameter: _____

Pump Setting Depth: _____ Motor horsepower: _____

Total Cost: _____ Owner: _____

Owner Contact Person: _____ Telephone: _____

Qualifying Project #2: _____

Project Summary: _____

Year Completed: _____ Column Diameter: _____

Pump Setting Depth: _____ Motor horsepower: _____

Total Cost: _____ Owner: _____

Owner Contact Person: _____ Telephone: _____

INFORMATION REQUIRED OF BIDDER

ATTACHMENT B

(Copy as necessary – provide experience that meets the requirements listed above)

Superintendent Data Sheet

Name: _____

Years experienced as Superintendent: _____

Years of prior experience: _____ Positions: _____

Qualifying Project #1: _____

Project Summary: _____

Year Completed: _____ Column Diameter: _____

Pump Setting Depth: _____ Motor horsepower: _____

Total Cost: _____ Owner: _____

Owner Contact Person: _____ Telephone: _____

Qualifying Project #2: _____

Project Summary: _____

Year Completed: _____ Column Diameter: _____

Pump Setting Depth: _____ Motor horsepower: _____

Total Cost: _____ Owner: _____

Owner Contact Person: _____ Telephone: _____

Qualifying Project #3: _____

Project Summary: _____

Year Completed: _____ Column Diameter: _____

Pump Setting Depth: _____ Motor horsepower: _____

Development Method (min. one project): _____

Total Cost: _____ Owner: _____

Owner Contact Person: _____ Telephone: _____

INFORMATION REQUIRED OF BIDDER

ATTACHMENT C

(Provide experience that meets the requirements listed above)

Contractor Project #1 Experience Summary

Project Name: _____

Project Location: _____

Project Manager: _____

Project Superintendent: _____

Project Description: _____

Pump type, depth, diameter, and horsepower (min. three projects): _____

Mechanical development method (min. one project): _____

Date Bid: _____ Date Completed: _____

Contract final price: _____

Owner's contact information: _____

INFORMATION REQUIRED OF BIDDER

Contractor Project #2 Experience Summary

Project Name: _____

Project Location: _____

Project Manager: _____

Project Superintendent: _____

Project Description: _____

Pump type, depth, diameter, and horsepower (min. three projects): _____

Mechanical development method (min. one project): _____

Date Bid: _____ Date Completed: _____

Contract final price: _____

Owner's contact information: _____

INFORMATION REQUIRED OF BIDDER

Contractor Project #3 Experience Summary

Project Name: _____

Project Location: _____

Project Manager: _____

Project Superintendent: _____

Project Description: _____

Pump type, depth, diameter, and horsepower (min. three projects): _____

Mechanical development method (min. one project): _____

Date Bid: _____ Date Completed: _____

Contract final price: _____

Owner's contact information: _____

AGREEMENT

An Agreement made as of the _____ day of _____, 20____, by and between the Jordan Valley Water Conservancy District, a Utah special district ("OWNER"), and _____, a _____ corporation qualified to do business and doing business in the State of Utah ("CONTRACTOR").

TERMS:

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE I WORK

CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents for the _____. The description is as follows:

Furnishing all labor, services, materials, equipment, and supplies except for such materials, equipment, and services as may be stipulated in the Contract Documents to be furnished by the OWNER; furnishing and removing all plant machinery, temporary structures, tools, supplies, transportation, utilities, and all other items, facilities and equipment, and to do everything required by this Agreement and the Contract Documents; accepting all responsibility for and paying for all loss and damage arising out of the nature of the Work aforesaid, or from the action of the elements, or from any unforeseen difficulties which may arise during the prosecution of the Work until its acceptance by OWNER, and for all risks of every description connected with the Work; also for all expenses resulting from the suspension or discontinuance of work, except as in the Contract Documents are expressly stipulated to be borne by OWNER.

ARTICLE II ENGINEER

The Project has been designed by the OWNER. The OWNER will assume all duties and responsibilities and have the rights and authority assigned to the ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

[ALTERNATE PARAGRAPH] The Project has been designed by _____, a _____ corporation qualified to do business and doing business in the State of Utah, who is hereinafter called "ENGINEER" and who is to act as OWNER's representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE III CONTRACT TIME

- 3.1 The Work shall be complete, in accordance with paragraphs 14.08 and 14.09 of the General Conditions, on or before _____.
- 3.2 Liquidated Damages: OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the Work is not completed within the time specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by the OWNER if the Work is not completed on time. Accordingly, instead of requiring any proof of loss, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR will pay OWNER the amount specified in Article 14.07 of the General Conditions and in Article 18.01 of the Supplementary General Conditions for each day that expires after the time specified in paragraph 3.1 for completion until the Work is substantially complete. And, after Substantial Completion if CONTRACTOR neglects, refuses or fails to complete the remaining Work within forty-five (45) days or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER the amount specified in Article 14.07 of the General Conditions and in Article 18.01 of the Supplemental General Conditions for each day that expires after the forty-five (45) days until readiness for final payment.

ARTICLE IV CONTRACT PRICE

All payments to the Contractor shall be made in accordance with the Contract Documents. OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in the current funds, those prices stated in the approved Bid Schedule as named in the Notice of Award.

ARTICLE V PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the ENGINEER as provided in the General Conditions.

- 5.1 Progress Payments: OWNER shall make progress payments on account of the Contract Price based on CONTRACTOR's Applications for Payment as recommended by ENGINEER, monthly. All progress payments will be based on the progress of the Work measured by the schedule of values established

in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Conditions.

- 5.2 Final Payment: Upon completion and acceptance of the Work in accordance with Article 14 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER as provided in Article 14.

ARTICLE VI INTEREST

All monies not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of twelve percent (12%) per annum.

ARTICLE VII CONTRACTOR'S REPRESENTATION

To induce OWNER to enter into the Agreement, CONTRACTOR makes the following representations:

- 7.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
- 7.2 CONTRACTOR has studied all exploration reports and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary General Conditions, as provided in paragraph 4.02 of the General Conditions, and accepts the Technical Data contained in such reports and drawings upon which CONTRACTOR is entitled to rely.
- 7.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in paragraph 7.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.02 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.

- 7.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities.
- 7.5 CONTRACTOR has correlated the results of all observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.
- 7.6 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, or discrepancies that are discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

ARTICLE VIII CONTRACT DOCUMENTS

The Contract Documents for the _____, which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work, consist of the following:

- 8.1 This Agreement;
- 8.2 Performance and Payment Bonds;
- 8.3 Notice of Award;
- 8.4 Notice to Proceed;
- 8.5 General Conditions;
- 8.6 Supplemental General Conditions;
- 8.7 Notice Inviting Bids;
- 8.8 Instructions to Bidders;
- 8.9 Information Required of Bidder;
- 8.10 Technical Specifications;
- 8.11 Drawings - Sheets number one through _____;
- 8.12 Addendum number one through _____; and,
- 8.13 CONTRACTOR's Bid, including all schedules and explanatory attachments, attached as Exhibit A.

The CONTRACTOR (1) acknowledges that he has received a copy of each document specified above, (2) acknowledges that he has read and understands each document specified above, and (3) agrees to every term, condition and contract obligation set forth in each document specified above.

There are no Contract Documents other than those listed above in Article 8. The Contract Documents may only be amended, modified, or supplemented as provided in paragraphs 3.03 of the General Conditions.

ARTICLE IX
FEDERAL REQUIREMENTS

The CONTRACTOR shall comply with federal regulations as stated in the Supplemental General Conditions, Article 21.

ARTICLE X
MISCELLANEOUS

- 10.1 Terms used in this Agreement that are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.
- 10.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.
- 10.3 In the event any legal action or other proceeding is brought for the enforcement of this Agreement and/or the Contract Documents, or damages, because of an alleged dispute, breach, default or misrepresentation in connection with any of the provisions thereof, the successful or prevailing party shall be entitled to recover reasonable attorneys' fees and other costs incurred in the action or proceeding, in addition to any other relief to which it may be entitled.
- 10.4 Any notice to be given hereunder shall be deemed given when sent by registered or certified mail, postage prepaid, to the parties at their respective addresses stated below or at any other address when notice of such change of address has been given as provided in this Article 10.4.

[SIGNATURE PAGE TO FOLLOW]

“OWNER”:

Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

“CONTRACTOR”

Name
Address
City, State Zip

Utah Contractor License No. 0000

Utah Business Entity No. 0000

By: _____
Its: Jacob C. Young
General Manager/CEO

By: _____
Its: Name
Title

EXHIBIT A
CONTRACTOR'S BID

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____, as Contractor, and _____ as Surety, are held firmly bound unto the Jordan Valley Water Conservancy District hereinafter called "Owner," in the sum of \$_____ for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has been awarded and is about to enter into the annexed Agreement with Owner to perform all work required under the Bidding Schedule(s) of the Owner's Contract Documents entitled "7700 South 700 East Well Pump Replacement".

NOW THEREFORE, if Contractor shall perform all the requirements of the Agreement required to be performed on his part, at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

PROVIDED, that any alterations in the work to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of the Agreement, shall not in any way release Contractor or Surety thereunder, nor shall any extensions of the time granted under the provisions of the Agreement release either the Contractor or Surety, and notice of such alterations or extensions of the work, materials or time to complete made under the Agreement is hereby waived by Surety. This Bond is furnished in compliance and in accordance with 14-1-18, Utah Code Ann., as amended, and 63-56-38 Utah Code Ann., as amended.

SIGNED AND SEALED, this _____ day of _____, 20__.

By: _____

By: _____

Its: _____

(SEAL)

(SEAL)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____ as Contractor, and _____ as Surety, are held firmly bound unto the Jordan Valley Water Conservancy District hereinafter called "Owner," in the sum of \$_____ for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has been awarded and is about to enter into the annexed Agreement with Owner to perform all work required under the Bidding Schedule(s) of the Owner's Contract Documents entitled, "7700 South 700 East Well Pump Replacement".

NOW THEREFORE, if said Contractor, or subcontractor, fails to pay for any materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, or for amounts due under applicable State law for any work or labor thereon, said Surety will pay for the same in an amount not exceeding the sum specified above, and, in the event suit is brought upon this bond, a reasonable attorney's fee to be fixed by the court. This bond shall inure to the benefit of any persons, companies, or corporations entitled to file claims under applicable State law.

PROVIDED, that any alterations in the work to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of the Agreement, shall not in any way release Contractor or Surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either Contractor or the Surety, and notice of such alterations or extensions of the work, materials or time to complete made under the Agreement is hereby waived by Surety. This bond is furnished in compliance and in accordance with 14-1-18 and 19 Utah Code Ann., as amended, and 63-56-38 Utah Code Ann., as amended.

SIGNED AND SEALED, this _____ day of _____, 20____.

By: _____

By: _____

Its: _____

Its: _____

(SEAL)

(SEAL)

(SEAL AND NOTARIAL ACKNOWLEDGMENT OF SURETY)

NOTICE OF AWARD

To:

Re: 7700 South 700 East Well Pump Replacement

You are hereby notified that the OWNER has accepted your bid for the above referenced project in the amount of \$_____.

Furnish the required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within ten calendar days from the date of this notice to you. An acknowledged copy of this Notice of Award, together with all future correspondence regarding this project, shall be sent to the District's Project Manager: Kevin Rubow.

When the Agreement is provided, sign and return it within ten calendar days from receipt of the agreement.

Dated this ____ day of _____, 20____.

Shane Swensen, PE
Director of Engineering & Water Development

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by:

This _____ day of _____, 20____.

Signature: _____

Printed Name: _____

Title: _____

NOTICE TO PROCEED

To:

Re: 7700 South 700 East Well Pump Replacement

You are hereby notified to commence work in accordance with the Agreement dated _____, and you are to complete the work within ____ calendar days.

An acknowledged copy of this Notice to Proceed should be returned to the Owner, Attention: Kevin Rubow, Project Manager.

Dated this _____ day of _____.

Travis P. Christensen, P.E.
Engineering Group Leader

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by: _____

This _____ day of _____, 20____.

Signature: _____

Printed Name: _____

Title: _____

JORDAN VALLEY WATER CONSERVANCY DISTRICT

PAYMENT APPLICATION AND CERTIFICATE No. ____ **DATE:** _____

SHEET _____ OF _____

PERIOD FROM _____ TO _____, 20____

PROJECT: 7700 South 700 East Well Pump Replacement

JVWCD PROJECT NO.: 4421

CONTRACTOR: _____

ADDRESS: _____

ENGINEER: _____

1. ORIGINAL CONTRACT PRICE:..... \$ _____
2. NET CHANGE ORDERS APPROVED TO DATE: \$ _____
 (Attach Summary Sheet)
3. REVISED CONTRACT AMOUNT: \$ _____
 (Sum of Lines 1 & 2)
4. TOTAL VALUE OF WORK COMPLETED TO DATE \$ _____
 (Attached Payment Breakdown)
5. PERCENT PROJECT COMPLETE: %
 (Divide Line 4 by 3 and multiply by 100)
6. LESS AMOUNT RETAINED (5%) \$ _____
7. MATERIALS ON HAND..... \$ _____
 (95% of Value, Listing Attached)
8. SUBTOTAL (Sum of Lines 4, Line 6 and Line 7) \$ _____
9. LESS PREVIOUS PAYMENTS \$ _____
10. CURRENT PAYMENT DUE: \$ _____
 (Line 8 & 9)

JORDAN VALLEY WATER CONSERVANCY DISTRICT

Payment Application and Certificate No _____

SHEET _____ OF _____

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that: (1) all previous progress payments received from OWNER on account of work done under the Contract referred to herein have been applied to discharge in full all obligations of CONTRACTOR incurred in connection with work covered by prior Applications for Payment numbered 1 through _____ inclusive; and, (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by bond acceptable to OWNER).

Dated: _____ CONTRACTOR: _____

By: _____

Engineer's Recommendation:

This Application (with accompanying documentation) meets the requirements of the Contract Documents and payment of the amount due this application is recommended.

ENGINEER

Dated _____
Project Representative

Dated _____
Project Manager

JORDAN VALLEY WATER CONSERVANCY DISTRICT

CHANGE ORDER

Change Order No. _____

Date: _____

Page ____ of ____

NAME OF PROJECT: 7700 South 700 East Well Pump Replacement

PROJECT NUMBER: 4421

CONTRACTOR: _____

CONTRACT DATE: _____

The following changes are hereby made to the CONTRACT DOCUMENTS:

- 1)
- 2)
- 3)

Total Change to CONTRACT PRICE: \$

Original CONTRACT PRICE: \$

Current CONTRACT PRICE adjusted by previous CHANGE ORDER(S)..... \$

The new CONTRACT PRICE including this CHANGE ORDER will be \$

The CONTRACT TIME will be increased by _____ calendar days.

The date for Substantial Completion will be _____, 20__.

The Contractor agrees to furnish all labor and materials and perform all work as necessary to complete the change order items for the price named herein, which includes all supervision and miscellaneous costs. This change order constitutes full and mutual accord and satisfaction for all time and all costs related to this change. By acceptance of this change order the Contractor agrees that the change order represents an equitable adjustment to the Contract, and further agrees to waive all right to file a claim arising out of or as a result of this change. This document will become a supplement to the Contract, and all provisions will apply hereto, upon approval by the Owner.

JORDAN VALLEY WATER CONSERVANCY DISTRICT

**CHANGE ORDER
(CONTINUED)**

Change Order No. _____

Date: _____

Page ____ of ____

Recommended:	_____	_____
	Engineer – JVVCD	Date
Accepted:	_____	_____
	Contractor -	Date
Approved:	_____	_____
	Owner - Jordan Valley Water Conservancy District	Date

JORDAN VALLEY WATER CONSERVANCY DISTRICT

**CONTRACTOR'S CERTIFICATE
OF
SUBSTANTIAL COMPLETION**

OWNER

TO: Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

PROJECT: 7700 South 700 East Well Pump Replacement

ATTENTION: _____

FROM: _____
Firm or Corporation

This is to certify that I, _____ am an authorized official of
_____ working in the capacity of _____
_____ and have been properly authorized by said
firm or corporation to sign the following statements pertaining to the subject contract:

I know of my own personal knowledge, and do hereby certify, that the work of the contract described above has been substantially performed and all materials used and installed to date are in accordance with, and in conformity to, the contract drawings and specifications. A list of all incomplete work is attached.

The Contractor hereby releases the Owner and its agents from all claims of and liability to the Contractor for anything done or furnished for or relating to the work, as further provided in Article 14.08B of the General Conditions, except demands against the Owner for the remainder of progress payments retained to date, and unresolved written claims prior to this date.

The contract work is now substantially complete, ready for its intended use, and ready for your inspection. You are requested to issue a Certificate of Substantial Completion.

SIGNATURE: _____

DATE: _____

JORDAN VALLEY WATER CONSERVANCY DISTRICT

**CONTRACTOR'S CERTIFICATE
OF
FINAL COMPLETION**

OWNER

TO: Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088

PROJECT: 7700 South 700 East Well Pump Replacement

ATTENTION: Project Representative: _____

FROM: _____
Firm or Corporation

This is to certify that I, _____ am an authorized official of
_____ working in the capacity of _____
_____ and have been properly authorized
by said firm or corporation to sign the following statements pertaining to the subject
contract:

I know of my own personal knowledge, and do hereby certify, that the work of the
contract described above has been performed and all materials used and installed
to date are in accordance with, and in conformity to, the contract drawings and
specifications.

The Contract work is now complete in all parts and requirements, excepting the
attached list of minor deficiencies and the reasons for each being incomplete to
date, for which exemption from final payment requirements is requested in
conformance to Article 14.09A of the General Conditions of our Contract (if no
exemptions requested, write "none") _____. The work is now ready for your final
inspection. The following items required from the Contractor prior to application for
final payment (such as O & M Manuals, guarantees, record drawings, etc.) are
submitted herewith, if any:

JORDAN VALLEY WATER CONSERVANCY DISTRICT

I understand that neither the issuance by the Engineer of a Notice of Completion, nor the acceptance thereof by the Owner, shall operate as a bar or claim against the Contractor under the terms of the guarantee provisions of the Contract Documents.

SIGNATURE: _____

DATE: _____

JORDAN VALLEY WATER CONSERVANCY DISTRICT

CONSENT OF SURETY FOR FINAL PAYMENT

PROJECT NAME: 7700 South 700 East Well Pump Replacement

LOCATION: _____

TYPE OF CONTRACT: _____

AMOUNT OF CONTRACT: _____

In accordance with the provisions of the above-named contract between the Owner and the Contractor, the following named surety:

on the Payment Bond of the following named Contractor:

hereby approves of final payment to the Contractor, and further agrees that said final payment to the Contractor shall not relieve the Surety Company named herein of any of its obligations to the following named Owner (as set forth in said Surety company's bond):

IN WITNESS WHEREOF, the Surety Company has hereunto set its hand and seal this _____ day of _____, 20____.

(Name of Surety Company)

(Signature of Authorized Representative)

(Name of Authorized Representatives)

(Title)

JORDAN VALLEY WATER CONSERVANCY DISTRICT

AFFIDAVIT OF PAYMENT

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by the Jordan Valley Water Conservancy District to furnish labor and materials under a contract dated _____ for the project entitled "7700 South 700 East Well Pump Replacement in the County of Salt Lake, State of Utah, of which Jordan Valley Water Conservancy District is the Owner.

NOW, THEREFORE, this _____ day of _____, 20__, the undersigned, as the Contractor for the above-named Contract pursuant to the Conditions of the Contract hereby certifies that, except as listed below, he has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or his property might in any way be held responsible.

EXCEPTIONS: (If none, write "None". If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each Exception.)

Contractor (Name of sole ownership,
corporation or partnership)

(affix corporate seal here)

(Signature of Authorized Representative)

Title: _____

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated:

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract between the OWNER and the CONTRACTOR for the performance of the WORK pursuant to the Contract Documents. Documents incorporated into the contract by reference become part of the contract and of the Agreement.

Application for Payment - The form furnished by the ENGINEER and completed by the CONTRACTOR to request progress or final payment including supporting documentation to substantiate the amounts for which payment is requested.

Bonds - Performance, and Payment Bonds and other instruments which protect against loss due to inability or refusal of the CONTRACTOR to perform pursuant to the Contract Documents.

Change Order - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the OWNER and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - Information and Instructions, forms (including the Schedule of Prices and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplemental General Conditions, Technical Specifications, Drawings and all Addenda and Change Orders executed pursuant to the provisions of the Contract Documents.

Contract Price - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

Contract Time - The number of successive Days stated in the Contract Documents for the completion of the WORK. The Contract Time begins to run on the date specified in the Notice to Proceed.

CONTRACTOR - The person, firm, or corporation with whom the OWNER has executed the Agreement.

Cost Proposal - The offer or proposal of the pipeline installation subcontractor to the CONTRACTOR to provide the work required under these Contract Documents.

Day - A calendar day of 24 hours measured from midnight to the next midnight.

Defective Work - Work that: is unsatisfactory, faulty, or deficient; does not conform to the Contract Documents; does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; has been damaged prior to the ENGINEERS's recommendation of final payment.

Drawings - The drawings, plans, maps, profiles, diagrams, and other graphic representations which show the character, location, nature, extent, and scope of the WORK.

Effective date of the Agreement - The date indicated in the Agreement on which it was executed, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

ENGINEER - The person, firm, or corporation named as such in the Contract Documents.

Field Order - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

Laws and Regulations; Laws or Regulations - Laws, rules, regulations, ordinances, codes, and/or orders promulgated by a lawfully constituted body authorized to issue such Laws and Regulations.

Notice of Award - The OWNER's written notice to the apparent successful Bidder stating that upon compliance with the conditions precedent enumerated therein by the apparent successful Bidder within the time specified, the OWNER will enter into the Agreement.

Notice to Proceed - The OWNER's written notice to the CONTRACTOR authorizing the CONTRACTOR to proceed with the work and establishing the date of commencement of the Contract Time.

OWNER - The Jordan Valley Water Conservancy District.

Partial Utilization - Placing a portion of the WORK in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion of the WORK.

Project - A unit of total construction of which the WORK to be provided under the Contract Documents, may be the whole, or a part thereof.

Project Representative - The authorized representative of the ENGINEER who is assigned to the site or any part thereof.

Proposer - Any person, firm or corporation submitting a proposal for the work.

Schedule of Prices - The offer or proposal of the CONTRACTOR setting forth the price or prices for the work to be performed.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of WORK and all illustrations, brochures, standard schedules, performance charts, instruction, and diagrams to illustrate material or equipment for some portion of the WORK.

Specifications - (Same definition as for Technical Specifications hereinafter).

Subcontractor - An individual, firm, or corporation having a direct contract with the CONTRACTOR or with any other Subcontractor for the performance of a part of the WORK at the site.

Substantial Completion - That state of construction when the WORK has progressed to the point where, in the opinion of the ENGINEER as evidenced by the Certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the WORK can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to any work refer to substantial completion thereof.

Supplementary General Conditions - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman, or vendor.

Technical Data - The factual information contained in reports describing physical conditions, including exploration method, plans, logs, laboratory test methods and factual data. Technical Data does not include conclusions, interpretations, interpolations, extrapolations or opinions contained in reports or reached by the CONTRACTOR.

Technical Specifications - Those portions of the Contract Documents consisting of the written technical descriptions of products and execution of the WORK.

Underground Utilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments and any encasements containing such facilities which have been installed under ground to furnish any of the following services or

materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic, or other control systems.

WORK - The entire construction required to be furnished under the Contract Documents. WORK is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

GENERAL CONDITIONS

ARTICLE 2 - PRELIMINARY MATTERS

2.01 DELIVERY OF BONDS/INSURANCE CERTIFICATES

- A. The CONTRACTOR shall deliver to the OWNER the Agreement, Bonds, Insurance Policies and Certificates required by the Contract Documents within ten (10) days after receiving the Notice of Award from the OWNER.

2.02 COPIES OF DOCUMENTS

- A. The OWNER shall furnish the CONTRACTOR 5 copies of the Contract Documents, together with 5 sets of full-scale Drawings. Additional quantities of the Contract Documents will be furnished at reproduction cost.

2.03 STARTING THE PROJECT

- A. The CONTRACTOR shall begin construction of the WORK within 10 days after the commencement date stated in the Notice to Proceed, but shall not commence construction prior to the commencement date.

2.04 BEFORE STARTING CONSTRUCTION

- A. Before undertaking each part of the WORK, the CONTRACTOR shall carefully study and compare the Contract Documents to check and verify pertinent figures and dimensions shown thereon with all applicable field measurements. The CONTRACTOR shall promptly report in writing to the ENGINEER any conflict, error, or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the ENGINEER before proceeding with any work affected thereby.
- B. The CONTRACTOR shall submit to the ENGINEER for review those documents called for in each section of the Technical Specifications.

2.05 PRECONSTRUCTION CONFERENCE

- A. The CONTRACTOR shall attend a preconstruction conference with the OWNER, the ENGINEER and others as appropriate to discuss the construction of the WORK in accordance with the Contract Documents.

GENERAL CONDITIONS

2.06 FINALIZING SCHEDULES

- A. At least 7 days before the CONTRACTOR's submittal of its first Application for Payment, the CONTRACTOR, the ENGINEER, and others as appropriate will meet to finalize the schedules submitted in accordance with the Technical Specifications.

GENERAL CONDITIONS

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 INTENT

- A. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the WORK. The Contract Documents are complementary, what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.
- B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. All work, materials, or equipment that may be reasonably inferred from the Contract Documents as being required to produce the completed work shall be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe work, materials, or equipment such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals, or codes or any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, or the ENGINEER or any of their consultants, agents, or employees from those set forth in the Contract Documents.
- C. If, during the performance of the WORK, the CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, the CONTRACTOR shall immediately report it to the ENGINEER in writing and before proceeding with the work affected thereby. The ENGINEER shall then make a written interpretation, clarification, or correction from the ENGINEER.

GENERAL CONDITIONS

3.02 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. In resolving conflicts resulting from conflicts, errors, or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Change Orders
2. Agreement
3. Addenda
4. Contractor's Bid (Bid Form)
5. Supplemental General Conditions
6. Notice Inviting Bids
7. Instructions to Bidders
8. General Conditions
9. Technical Specifications
10. Referenced Standard Specifications
11. Drawings

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings
3. Addenda/change order drawings govern over general drawings
4. Contract Drawings govern over standard drawings

3.03 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS

A. The Contract Documents may be amended by a Change Order (pursuant to Article 10) to provide for additions, deletions or revisions in the WORK or to modify terms and conditions.

GENERAL CONDITIONS

3.04 REUSE OF DOCUMENTS

- A. Neither the CONTRACTOR, Subcontractor, Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent.

GENERAL CONDITIONS

ARTICLE 4 - AVAILABILITY OF LANDS; PHYSICAL CONDITIONS: REFERENCE POINTS

4.01 AVAILABILITY OF LANDS

- A. The OWNER shall furnish the lands, rights-of-way and easements upon which the WORK is to be performed and for access thereto, together with other lands designated for the use of the CONTRACTOR in the Contract Documents. Easements for permanent structures or permanent changes in existing major facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. The CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property owner, and a copy of the easement furnished to the ENGINEER prior to its use. Neither the OWNER nor the ENGINEER shall be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any properties.

4.02 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES

- A. Explorations and Reports: The paragraph entitled "Physical Conditions" of the Supplementary General Conditions identifies exploration reports and subsurface conditions tests at the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the Technical Data contained in these reports. The CONTRACTOR is responsible for the interpretation, extrapolation or interpolation of all technical as well as nontechnical data and its reliance on the completeness, opinions and interpretation of the reports.
- B. Existing Structures: The paragraph entitled "Physical Conditions" of the Supplementary General Conditions identifies the drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Utilities referred to in Paragraph 4.04 herein) which are at or contiguous to the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR is responsible for the interpretation, extrapolation or interpolation of all technical as well as nontechnical data and its reliance on the completeness, opinions and interpretation of the reports.

GENERAL CONDITIONS

4.03 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall notify the ENGINEER upon encountering any of the following unforeseen conditions, hereinafter called "differing site conditions," during the prosecution of the WORK. The CONTRACTOR's notice to the ENGINEER shall be in writing and delivered before the differing site conditions are disturbed, but in no event later than 14 days after their discovery.
 - 1. Subsurface or latent physical conditions at the site of the WORK differing materially from those indicated, described, or delineated in the Contract Documents including those reports and documents discussed in Paragraph 4.02; and
 - 2. Physical conditions at the site of the WORK of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents including those reports and documents discussed in Paragraph 4.02.
- B. The ENGINEER will review the alleged differing site conditions, determine the necessity of obtaining additional explorations or tests with respect to verifying their existence and extent and advise the OWNER in writing of the ENGINEER's findings and conclusions.
- C. If the OWNER concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the differing site conditions.
- D. In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to the differing site conditions. If the OWNER and the CONTRACTOR are unable to agree as to the amount or length of the Change Order, a claim may be made as provided in Articles 11 and 12.
- E. The CONTRACTOR's failure to give written notice of differing site conditions within 14 days of their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith, whether direct or consequential in nature.

GENERAL CONDITIONS

4.04 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

- A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site are based on information and data furnished to the OWNER or the ENGINEER by the owners of Underground Utilities or by others. Unless it is expressly provided in the Supplementary General Conditions and/or the Section entitled "Protection and Restoration of Existing Facilities" of the Technical Specifications, the OWNER and the ENGINEER shall not be responsible for the accuracy or completeness of any Underground Utilities information or data. The CONTRACTOR's responsibility relating to underground utilities are: review and check all information and data, locate all Underground Utilities shown or indicated in the Contract Documents, coordinate the WORK with the owners of Underground Utilities during construction, the safeguard and protect the of Underground Utilities, and repair any damage to Underground Utilities resulting from the WORK. The cost of all these activities will be considered as having been included in the Contact Price.
- B. Not Shown or Indicated: If an Underground Utility not shown or indicated in the Contract Documents is uncovered or revealed at or contiguous to the site and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall give written notice to the OWNER of that utility and the ENGINEER, specifying the location of the utility in question.

4.05 REFERENCE POINTS

- A. The ENGINEER will provide one bench mark, near or on the site of the WORK, and will provide two points near or on the site to establish a base line for use by the ENGINEER for alignment control. Unless otherwise specified in the Technical Specifications, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.
- B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks. In case of their removal or destruction by its own employees or by its subcontractor's employees, the CONTRACTOR shall be responsible for the accurate replacement of reference points by professionally qualified personnel at no additional cost to the OWNER.

GENERAL CONDITIONS

ARTICLE 5 - BONDS AND INSURANCE

5.01 PERFORMANCE AND OTHER BONDS

- A. The CONTRACTOR shall furnish Performance and Payment Bonds, each in the amount set forth in the Supplementary General Conditions as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. All insurance companies, sureties, and bond companies shall have an AM Best rating of A- or better, with a Financial Size Category of XII or better. Sureties shall also be listed on the Department of the Treasury's Circular 570, with an acceptable underwriting limitation limit. The Performance Bond shall remain in effect at least until one year after the date of Notice of Completion, except as otherwise provided by Law or Regulation or by the Contract Documents. After the ENGINEER issues the Notice of Completion, the amount of the Performance Bond may be reduced to 10 percent of the Contract Price, or \$1,000, whichever is greater. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.
- B. If the surety on any Bond furnished by the CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days after written approval by the OWNER of a substitute Bond and Surety substitute the approved Bond and Surety.

5.02 INSURANCE

- A. The CONTRACTOR shall purchase and maintain the insurance required under this paragraph. All insurance companies, sureties, and bond companies shall have an AM Best rating of A- or better, with a Financial Size Category of XII or better. Sureties shall also be listed on the Department of the Treasury's Circular 570, with an acceptable underwriting limitation limit. This insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by law, whichever is greater. The CONTRACTOR's liabilities under the Agreement shall not be deemed limited in any way to the insurance coverage required.
- B. The CONTRACTOR shall furnish the OWNER and ENGINEER with certificates indicating the type, amount, class of operations covered, effective dates and expiration dates of all policies. All insurance policies purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 30 days' prior written

GENERAL CONDITIONS

notice has been given to the OWNER by certified mail. All insurance shall remain in effect until the ENGINEER issues the Notice of Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing defective work in accordance with Paragraph 13.06 or completing punch list items required by the Notice of Completion. In addition, the insurance required herein (except for Worker's Compensation and Employer's Liability) shall name the OWNER, the ENGINEER, and their officers, agents, and employees as "additional insured" under the policies.

1. Workers' Compensation and Employer's Liability: This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This policy shall include an "all states" endorsement. The CONTRACTOR shall require each subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in the WORK unless its employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In the event a class of employees is not protected under the Workers' Compensation Statute, the CONTRACTOR or Subcontractor, as the case may be, shall provide adequate employer's liability insurance for the protection of its employees not protected under the statute.
2. Comprehensive General Liability: This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims arising from injuries to persons other than its employees and damage to property of the OWNER or others arising out of any act or omission of the CONTRACTOR or its agents, employees or subcontractors. The policy shall include the following endorsements: (1) Protective Liability endorsement to insure the contractual liability assumed by the CONTRACTOR under the indemnification provisions in these General Conditions; (2) Broad Form Property Damage endorsement; (3) Personal Injury endorsement to cover personal injury liability for intangible harm. The Comprehensive General Liability coverage shall contain no exclusion relative to blasting, explosion, collapse of building, or damage to underground structures.
3. Comprehensive Automobile Liability: This insurance shall be written in comprehensive form. The policy shall protect the CONTRACTOR against all claims for injuries to employees, members of the public and

GENERAL CONDITIONS

damage to property of others arising from the use of CONTRACTOR's motor vehicles, whether they are owned, non-owned, or hired, and whether used or operated on or off the site. The motor vehicle insurance required under this paragraph shall include: (a) motor vehicle liability coverage; (b) personal injury protection coverage and benefits; and (c) uninsured motor vehicle coverage.

4. Subcontractor's Insurance: The CONTRACTOR shall require each of its subcontractors to procure and to maintain Comprehensive General Liability Insurance and Comprehensive Automobile Liability Insurance of the type and in the amounts specified in the Supplementary General Conditions or insure the activities of its subcontractors in the CONTRACTOR's own policy, in like amount.
5. Builder's Risk: This insurance shall be of the "all risk" type, shall be written in completed value form, and shall protect the CONTRACTOR, the OWNER, and the ENGINEER against damage to buildings, structures, materials and equipment. The amount of this insurance shall not be less than the insurable value of the WORK at completion. Builder's risk insurance shall provide for losses to be payable to the CONTRACTOR, the OWNER, and the ENGINEER as their interests may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR, the OWNER, and the ENGINEER. The Builder's Risk policy shall insure against all risks of direct physical loss or damage to property from any external cause including flood and earthquake. Allowable exclusions, if any, shall be as specified in the Supplementary General Conditions.

GENERAL CONDITIONS

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 SUPERVISION AND SUPERINTENDENCE

- A. The CONTRACTOR shall supervise and direct the WORK competently and efficiently, devoting the attention and applying the skills and expertise necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the finished WORK complies accurately with the Contract Documents.
- B. The CONTRACTOR shall employ the Superintendent named in "Information Required of Bidder" on the work site at all times during the progress of the WORK. The superintendent shall not be replaced without the OWNER's written consent. The superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER.
- C. The CONTRACTOR's superintendent shall be present at the site of the WORK at all times while work is in progress. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until the superintendent is again present at the site.

6.02 LABOR, MATERIALS, AND EQUIPMENT

- A. The CONTRACTOR shall provide skilled, competent and suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. When required in writing by the OWNER or ENGINEER, the CONTRACTOR or any subcontractor shall discharge any person who is, in the opinion of the OWNER or ENGINEER, incompetent, disorderly, or otherwise unsatisfactory and shall not again employ the discharged person on the WORK without the consent of the OWNER or ENGINEER. The CONTRACTOR shall at all times maintain good discipline and order at the site.
- B. Except in connection with the safety or protection of persons the WORK, or property at the site or adjacent thereto, all work at the site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without the OWNER's written consent given after prior written notice

GENERAL CONDITIONS

to the ENGINEER. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid the CONTRACTOR for overtime work in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work, but only to the extent that the CONTRACTOR pays overtime wages on a regular basis being paid by for overtime work of a similar nature in the same locality.

- C. All costs of inspection and testing performed during overtime work approved solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER shall have the authority to deduct the costs of all inspection and testing from any partial payments otherwise due to the CONTRACTOR.
- D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish, erect, maintain and remove the construction plant, and temporary works and assume full responsibility for all materials, equipment, labor, transportation, construction equipment, machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities and all other facilities and incidentals necessary for the furnishing, performance testing, start-up and completion of the WORK.
- E. All materials and equipment incorporated into the WORK shall be of new and good quality, except as otherwise provided in the Contract Documents. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. The CONTRACTOR shall apply, install, connect, erect, use, clean, and condition all material and equipment in accordance with the instructions of the manufacturer and Supplier except as otherwise provided in the Contract Documents.

6.03 ADJUSTING PROGRESS SCHEDULE

- A. The CONTRACTOR shall submit any adjustments in the progress schedule to the ENGINEER for acceptance in accordance with the provisions for "Contractor Submittals" in the Technical Specifications.

GENERAL CONDITIONS

6.04 SUBSTITUTES OR "OR-EQUAL" ITEMS

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below:
1. "Or-Equal" Items: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.04.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment ENGINEER determines that: (i) it is a least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;
 - b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Document.
 2. Substitute Items
 - a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.04.A.1, it will be considered a proposed substitute item.
 - b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or

GENERAL CONDITIONS

equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

- c. The procedure for review by ENGINEER will be as set forth in paragraph 6.04.A.2.d, as supplemented in the Technical Specifications and as ENGINEER may decide is appropriate under the circumstances.
 - d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of the proposed substitute item will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item, and whether or not incorporation or use of the substitute item is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.
- B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in

GENERAL CONDITIONS

ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.04.A.2.

- C. Engineer's Evaluation: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.04.A and 6.04.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.
- D. Special Guarantee: OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.
- E. ENGINEER's Cost Reimbursement: ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.04.A.2 and 6.04.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluation each such proposed substitute.
- F. CONTRACTOR's EXPENSE: CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.05 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its subcontractors and their employees to the same extent as the CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this paragraph shall create any contractual relationship between any subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the Agreement.

6.06 PERMITS

GENERAL CONDITIONS

- A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including furnishing the insurance and bonds required by such agencies. The costs incurred by the CONTRACTOR in compliance with this paragraph shall not be made the basis for claims for additional compensation. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids, including all utility connection charges for utilities required by the WORK.
- B. The CONTRACTOR shall pay all license fees and royalties and assume all costs when any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others when issued in the construction of the WORK or incorporated into the WORK. If a particular invention, design, process, product, or device is specified in the Contract Documents for incorporation into or use in the construction of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of these rights shall be disclosed by the OWNER in the Contract Documents. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents.

6.07 LAWS AND REGULATIONS

- A. The CONTRACTOR shall observe and comply with all federal, state, and local laws, ordinances, codes, orders, and regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered in the Contract Documents in relation to any law, ordinance, code, order, or regulations, the CONTRACTOR shall report the same in writing to the ENGINEER. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER, the ENGINEER and their officers, agents, and employees against all claims and from violation of any law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees or subcontractors. Any particular law or regulation specified or

GENERAL CONDITIONS

referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations. Where an individual State act on occupational safety and health standards has been approved by Federal authority, then the provision of said State act shall control.

6.08 EQUAL OPPORTUNITY

- A. The Contractor agrees to abide by: the provisions of Title VII of the Civil Rights Act of 1964 (42USC § § 2000e et seq.), which prohibits discrimination against any employee or applicant for employment on the basis of race, religion, color, or national origin; Executive Order No. 11246, as amended, which prohibits discrimination on the basis of sex; 45 CFR 90, which prohibits discrimination on the basis of age; Section 504 of the Rehabilitation Act of 1973, (42 USC § 794), which prohibits discrimination on the basis of handicap; Utah Executive Order dated June 30, 1989, which prohibits sexual harassment in the workplace; and the Americans with Disabilities Act (42 USC § § 12111 et seq.), which prohibits discrimination against qualified employees and applicants with a disability.

GENERAL CONDITIONS

6.09 TAXES

- A. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the WORK.

6.10 USE OF PREMISES

- A. The CONTRACTOR shall confine construction equipment, stored materials and equipment, and other operations of workers to (1) the Project site, (2) the land and areas identified for the CONTRACTOR's use in the Contract Documents, and (3) other lands whose use is acquired by Laws and Regulations, rights-of-way, permits, and easements. The CONTRACTOR shall be fully responsible to the owner and occupant of such lands for any damage to the lands or areas contiguous thereto, resulting from the performance of the WORK or otherwise. Should any claim be made against the OWNER or the ENGINEER by owner or occupant of lands because of the performance of the WORK, the CONTRACTOR shall promptly settle the claim by agreement, or resolve the claim through litigation. The CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold the OWNER and the ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers, architects, attorneys, and other professionals and court costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any owner or occupant of land against the OWNER or the ENGINEER to the extent the claim is based or arises out of the CONTRACTOR's performance of the WORK.

6.11 SAFETY AND PROTECTION

- A. The CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. All employees on the WORK and other persons and organizations who may be affected thereby.
 - 2. All the WORK and materials and equipment to be incorporated therein, whether in storage on or off the site; and

GENERAL CONDITIONS

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
- B. The CONTRACTOR shall comply with all applicable Laws and Regulations (whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Unless the CONTRACTOR otherwise designates in writing a different individual as the responsible individual, the CONTRACTOR's superintendent shall be CONTRACTOR's representative at the site whose duty shall be the prevention of accidents.

6.12 SHOP DRAWINGS AND SAMPLES

- A. After checking and verifying all field measurements and after complying with the applicable procedures specified in the Technical Specifications, the CONTRACTOR shall submit all shop drawings to the ENGINEER for review and approval in accordance with the approved schedule for shop drawings submittals specified in the Technical Specifications.
- B. The CONTRACTOR shall also submit to the ENGINEER for review and approval all samples in accordance with the approved schedule of sample submittals specified in the Technical Specifications.
- C. Before submitting shop drawings or samples, the CONTRACTOR shall determine and verify all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and review or coordinate each shop drawing or sample with other shop drawings and samples and with the requirements of the WORK and the Contract Documents.

GENERAL CONDITIONS

6.13 CONTINUING THE WORK

- A. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No work shall be delayed or postponed pending resolution of any dispute or disagreement, except as the CONTRACTOR and the OWNER may otherwise mutually agree in writing.

6.14 INDEMNIFICATION

- A. To the fullest extent permitted by Laws and Regulations, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, and their officers, agents, and employees, against and from all claims and liability arising under or by reason of the Agreement or any performance of the WORK, but not from the sole negligence or willful misconduct of the OWNER and/or the ENGINEER. Such indemnification by the CONTRACTOR shall include but not be limited to the following:
 - 1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR or its agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR or its agents;
 - 2. Liability or claims arising directly or indirectly from or based on the violation of any law, ordinance, regulation, order, or decree, whether by the CONTRACTOR or its agents;
 - 3. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its agents, or the OWNER in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specifically stipulated in this Agreement.
 - 4. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the OWNER or any other parties by the CONTRACTOR or its agents;
 - 5. Liabilities or claims arising directly or indirectly from the willful misconduct of the CONTRACTOR or its agents; and,

GENERAL CONDITIONS

- 6. Liabilities or claims arising directly or indirectly from any breach of the obligations assumed herein by the CONTRACTOR.
- B. The CONTRACTOR shall reimburse the OWNER, and the ENGINEER for all costs and expense, (including but not limited to fees and charges of engineers, architects, attorneys, and other professional and court costs) incurred by the OWNER, and the ENGINEER in enforcing the provisions of this Paragraph.
- C. The indemnification obligation under this Paragraph shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any such subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.

6.15 CONTRACTOR'S DAILY REPORTS

- A. The CONTRACTOR shall complete a daily report indicating manpower, major equipment, subcontractors, weather conditions, etc., involved in the performance of the WORK. The daily report shall be completed on forms prepared by the CONTRACTOR and acceptable to the ENGINEER, and shall be submitted to the ENGINEER at the conclusion of each work day.

6.16 ASSIGNMENT OF CONTRACT

- A. The CONTRACTOR shall not assign, sublet, sell, transfer, or otherwise dispose of the Agreement or any portion thereof, or its right, title, or interest therein, or obligations thereunder, without the written consent of the OWNER except as imposed by law. If the CONTRACTOR violates this provision, the Agreement may be terminated at the option of the OWNER. In such event, the OWNER shall be relieved of all liability and obligations to the CONTRACTOR and to its assignee or transferee, growing out of such termination.

GENERAL CONDITIONS

ARTICLE 7 - OTHER WORK

7.01 RELATED WORK

- A. The OWNER may perform other work related to the Project at the site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts for the performance of the other work which may contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to commencing any other work.
- B. The CONTRACTOR shall afford each utility owner and other contractor who is a party to a direct contract (or the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of the other work. The CONTRACTOR shall properly connect and coordinate the WORK with the other work. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to make its several parts come together properly and integrate with the other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and shall only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.
- C. If the proper execution or results of any part of the CONTRACTOR's work depends upon the integration of work with the completion of other work by any other contractor or utility owner (or the OWNER), the CONTRACTOR shall inspect and report to the ENGINEER in writing all delays, defects, or deficiencies in the other work that renders it unavailable or unsuitable for proper integration with the CONTRACTOR's work. Except for the results or effects of latent or nonapparent defects and deficiencies in the other work, the CONTRACTOR's failure to report will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work and as a waiver of any claim for additional time or compensation associated with the integration of the CONTRACTOR's work with the other work.

GENERAL CONDITIONS

7.02 COORDINATION

- A. If the OWNER contracts with others for the performance of other work on the Project at the site, a coordinator will be identified to the extent that the coordinator can be identified at this time, in the Supplementary General Conditions and delegated the authority and responsibility for coordination of the activities among the various contractors. The specific matters over which the coordinator has authority and the extent of the coordinator's authority and responsibility will be itemized in the Supplementary General Conditions or in a notice to the CONTRACTOR at such time as the identity of the coordinator is determined.

GENERAL CONDITIONS

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 COMMUNICATIONS

- A. The OWNER shall issue all its communications to the CONTRACTOR through the ENGINEER.

8.02 PAYMENTS

- A. The OWNER shall make payments to the CONTRACTOR as provided in Paragraphs 14.05 and 14.09.

8.03 LANDS, EASEMENTS, AND SURVEYS

- A. The OWNER's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. The OWNER shall identify and make available to the CONTRACTOR copies of exploration reports and subsurface conditions tests at the site and in existing structures which have been utilized by the ENGINEER in preparing the Drawings and Technical Specifications as set forth in Paragraph 4.02

8.04 CHANGE ORDERS

- A. The OWNER shall execute approved Change Orders for the conditions described in Paragraph 10.01D.

8.05 INSPECTIONS AND TESTS

- A. The OWNER's responsibility with respect to inspection, tests, and approvals is set forth in Paragraph 13.03B.

8.06 SUSPENSION OF WORK

- A. In connection with the OWNER's right to stop work or suspend work, see Paragraphs 13.04 and 15.01. Paragraphs 15.02 and 15.03 deal with the OWNER's right to terminate services of the CONTRACTOR under certain circumstances.

GENERAL CONDITIONS

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 OWNER'S REPRESENTATIVE

- A. The ENGINEER will be the OWNER's representative during the construction period. The duties, responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are set forth in a separate agreement with the OWNER and are summarized hereafter.

9.02 VISITS TO SITE

- A. The ENGINEER will make visits to the site during construction to observe and inspect the progress and quality of the WORK and to determine, in general if the WORK is proceeding in accordance with the Contract Documents.

9.03 PROJECT REPRESENTATION

- A. The ENGINEER will furnish a Project Representative to observe and inspect the performance of the WORK. The Project Representative and/or other authorized agents of the Engineer shall serve as the chief Owner/Engineer contact(s) with the Contractor during the construction phase. All submittals shall be delivered to and communications between the Engineer and the Contractor shall be handled by the Project Representative and/or other authorized agents. The Project Representative shall be the chief authorized representative of the Owner and the Engineer at the site of the work in all on-site relations with the Contractor.

9.04 CLARIFICATIONS AND INTERPRETATIONS

- A. The ENGINEER will issue with reasonable promptness written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

9.05 AUTHORIZED VARIATIONS IN WORK

- A. The ENGINEER may authorize minor variation in the WORK as described in the Contract Documents when such variations do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These variations shall be accomplished by issuing a Field Order. The issuance of a Field Order requires the CONTRACTOR to perform the work described in the order promptly. If the

GENERAL CONDITIONS

CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and parties are unable to agree as the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

9.06 REJECTION OF DEFECTIVE WORK

- A. The ENGINEER is authorized to reject work which the ENGINEER believes to be defective and require special inspection or testing of the WORK as provided in Paragraph 13.03G, whether or not the WORK is fabricated, installed, or completed.

9.07 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

- A. The ENGINEER will review for approval all Contractor submittals, including shop drawings, samples, substitutes, and "or equal" items, etc., in accordance with the procedures set forth in the Technical Specifications.
- B. In connection with the ENGINEER's responsibilities as to Change Orders, see Articles 10, 11, and 12.
- C. In connection with the ENGINEER's responsibilities with respect to Applications for Payment, see Article 14.

9.08 DECISIONS ON DISPUTES

- A. All claims, disputes, and other matters concerning the acceptability of the WORK, the interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK, and claims for changes in the Contract Price or Contract Time under Articles 11 and 12 will be referred to the ENGINEER in writing with a request for formal decision in accordance with this paragraph. The ENGINEER will render a decision in writing within 30 days of receipt of the request. Written notice of each claim, dispute, or other matter will be delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event. Written supporting data will be submitted to the ENGINEER with the written claim unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.
- B. When reviewing the claim or dispute, the ENGINEER will not show partiality to the OWNER or the CONTRACTOR and will incur no liability in connection with any interpretation or decision rendered in good faith. The ENGINEER's rendering of a decision with respect to any claim, dispute, or other matter (except any which have been waived by the making or acceptance of final

GENERAL CONDITIONS

payment as provided in Paragraph 14.12) shall be a condition precedent to the OWNER's or the CONTRACTOR's exercise of their rights or remedies under the Contract Documents or by Law or Regulations with respect to the claim, dispute, or other matter.

9.09 LIMITATION ON ENGINEER'S RESPONSIBILITIES

- A. Neither the ENGINEER's authority to act pursuant to its agreement with the OWNER, nor the description of that authority under this Article 9, nor any other description of the ENGINEER's responsibility in the Contract Documents, nor any decision made by the ENGINEER in good faith either to exercise or not exercise its authority, shall give rise to any duty or responsibility on the part of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety or any other person or organization performing any part of the WORK.
- B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgement of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of its agreement with the OWNER.
- C. The ENGINEER will not be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction not specified in the Contract Documents or the safety precautions and programs incident thereto.
- D. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any subcontractor, supplier, or any other person or organization performing any of the WORK to the extent that such acts or omissions are not reasonably discoverable considering the level of observation and inspection required by the ENGINEER's agreement with the OWNER.

GENERAL CONDITIONS

ARTICLE 10 - CHANGES IN THE WORK

10.01 GENERAL

- A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK; these will be authorized by a written Field Order and/or a Change Order issued by the ENGINEER. Upon receipt of any of these documents, the CONTRACTOR shall promptly proceed with the work involved pursuant to the applicable conditions of the Contract Documents.
- B. If the OWNER and the CONTRACTOR are unable to agree upon the increase or decrease in the Contract Price or an extension or shortening of the Contract Time, if any, that should be allowed as a result of a Field Order, a claim may be made therefor as provided in Articles 11 or 12.
- C. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work provided in the Paragraph 13.03G.
- D. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:
 - 1. Changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.01A;
 - 2. Changes required because of acceptance of defective work under Paragraph 13.06;
 - 3. Changes in the Contract Price or Contract Time which are agreed to by the parties; or
 - 4. Any other changes agreed to by the parties.
- E. If the provisions of any Bond require notice of any change to be given to a surety, the giving of these notices will be the CONTRACTOR's responsibility. The CONTRACTOR shall provide for the amount of each applicable Bond to be adjusted accordingly.

GENERAL CONDITIONS

10.02 ALLOWABLE QUANTITY VARIATIONS

- A. Whenever a unit price and quantity have been established for a bid item in the Contract Documents, the quantity stated may be increased or decreased to a maximum of 25 percent with no change in the unit price. An adjustment in the quantity in excess of 25 percent will be sufficient to justify a change in the unit price. Changes in the quantity of all bid items established in the Contract Documents, regardless of whether the changes are more or less than 25 percent and at the unit price established in the Contract Documents or adjusted otherwise, shall be documented by Change Orders.
- B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover the eliminated work, the price of the eliminated work shall be agreed upon in writing by the OWNER and the CONTRACTOR. If the OWNER and the CONTRACTOR fail to agree upon the price of the eliminated work, the price shall be determined in accordance with the provisions of Article 11.

GENERAL CONDITIONS

ARTICLE 11 - CHANGE OF CONTRACT PRICE

11.01 GENERAL

- A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. Except as directed by Change Orders, all duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR shall be at its expense without change in the Contract Price.
- B. The Contract Price may only be changed by a Change Order. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered with the claim, unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim, and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of the occurrence of the event. If the OWNER and the CONTRACTOR cannot otherwise agree on the amount involved, all claims for adjustment in the Contract Price shall be determined by the ENGINEER in accordance with Paragraph 9.08A. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.01B.
- C. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:
 - 1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
 - 2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.
 - 3. On the basis of the cost of work (determined as provided in Paragraphs 11.02 and 11.03) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 11.04).

GENERAL CONDITIONS

11.02 COST OF WORK (BASED ON TIME AND MATERIALS)

- A. General: The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project.
- B. Labor: The cost of labor used in performing work by the CONTRACTOR, a subcontractor, or other forces will be the sum of the following:
1. The actual wages paid plus any employer payments to, or on behalf of workers for fringe benefits including health and welfare, pension, vacation, and similar purposes. The cost of labor may include the rates paid to foremen when determined by the ENGINEER that the services of foremen do not constitute a part of the overhead allowance.
 2. All payments imposed by state and federal laws including, but not limited to, compensation insurance, and social security payments.
 3. The amount paid for subsistence and travel required by collective bargaining agreements, or in accordance with the regular practice of the employer.

At the beginning of the extra work and as later requested by the ENGINEER, the CONTRACTOR shall furnish the ENGINEER proof of labor compensation rates being paid.

- C. Materials: The cost of materials used in performing work will be the cost to the purchaser, whether CONTRACTOR or subcontractor, from the supplier thereof, except as the following are applicable:
1. Trade discounts available to the purchase shall be credited to the OWNER notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.
 2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Markup except for actual costs incurred in the handling of such materials will not be allowed.

GENERAL CONDITIONS

3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from these sources on extra work items or current wholesale price for the materials delivered to the work site, whichever is lower.
 4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of the material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned, delivered to the work site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim shall be made by the CONTRACTOR for costs and profit on such materials.
- D. Equipment: The CONTRACTOR will be paid for the use of equipment at the rental rate listed for the equipment specified in the Supplementary General Conditions. The rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate resulting in the least total cost to the Owner for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the Supplementary General Conditions an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishing the rental rate.
1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used.
 2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number.
 3. Unless otherwise specified, manufacturers' ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.
 4. Individual pieces of equipment or tools having a replacement value of \$100 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore.

GENERAL CONDITIONS

5. Rental time will not be allowed while equipment is inoperative due to breakdowns.
- E. Equipment on the Work: The rental time to be paid for equipment used on the WORK shall be the time the equipment is in productive operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location that requires no more moving time than that required to return it to its original location. Moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power. However, no payment will be made for loading and transporting costs when the equipment is used on other than the extra work even though located at the site of the extra work. The following shall be used in computing the rental time of equipment on the WORK.
1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be 1/2-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.
 2. When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be 1/2-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraph (3), (4), and (5), following.
 3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.02D, herein.
 4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the WORK, or in the absence of such labor, established by collective bargaining agreements for the type of workmen and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.02B, herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all payments made to on behalf of workers other than actual wages.

GENERAL CONDITIONS

5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.04, herein.

11.03 SPECIAL SERVICES

- A. Special work or services are defined as that work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. The following may be considered by the ENGINEER in making estimates for payment for special services:
 1. When the ENGINEER and the CONTRACTOR, by agreement, determine that a special service or work is required which cannot be performed by the forces of the CONTRACTOR or those of any of its subcontractors, the special service or work may be performed by an entity especially skilled in the work to be performed. After validation of invoices and termination of market values by the ENGINEER, invoices for special services or work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental cost.
 2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, the charges for that portion of the work performed at the off-site facility may by agreement, be accepted as a special service and accordingly, the invoices from the work may be accepted without detailed itemization.
 3. All invoices for special services will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit specified in Paragraph 11.04, herein, an allowance of 5 percent will be added to invoices for special services.
- B. All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference hereto as under the original Agreement. Copies of all amendments to surety bonds or supplemental surety bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

GENERAL CONDITIONS

11.04 CONTRACTOR'S FEE

- A. WORK ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. For extra work involving a combination of increases and decreases in the WORK the actual necessary cost will be the arithmetic sum of the additive and deductive costs. The allowance for overhead and profit shall include full compensation for superintendence, bond and insurance premiums, taxes, office expenses, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraphs 11.02B, C, and D, herein including extended overhead and home office overhead. The allowance for overhead and profit will be made in accordance with the following schedule:

ACTUAL NECESSARY COST OVERHEAD AND PROFIT ALLOWANCE

Labor 10 percent

Materials 10 percent

Equipment 10 percent

- B. It is understood that labor, materials, and equipment may be furnished by the CONTRACTOR or by the subcontractor, the allowance specified herein shall be applied to the labor, materials, and equipment costs of the subcontractor, to which the CONTRACTOR may add 5 percent of the subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of subcontractors, the 5 percent increase above the subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only for each separate work transaction.

GENERAL CONDITIONS

ARTICLE 12 - CHANGE OF CONTRACT TIME

12.01 GENERAL

- A. The Contract Time may only be changed by a Change Order. Any claim for an extension of the Contract time shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 30 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the ENGINEER in accordance with Paragraph 9.08 if the OWNER and the CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this Paragraph 12.01A.
- B. The Contract Time will be extended in an amount equal to time lost if the CONTRACTOR makes a claim as provided in Paragraph 12.01A and the ENGINEER determines that the delay was caused by events beyond the control of the CONTRACTOR. Examples of events beyond the control of the CONTRACTOR include acts or neglect by the OWNER or others performing additional work as contemplated by Article 7, or by acts of God or of the public enemy, fire, floods, epidemics, quarantine restrictions, strikes, labor disputes, sabotage, or freight embargoes.
- C. All time limits stated in the Contract Documents are of the essence.
- D. None of the aforesaid time extensions shall entitle the CONTRACTOR to any adjustment in the Contract Price or any damages for delay. Furthermore, the CONTRACTOR hereby indemnifies and holds harmless the OWNER and ENGINEER, their officers, agents and employees from and against all claims, damages, losses and expenses (including lost property and attorney's fees) arising out of or resulting from the temporary suspension of work whether for the OWNER's convenience as defined in Article 15.01 (a) or for whatever other reasons including the stoppage of work by the ENGINEER for the CONTRACTOR's failure to comply with any order issued by the ENGINEER.

GENERAL CONDITIONS

12.02 EXTENSIONS OF THE TIME FOR DELAY DUE TO INCLEMENT WEATHER

- A. "Inclement weather" is any weather condition or conditions resulting immediately therefrom, causing the CONTRACTOR to suspend construction operations or preventing the CONTRACTOR from proceeding with at least 75 percent of the normal labor and equipment force engaged on the WORK.
- B. Should the CONTRACTOR prepare to begin work at the regular starting time at the beginning of any regular work shift on any day on which inclement weather, or its effects on the condition of the WORK prevents work from beginning at the usual starting time and the crew is dismissed as a result thereof, the CONTRACTOR will not be charged for a working day whether or not conditions change thereafter during the day and the major portion of the day could be considered to be suitable for construction operations.
- C. The CONTRACTOR shall base its construction schedule upon the inclusion of the number of days of inclement weather specified in the paragraph entitled "Inclement weather delays" of the Supplementary General Conditions. No extension of the Contract Time due to inclement weather will be considered until after the stated number of days of inclement weather has been reached. However, no reduction in Contract Time will be made if the number of inclement weather days is not reached.

12.03 EXTENSIONS OF TIME FOR OTHER DELAYS

- A. If the CONTRACTOR is delayed in completion of the WORK beyond the time named in the Contract Documents for the completion of the WORK, by acts of God or of the public enemy, fire, floods, epidemics, quarantine restrictions, strikes, labor disputes, industry-wide shortage of raw materials, sabotage or freight embargoes, the CONTRACTOR shall be entitled to an adjustment in the Contract Time. No such adjustment will be made unless the CONTRACTOR shall notify the ENGINEER in writing of the causes of delay within 15 calendar days from the beginning of any such delay. The ENGINEER shall ascertain the facts and the extent of the delay. No adjustment in time shall be made for delays resulting from noncompliance with the Contract, accidents, failure on the part of the CONTRACTOR to carry out the provisions of the Contract including failure to provide materials, equipment or workmanship meeting the requirements of the Contract Documents; the occurrence of such events shall not relieve the CONTRACTOR from the necessity of maintaining the required progress.
- B. In the event that Contract completion is delayed beyond the Contract Time named in the Specifications by reason of shortages of raw materials required for CONTRACTOR-furnished items, the CONTRACTOR shall be entitled to

GENERAL CONDITIONS

an adjustment in the Contract Time in like manner as if the WORK had been suspended for the convenience and benefit of the OWNER; provided, however, that the CONTRACTOR shall furnish documentation acceptable to the OWNER and ENGINEER that he placed or attempted to place firm orders with suppliers at a reasonable time in advance of the required date of delivery of the items in question, that such shortages shall have developed following the date such orders were placed or attempts made to place same, that said shortages are general throughout the affected industry, that said shortages are shortages of raw materials required to manufacture CONTRACTOR-furnished items and not simply failure of CONTRACTOR's suppliers to manufacture, assemble or ship items on time, and that the CONTRACTOR shall, to the degree possible, have made revisions in the sequence of his operations, within the terms of the Contract, to offset the expected delay. The CONTRACTOR shall notify the ENGINEER, in writing, concerning the cause of delay, within 15 calendar days of the beginning of such delay. The validity of any claim by the CONTRACTOR to an adjustment in the Contract Time shall be determined by the OWNER acting through the ENGINEER, and his findings thereon shall be based on the ENGINEER's knowledge and observations of the events involved and documentation submitted by the CONTRACTOR, showing all applicable facts relative to the foregoing provisions. Only the physical shortage of raw materials will be considered under these provisions as a cause for adjustment of time and no consideration will be given to any claim that items could not be obtained at a reasonable, practical, or economical cost or price, unless it is shown to the satisfaction of the OWNER that such items could have been obtained only at exorbitant prices entirely out of line with current rates taking into account the quantities involved and the usual practices in obtaining such quantities.

- C. If the CONTRACTOR is delayed in completion of the WORK by reason of changes made under the provisions of Article 10 or changed conditions as provided under Article 4.03, or by failure of the OWNER to acquire or clear right-of-way as provided under Article 15.01, or by any act of the ENGINEER or of the OWNER, not contemplated by the Contract, an adjustment in the Contract time will be made by the OWNER in like manner as if the WORK had been suspended for the convenience and benefit of the OWNER, except, that if the WORK is increased as a result of changes, the OWNER, at his sole discretion, may grant an adjustment in the number of calendar days for completion of the Contract. In the event of such delay, the CONTRACTOR shall notify the ENGINEER in writing of the causes of delay within 15 calendar days from the beginning of any such delay.

GENERAL CONDITIONS

ARTICLE 13 - WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

13.01 WARRANTY, GUARANTEE AND MAINTENANCE PERIOD

- A. The CONTRACTOR warrants and guarantees to the OWNER and the ENGINEER that all work, equipment, materials and workmanship are in accordance with the Contract Documents and are not defective. Prompt notice of defects discovered by the OWNER or ENGINEER shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13.
- B. If within one (1) year after the date of Final Completion, as set by the Engineer's Notice of Completion, or a longer period of time prescribed by Laws or Regulations or by the terms of any applicable special guarantee or specific provisions of the Contract Documents, any work is found to be defective, the OWNER shall notify the CONTRACTOR in writing and the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with the OWNER's written notification, either correct the defective work, or, if it has been rejected by the OWNER, remove it from the site and replace it with non-defective work. In the event the CONTRACTOR does not promptly comply with the notification, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the defective work corrected or rejected work removed and replaced. All direct, indirect, and consequential costs of the removal and replacement including but not limited to fees and charges of engineers, architects, attorneys and other professionals will be paid by the CONTRACTOR. This paragraph shall not be construed to limit nor diminish the CONTRACTOR's absolute guarantee to complete the WORK in accordance with the Contract Documents.

13.02 ACCESS TO WORK

- A. The ENGINEER, other representatives of the OWNER, testing agencies, and governmental agencies with jurisdictional interests shall have access to the work at reasonable times for their observation, inspections, and testing. The CONTRACTOR shall provide proper and safe conditions for their access.

GENERAL CONDITIONS

13.03 TESTS AND INSPECTIONS

- A. The CONTRACTOR shall give the ENGINEER timely notice of readiness of the WORK for all required inspections, tests, or approvals.
- B. If Laws or Regulations of any public body other than the OWNER, with jurisdiction over the WORK require any work to be specifically inspected, tested, or approved, the CONTRACTOR shall pay all costs in connection therewith. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the OWNER's or the ENGINEER's acceptance of a Supplier of materials or equipment proposed as a substitution or-equal to be incorporated in the WORK and of materials or equipment submitted for review prior to the CONTRACTOR's purchase for incorporation in the WORK. The cost of all inspections, tests, and approvals with the exception of the above which are required by the Contract Documents shall be paid by the OWNER (unless otherwise specified).
- C. The ENGINEER will make, or have made, such inspections and test as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. The Contractor without additional cost to the OWNER, shall provide the labor and equipment necessary to make the WORK available for inspections. Unless otherwise specified in the Supplementary General Conditions or the OWNER-ENGINEER Agreement, all other costs of inspection and testing will be borne by the OWNER. In the event the inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent re-inspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.
- D. All inspections, tests, or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by properly licensed organizations selected by the OWNER.

GENERAL CONDITIONS

- E. If any work (including the work of others) that is to be inspected, tested, or approved is covered without the ENGINEER's written authorization, it must, if requested by the ENGINEER, be uncovered for testing, inspection, and observation. The uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR timely notified the ENGINEER of the CONTRACTOR's intention to cover the same and the ENGINEER failed to act with reasonable promptness in response to the notice.
- F. In any work is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and replaced at the CONTRACTOR's expense.
- G. If the ENGINEER considers it necessary or advisable that covered work be observed, inspected or tested by the ENGINEER or others, the ENGINEER shall direct the CONTRACTOR to uncover, expose, or otherwise make available for observation, inspection, or testing that portion of the work in question. The CONTRACTOR shall comply with the ENGINEER's direction and furnish all necessary labor, material, and equipment. If found the work is defective, the CONTRACTOR shall bear all direct, indirect and consequential costs of uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction of the work, including but not limited to fees and charges for engineers, architects, attorneys, and other professionals. However, if the work is not defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both. The increase in Contract Time and Contract Price shall be the CONTRACTOR's actual time and costs directly attributable to uncovering and exposing the work. If the parties are unable to agree as to the amount or extent of the changes, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

13.04 OWNER MAY STOP THE WORK

- A. If the WORK is defective, or the CONTRACTOR fails to perform work in such a way that the completed WORK will conform to the Contract Documents, the OWNER may order the CONTRACTOR to stop the WORK, or any portion thereof, until the cause for the order has been eliminated. This right of the OWNER to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.

13.05 CORRECTION OR REMOVAL OF DEFECTIVE WORK

- A. When directed by the ENGINEER, the CONTRACTOR shall promptly correct all defective work, whether or not fabricated, installed, or completed, or, if the

GENERAL CONDITIONS

work has been rejected by the ENGINEER, remove it from the site and replace it with non-defective work. The CONTRACTOR shall bear all direct, indirect and consequential costs of correction or removal, including but not limited to fees and charges of engineers, architects, attorneys, and other professionals made necessary thereby.

13.06 ACCEPTANCE OF DEFECTIVE WORK

- A. If, instead of requiring correction or removal and replacement of defective work, the OWNER prefers to accept the work, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept the defective work. If any acceptance of defective work occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

GENERAL CONDITIONS

ARTICLE 14 - PAYMENTS TO CONTRACTOR, LIQUIDATED DAMAGES AND COMPLETION

14.01 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN)

- A. The schedule of values or lump sum price breakdown established as provided in the Technical Specifications shall serve as the basis for progress payments and will be incorporated into the form of Application for Payment included in the Contract Documents.

14.02 UNIT PRICE BID SCHEDULE

- A. Progress payments for unit price work will be based on the number of units completed.

14.03 APPLICATION FOR PROGRESS PAYMENT

- A. Unless otherwise prescribed by the Owner, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review and approval, an Application for Payment completed and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as required by the Contract Documents.
- B. The Application for Payment shall identify, as a sub-total, the amount of the CONTRACTOR's Total Earnings to Date, plus the Value of Materials at the Site which have not yet been incorporated in the WORK, and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions of payment for Materials Stored at the Site but not yet incorporated in the WORK.
- C. The Net Payment Due to the CONTRACTOR shall be the above-mentioned sub-total, from which shall be deducted the retainage amount and the total amount of all previous payments made to the CONTRACTOR.
- D. The OWNER may withhold and retain 5% of each approved progress payment to the CONTRACTOR. The total retention proceeds withheld shall not exceed 5% of the total construction price. All retention proceeds shall be placed by the OWNER in an interest-bearing account. The interest accrued shall be for the benefit of the CONTRACTOR and its subcontractors, and it shall be paid after the WORK has been completed and accepted by the OWNER. CONTRACTOR shall ensure that any interest accrued on the

GENERAL CONDITIONS

retainage is distributed by the CONTRACTOR to its subcontractors on a pro rata basis.

- E. Any retention proceeds withheld, and any accrued interest, shall be released by the OWNER pursuant to an Application for Payment from the CONTRACTOR within 45 days from the later of:
1. the date the OWNER receives the final Application for Payment from the CONTRACTOR;
 2. the date that a certificate of occupancy or final acceptance notice is issued to:
 - (a) the Contractor who obtained the building permit from the building inspector or from a public agency;
 - (b) the OWNER; or
 - (c) the ENGINEER.
 3. the date the CONTRACTOR accepts final payment for the Work; or
 4. the date that a public agency or building inspector having authority to issue its own certificate of occupancy does not issue the certificate but permits partial or complete occupancy of a newly constructed or remodeled building; provided, however, that if only partial occupancy of a building is permitted, any retention proceeds withheld and retained, and any accrued interest, shall be partially released in direct proportion to the value of the part of the building occupied.

Each Application for Payment from the CONTRACTOR shall include documentation of lien releases or waivers.

- F. Notwithstanding any other provision in this Article to the contrary,
1. If the CONTRACTOR is in default or breach of the terms and conditions of the Contract Documents, the OWNER may withhold from payment to the CONTRACTOR for so long as reasonably necessary an amount necessary to cure the breach or default of the CONTRACTOR; or
 2. If the WORK or a portion of the WORK has been substantially completed, the OWNER may retain until completion up to twice the

GENERAL CONDITIONS

fair market value of the WORK of the CONTRACTOR that has not been completed:

- (a) in accordance with the Contract Documents; or
- (b) in the absence of applicable provisions in the Contract Documents to generally accepted craft standards.

- 3. If the OWNER refuses payment under subparagraphs (F)(i) or (ii), it shall describe in writing within 45 days of withholding such amounts what portion of the WORK was not completed according to the standards specified in the Contract Documents.

G. The CONTRACTOR shall distribute retention proceeds as outlined below:

- 1. Except as provided in Paragraph 14.03.G.2, below, if the CONTRACTOR receives retention proceeds, it shall pay each of its subcontractors from whom retention has been withheld each subcontractor's share of the retention received within ten days from the day that all or any portion of the retention proceeds is received from the OWNER.
- 2. Notwithstanding Paragraph 14.03.G.1, above, if a retention payment received by the CONTRACTOR is specifically designated for a particular subcontractor, payment of the retention shall be made to the designated subcontractor.

H. Except as otherwise provided in the Supplementary General Conditions, the value of materials stored at the site shall be valued at 95 percent of the value of the materials. This amount shall be based upon the value of all acceptable materials and equipment stored at the site or at another location agreed to in writing by the OWNER; provided, each individual item has a value of more than \$5,000 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the CONTRACTOR has received the materials and equipment free and clear of all liens, charges, security interests, and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER.

GENERAL CONDITIONS

14.04 CONTRACTOR'S WARRANTY OF TITLE

- A. The CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of final payment free and clear of all liens.

14.05 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

- A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the later case, the CONTRACTOR may make the necessary corrections and resubmit the Application. Thirty days after presentation of the Application for Payment with the ENGINEER's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.05B) become due and when due will be paid by the OWNER to the CONTRACTOR.
- B. The OWNER may refuse to make payment of the full amount recommended by the ENGINEER to compensate for claims made by the OWNER on account of the CONTRACTOR's performance of the WORK or other items entitling the OWNER to a credit against the amount recommended, but the OWNER must give the CONTRACTOR written notice within 7 days (with a copy to the ENGINEER) stating the reasons for such action.

14.06 PARTIAL UTILIZATION

- A. The OWNER may utilize or place into service any item of equipment or other usable portion of the WORK at any time prior to completion of the WORK. The OWNER shall notify the CONTRACTOR in writing of its intent to exercise this right. The notice will identify the equipment or specific portion or portions of the WORK to be utilized or otherwise placed into service.
- B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all items or portions of the WORK to be partially utilized shall be borne by the CONTRACTOR. Upon the issuance of a notice of partial utilization, the ENGINEER will deliver to the OWNER and the CONTRACTOR a written recommendation as to division of responsibilities between the OWNER and the CONTRACTOR with respect to security, operation, safety, maintenance,

GENERAL CONDITIONS

heat, utilities and insurance. Upon the OWNER's acceptance of these recommendations, the ENGINEER's aforesaid recommendation will be binding on the OWNER and the CONTRACTOR until final payment.

- C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER and the CONTRACTOR's one year correction period shall commence only after the date of Final Completion for the WORK.

14.07 LIQUIDATED DAMAGES

- A. The CONTRACTOR shall pay to the OWNER the amount specified in the Supplemental General Conditions, not as a penalty but as liquidated damages, if he fails to complete the WORK or specified parts of the WORK within the time or times agreed upon. The periods for which these damages shall be paid shall be the number of Days from the agreed date or Contract Time as contained in the Agreement, or from the date of termination of any extension of time approved by the OWNER, to the date or dates on which the ENGINEER certifies Substantial Completion of WORK or specified parts of the WORK as provided in Article 14.08, herein. The OWNER may deduct the amount of said damages from any monies due or to become due the CONTRACTOR. After Substantial Completion, if the CONTRACTOR fails to complete the remaining WORK within 45 days or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER the amount stated in the Supplemental General Conditions as liquidated damages for each day that expires after the 45 days until readiness for final payment.
- B. The said amount is fixed and agreed upon by and between the CONTRACTOR and the OWNER because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the OWNER would sustain; and said amount is agreed to be the amount of damages which the OWNER would sustain. Said damages are not in lieu of but in addition to other actual or consequential damages to which the OWNER may be entitled.
- C. All times specified in the Contract Documents are hereby declared to be of the essence.

14.08 SUBSTANTIAL COMPLETION

- A. When the CONTRACTOR considers the WORK ready for its intended use, and the CONTRACTOR has delivered to the ENGINEER all maintenance and operating instructions, schedules, guarantees, bonds, certificates of

GENERAL CONDITIONS

inspection, marked-up record documents and other documents, all as required by the Contract Documents, the CONTRACTOR may notify the OWNER and the ENGINEER in writing that the WORK is substantially complete and request that the ENGINEER prepare a Certificate of Substantial Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER does not consider the WORK substantially complete, the ENGINEER will notify the OWNER and CONTRACTOR in writing giving the reasons therefor. If the ENGINEER considers the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER for its execution the Certificate of Substantial Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of Substantial Completion.

- B. The Certificate of Substantial Completion shall be a release by the CONTRACTOR of the OWNER and its agents from all claims and liability to the CONTRACTOR for anything done or furnished for, or relating to, the WORK or for any act or neglect of the OWNER or of any person relating to or affecting the WORK, to the date of Substantial Completion, except demands against the OWNER for the remainder of the amounts kept or retained from progress payments and excepting pending, unresolved claims filed in writing prior to the date of Substantial Completion. At the time of delivery of the Certificate of Substantial Completion, the ENGINEER will deliver to the OWNER and the CONTRACTOR, if applicable, a written recommendation as to division of responsibilities between the OWNER and the CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities and insurance. Upon the OWNER's acceptance of these recommendations, the ENGINEER's recommendation will be binding on the OWNER and the CONTRACTOR until final payment.
- C. The OWNER, upon written notice to the CONTRACTOR, shall have the right to exclude the CONTRACTOR from the WORK after the date of Substantial Completion, and complete all or portions of the WORK at the CONTRACTOR's expense.

GENERAL CONDITIONS

14.09 COMPLETION AND FINAL PAYMENT

- A. Upon written certification from the CONTRACTOR that the WORK is complete (if a Certificate of Substantial Completion has been issued this certification must occur within 45 days of that date), the ENGINEER will make a final inspection with the OWNER and the CONTRACTOR. If the OWNER and ENGINEER do not consider the WORK complete, the ENGINEER will notify the OWNER and the CONTRACTOR in writing of all particulars in which this inspection reveals that the WORK is incomplete or defective. The CONTRACTOR shall immediately take the measures necessary to remedy these deficiencies. If the ENGINEER and OWNER consider the WORK complete, the CONTRACTOR may proceed to file its application for final payment pursuant to this Article. At the request of the CONTRACTOR, the ENGINEER may recommend to the OWNER that certain minor deficiencies in the WORK that do not prevent the entire WORK from being used by the OWNER for its intended use, and the completion of which will be unavoidably delayed due to no fault of the CONTRACTOR, be exempted from being completed prerequisite to final payment. These outstanding items of pickup work, or "punch list items", shall be listed on the ENGINEER's Notice of Completion, together with the recommended time limits for their completion, and extended warranty requirements for those items and the value of such items.
- B. After the issuance of the Notice of Completion and after the CONTRACTOR has completed corrections that have not been exempted to the satisfaction of the ENGINEER and delivered to the ENGINEER all required additions and modifications to maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, marked-up record documents and other documents, all as required by the Contract Documents; and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final application for payment shall be accompanied by all documentation called for in the Contract Documents and other data and schedules as the OWNER or ENGINEER may reasonably require, including an affidavit of the CONTRACTOR that all labor, services, material, equipment and other indebtedness connected with the WORK for which the OWNER or his property might in any way be responsible, have been paid or otherwise satisfied, and a consent of the payment bond surety to final payment, all in forms approved by the OWNER.

GENERAL CONDITIONS

14.10 FINAL APPLICATION FOR PAYMENT

- A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final application for payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR has fulfilled all of his obligations under the Contract Documents, the ENGINEER will, within ten days after receipt of the final application for payment, indicate in writing his recommendation of payment and present the application to the OWNER for payment. Thereupon, the ENGINEER will give written notice to the OWNER and the CONTRACTOR that the WORK is acceptable by executing the ENGINEER's Notice of Completion. Otherwise, the ENGINEER will return the application to the CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case the CONTRACTOR shall make the necessary corrections and resubmit the application.
- B. Within 45 calendar days after the ENGINEER's filing of the Notice of Completion, the OWNER will make final payment including all deducted retainage (except as noted below) to the CONTRACTOR. The OWNER's remittance of final payment shall be the OWNER's acceptance of the WORK if formal acceptance of the WORK is not indicated otherwise. The final payment shall be that amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract, including the following items:
 - 1. Liquidated damages, as applicable.
 - 2. All amounts retained by the OWNER under Paragraph 14.03(F).

14.11 CONTRACTOR'S CONTINUING OBLIGATIONS

- A. The CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the ENGINEER, nor the issuance of a Certificate of Substantial Completion or Notice of Completion, nor payment by the OWNER to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by the OWNER, nor any act of acceptance by the OWNER nor any failure to do so, nor any review of a shop drawing or sample submittal, will constitute an acceptance of work or materials not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

GENERAL CONDITIONS

14.12 FINAL PAYMENT TERMINATES LIABILITY OF OWNER

- A. Final payment is defined as the last progress payment made to the CONTRACTOR for earned funds, less deductions listed in Paragraph 14.10B herein. The acceptance by the CONTRACTOR of the final payment referred to in Paragraph 14.10 herein, shall be a release of the OWNER and its agents from all claims of liability to the CONTRACTOR for anything done or furnished for, or relating to, the work or for any act or neglect of the OWNER or of any person relating to or affecting the work, except demands against the OWNER for the remainder, if any, of the amounts kept or retained under the provisions of Paragraph 14.10 herein; and excepting pending, unresolved claims filed prior to the date of the Certificate of Substantial Completion.

GENERAL CONDITIONS

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 SUSPENSION OF WORK BY OWNER

- A. The OWNER acting through the ENGINEER may, by written notice to the Contractor, temporarily suspend the WORK, in whole or in part, for a period or periods of time, but not to exceed 90 days, for the convenience and benefit of the OWNER upon the occurrence of any one or more of the following: (1) unsuitable weather; (2) delay in delivery of OWNER- furnished equipment or materials, or such other conditions as are considered unfavorable for prosecution of the work; (3) Shortfall in construction funds; (4) Constraints imposed by public entities, public utilities, property owners or legal proceedings; (5) Failure or delay in acquisition of easements or right-of-way by the OWNER; or (6) Other conditions which, in the opinion of the OWNER, warrant a delay in the WORK. Suspended WORK shall be resumed by the CONTRACTOR within 10 calendar days of receipt from the ENGINEER of written notice to proceed. Whenever the OWNER temporarily suspends work for any conditions enumerated in this Article 15.01 A, the CONTRACTOR shall be entitled to an adjustment in the Contract Time as specified in Article 12.03 C.
- B. The suspension of work shall be effective upon receipt by the Contractor of the written order suspending the work and shall be terminated upon receipt by the Contractor of the written order terminating the suspension.
- C. The CONTRACTOR hereby indemnifies and holds harmless the OWNER and ENGINEER, their officers, agents and employees, from and against all claims, damages, losses and expenses, including lost profits and attorney's fees, arising out of or resulting from the temporary suspension of the WORK, whether for the OWNER's convenience described in this Article or for whatever other reasons, including the stoppage of work by the ENGINEER for the CONTRACTOR's failure to comply with any order issued by the ENGINEER.

15.02 TERMINATION OF AGREEMENT BY OWNER (CONTRACTOR DEFAULT)

- A. In the event of default by the CONTRACTOR, the OWNER may give written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement. The notice shall state the event of default and the time allowed to remedy the default. It shall be considered a default by the CONTRACTOR whenever the CONTRACTOR shall: (1) declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors; (2) fail to provide materials or workmanship meeting the requirements of the Contract Documents; (3) disregard or violate provisions of the Contract Documents or ENGINEER's

GENERAL CONDITIONS

instructions, (4) fail to prosecute the WORK according to the approved progress schedule; or, (5) fail to provide a qualified superintendent, competent workmen, or materials or equipment meeting the requirements of the Contract Documents. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue a Notice of Termination.

- B. In the event the Agreement is terminated in accordance with Paragraph 15.02A, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK shall be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall have no claim to the difference.

15.03 TERMINATION OF AGREEMENT BY OWNER (FOR CONVENIENCE)

- A. The OWNER may terminate the Agreement at any time if it is found that reasons beyond the control of either the OWNER or CONTRACTOR make it impossible or against the OWNER's interests to complete the WORK. In such a case, the CONTRACTOR shall have no claims against the OWNER except: (1) for the value of the work, as determined by the engineer, performed by the Contractor up to the date the Agreement is terminated; and, (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated, which would be needed in the WORK and which meet the requirements of the Contract Documents. The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined by the ENGINEER in accordance with the procedure prescribed from making the final application for payment and final payment under Paragraphs 14.09 and 14.10.

15.04 TERMINATION OF AGREEMENT BY CONTRACTOR

- A. The CONTRACTOR may terminate the Agreement upon 10 days written notice to the OWNER, whenever: (1) the WORK has been suspended under the provisions of Paragraph 15.01, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the agreement has not been received from the OWNER within this time period; or, (2) the OWNER should fail to pay the

GENERAL CONDITIONS

CONTRACTOR any monies due him in accordance with the terms or the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefor, unless within said 10-day period the OWNER shall have remedied the condition upon which the payment delay was based. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.03, and as determined in Accordance with the requirements of that paragraph.

GENERAL CONDITIONS

ARTICLE 16 - MISCELLANEOUS

16.01 GIVING NOTICE

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

16.02 TITLE TO MATERIALS FOUND ON THE WORK

- A. The OWNER reserves the right to retain title to all soils, stone, sand, gravel, and other materials developed and obtained from excavations and other operations connected with the WORK. Unless otherwise specified in the Contract Documents, neither the CONTRACTOR nor any subcontractor shall have any right, title, or interest in or to any such materials. The CONTRACTOR will be permitted to use in the WORK, without charge, any such materials which meet the requirements of the Contract Documents.

16.03 RIGHT TO AUDIT

- A. If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon subcontractors. The right to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.

16.04 ASBESTOS

- A. If the CONTRACTOR during the course of work observes the existence of asbestos in any structure or building, the CONTRACTOR shall promptly notify the OWNER and the ENGINEER. The OWNER shall consult with the ENGINEER regarding removal or encapsulation of the asbestos material and the CONTRACTOR shall not perform any work pertinent to the asbestos material prior to receipt or special instruction from the OWNER through the ENGINEER.

SUPPLEMENTAL GENERAL CONDITIONS

ARTICLE 17- GENERAL

17.01 GENERAL

1. These Supplemental General Conditions amend or supplement the General Conditions of the Contract and any other provisions of the Contract Documents as indicated herein. All provisions which are not so amended or supplemented remain in full force and effect.
2. The terms used in these Supplemental General Conditions which are defined in the General Conditions of the Contract have the meanings assigned to them in the General Conditions of the Contract herein.

17.02 SUPPLEMENTAL DEFINITIONS

1. ENGINEER

The "Engineer" is

Jordan Valley Water Conservancy District
8215 South 1300 West
West Jordan, Utah 84088
801-565-4300

17.03 TESTING COSTS

1. Paragraph 13.03 of the General Conditions is amended as follows: the CONTRACTOR shall pay all testing costs. The Owner reserves the right to have additional tests performed by a testing organization selected by the OWNER and at the OWNER's expense.

SUPPLEMENTAL GENERAL CONDITIONS

ARTICLE 18 - AMOUNTS OF LIQUIDATED DAMAGES, BONDS AND INSURANCE

18.01 AMOUNT OF LIQUIDATED DAMAGES

- A. As provided in Article 14.07 of the General Conditions, the Contractor shall pay to the Owner as liquidated damages the amount of \$500 for each calendar day's delay beyond the Contract Time for substantial completion. The Contractor shall pay to the Owner as liquidated damages the amount of \$200 for each calendar day's delay beyond 45 calendar days from the date of substantial Completion until the Engineer issues the Notice of Final Completion.

18.02 PERFORMANCE AND OTHER BOND AMOUNTS

- A. The CONTRACTOR shall furnish a satisfactory Performance Bond in the amount of 100 percent of the Contract Price and a satisfactory Payment Bond in the amount of 100 percent of the Contract Price.

18.03 INSURANCE AMOUNTS

The limits of liability for the insurance required by Paragraph 5.02 of the General Conditions shall provide for not less than the following amounts or greater where required by Laws and Regulations:

- A. Workers' Compensation under Paragraph 5.02B.1 of the General Conditions:

1. State: Utah Statutory

- B. Comprehensive General Liability: (under Paragraph 5.02B.2 of the General Conditions):

1. Bodily Injury (including completed operations and products liability):

<u>\$ 500,000</u>	Each Occurrence
<u>\$ 1,000,000</u>	Annual Aggregate

Property Damage:

<u>\$ 500,000</u>	Each Occurrence
<u>\$ 1,000,000</u>	Annual Aggregate
or a combined single limit of	<u>\$1,000,000</u>

SUPPLEMENTAL GENERAL CONDITIONS

2. Property Damage liability insurance including, Explosion, Collapse and Underground coverages, where applicable.

3. Personal Injury, with employment exclusion deleted

\$ 1,000,000

Annual Aggregate

C. Comprehensive Automobile Liability: (Under Paragraph 5.02B.3 of the General Conditions:)

1. Bodily Injury

\$ 500,000

Each Person

\$ 1,000,000

Each Occurrence

2. Property Damage:

\$ 500,000

Each Occurrence

or combined single limit of

\$1,000,000

D. Builders Risk: Not required.

SUPPLEMENTAL GENERAL CONDITIONS

ARTICLE 19 - PHYSICAL CONDITIONS AND WEATHER DELAYS

19.01 INCLEMENT WEATHER DELAYS

- A. The Contractor's construction schedule shall be based upon the inclusion of at least five (5) day(s) of inclement weather delays. Reference Article 12, paragraph 12.02 of the General Conditions for additional requirements.

SUPPLEMENTAL GENERAL CONDITIONS

ARTICLE 20 - SUBCONTRACT LIMITATIONS

20.01 SUBCONTRACT LIMITATIONS

- A. In addition to the provisions of Paragraph 6.05 of the General Conditions, the CONTRACTOR shall perform not less than 20 percent of the WORK with its own forces (i.e., without subcontracting). The 20 percent requirement shall be understood to refer to the WORK, the value of which totals not less than 20 percent of the Contract Price.

ARTICLE 21 - MISCELLANEOUS

21.01 PATENTS AND COPYRIGHTS

The Contractor shall indemnify and save harmless the Owner, the Engineer, and their officers, agents, and employees, against all claims or liability arising from the use of any patented or copyrighted design, device, material, or process by the Contractor or any of his subcontractors in the performance of the work.

SPECIFICATIONS

DIVISION 1

GENERAL REQUIREMENTS

**SECTION 01 11 00
SUMMARY OF WORK**

PART 1 – GENERAL

1.1 GENERAL

- A. The Work to be performed under this Contract shall consist of furnishing all plant, tools, equipment, materials, supplies, and manufactured articles and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all Work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all Work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete, safe and proper construction of the Work in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of this Contract comprises work on the 7700 South 700 East Well. The CONTRACTOR is responsible for providing all the labor, materials, and equipment necessary to complete the project as specified. The location of the site as well as any drawings and associated details are given in FIGURES attached to these specifications. The work shall include, but not be limited to, the following:
1. Mobilization, demobilization, and site cleanup.
 2. Removal of the existing well motor, pump and accessories.
 3. Conducting a Video Camera Survey of the well prior to performing any downhole work. Anticipate performing a second video after the initial well brushing and bailing. A third video will be performed if requested by Owner.
 4. Performing well cleaning by brushing with a wire brush and bailing the well clean. Note: The well is a cable tool well and consists of mild steel blank casing with mills knife perforations. The well casing reduces with depth, starting with 20-inch diameter, 16-inch, and then 12-inch. The depths for the reduction in casing diameter shall be identified and recorded with the initial well video.
 5. Performing disinfection treatment on the well.
 6. Purchase and install a new well pump, column piping, shaft, transducer, and tubing.
 7. Recoating and reinstallation of the existing discharge head.
 8. Reconditioning and reinstalling the existing pump motor.
 9. Pump startup services.
 10. Restoring the well site to its original condition.
 11. Keeping a written daily record of work progress, crew present, and equipment and materials used. Furnishing logs, daily records, and other items as specified to the ENGINEER.
- B. In all stages of the project the CONTRACTOR shall record detailed notes and provide copies to the ENGINEER.
- C. The ENGINEER reserves the right to change materials and quantities specified in the following documents based on conditions encountered in the field. In addition, the ENGINEER reserves the right to discontinue the project if at any time the ENGINEER believes it is in the OWNER's best

interest to discontinue. In such a case, the CONTRACTOR shall be paid at the prices bid for the actual work accomplished.

- D. The Work of this Contract comprises providing all labor, materials, tools and equipment necessary to re-equip the 7700 South 700 East. Well with a new pump, column piping, shafting, well transducer, sounder tubing (1.25" SCH 80), recoating of the discharge head, complete, as described in the project specifications. All SCADA programming will be performed by others. All electrical related work must be coordinated with the District. The pump must be fully operational upon completion of the project.

1.3 DEFINITIONS

- A. Standby time shall be paid for any portion of a normal workday when the ENGINEER's representative orders work to cease or when other activities at the site dictate shutdown as approved by the ENGINEER's representative.
- B. Downtime shall mean that time, other than standby time, during which work could occur but does not or when machinery is broken down, materials or equipment are not available, or the CONTRACTOR elects not to develop. All downtime shall be at the sole expense of the CONTRACTOR.

1.4 GENERAL

- A. See attached Specifications which contain information and requirements that apply to the work specified herein and are mandatory for this project.

1.5 SUBMITTALS DURING CONSTRUCTION

- A. The CONTRACTOR shall provide three copies of submittals during construction to the ENGINEER.
- B. Specific submittal items are specified within individual sections of these Specifications.

1.6 NOTIFICATION TO THE ENGINEER

- A. The CONTRACTOR shall be responsible for giving the ENGINEER advance notice prior to performance of specific work items as specified within individual sections of these Specifications.

1.7 SPECIALISTS AND CONTRACTORS

- A. Portions of the work require operations that are commonly performed by specialists and subcontractors. Well development contractor (driller), pump installer, video logging and testing firms, and all others employed in developing the wells shall meet the licensing requirements of the State of Utah and shall be approved by the ENGINEER.

1.8 STANDARDS, SPECIFICATIONS, AND CODES

- A. The well shall be constructed in conformance with the State of Utah Administrative Rules of Water Well Drillers administered through the Utah Division of Water Rights as described in the Utah Administrative Code R655 (most recent version) and the State of Utah Rules for Public Drinking Water Systems, Design and Construction Standards for Systems administered by the Utah Division

of Drinking Water as described in the Utah Administrative Code R309 (most recent version). The requirements of Salt Lake County and Sandy City where the well is located shall also be observed in rehabilitation of the wells. The CONTRACTOR shall be responsible for filing the necessary permits and well logs required by the state.

1.9 SITE PROTECTION

- A. Throughout the period of construction, the CONTRACTOR shall keep the work site free and clean of all rubbish and debris. Protective barriers and other safety protection necessary to protect the public and workers shall be provided by the CONTRACTOR. The CONTRACTOR shall protect all existing fences, walls, buildings, trees, surface water bodies, wetlands, riparian areas, and landscape during the progress of work. In the event of damage to such property, the CONTRACTOR shall, at his own expense, immediately restore the property to a condition equal to its original condition and to the satisfaction of the ENGINEER. This provision includes damage to surface and subsurface utilities. After completion of the work, the CONTRACTOR shall remove from the premises and work areas all materials, tools, debris, and drill cuttings from the drilling and pump installation operations. At the completion of the well, the site shall be cleared of all materials and left in a condition acceptable to the ENGINEER.

1.10 CONTAMINATION

- A. The CONTRACTOR shall at all times perform his operation in such a manner as to prevent the introduction of contaminants into the well. Tools, casings, pumps, and other elements shall be kept clean and disinfected prior to insertion into the well. Water supply and drilling fluids shall be protected from contamination. The ENGINEER will require the materials and equipment to be cleaned and disinfected if, in the ENGINEER's sole opinion, the operation is introducing contaminants into the well.

1.11 DISPOSAL OF MATERIAL

- A. The CONTRACTOR shall be responsible for disposing all materials generated during well disinfection, development and well testing. The materials generated from these activities and any associated activities shall be disposed of as specified in Section 02094 – DRILLING FLUIDS, CUTTINGS, AND PUMPED WATER DISPOSAL.

1.12 EQUIPMENT AND PERSONNEL

- A. The ENGINEER must approve mobilization of any equipment or personnel under this Contract.

1.13 WELL SITE

- A. Equipment shall be set up within the areas designated by the ENGINEER. Upon completion and acceptance of the work, all equipment, unused materials, temporary facilities, and other miscellaneous items resulting from or used in the operations shall be removed. Each of the sites shall be restored to its original condition prior to construction of this project.
- B. If additional space is required for temporary storage of materials and equipment within the limits of the site, the CONTRACTOR shall make his own arrangements to obtain the areas. All stored materials and equipment shall be removed from the site as part of demobilization upon completion of this Contract.

PART 2 – PRODUCTS

2.1 GENERAL

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers will be considered by the ENGINEER. Approval of other products is at the sole discretion of the ENGINEER.

PART 3 – EXECUTION

3.1 GENERAL

- A. Equipment: All equipment shall be of the proper type and shall be in good condition to assure that the work can proceed without interruption and that development equipment, including collars and/or couplings, shall be of sufficient size, strength, and design to allow disinfection treatment and developing of the well to a depth of 1,500 feet or greater.

END OF SECTION

SECTION 01 20 00
MEASUREMENT AND PAYMENT

1.1 DESCRIPTION

- A. This Section defines the manner in which the Lump Sum Prices, Unit Prices, and the Allowances listed in the Bid Schedule will be used to determine measurement and payment for all Work and describes the required procedures for monthly progress payments to the Contractor.
- B. Bid amounts will include all equipment, tools materials, labor, service, and all other items required to complete the Work included in the Agreement unless specifically excluded by this section. Work required for which no separate Bid item is identified will be considered as a subsidiary obligation of the Contractor, and the cost therefore shall be included in the most applicable Bid item. Compensation for partial completion of the Work will be determined by use of the Construction Schedule. Adjustments to Allowance Bid Item amounts will be applied to the Contract Price when Work is completed, and actual Allowance item amounts are known.
- C. Payment for all items in the Bid Schedule will include full compensation for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of Work being described, as necessary to complete the various items of the Work in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including but not limited to all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Utah Division of Industrial Safety and the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA).
- D. All costs shall be included in the prices named in the Bid Schedule for the various items of Work. Except as otherwise provided herein, no separate payment will be made for any item that is not specifically set forth in the Bid Schedule.
- E. All estimated quantities stipulated in the Bid or other Contract Documents are approximate and are to be used only as a basis for estimating the probable cost of the Work and for the purpose of comparing the Bids submitted for the Work. The actual amounts of Work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts thereof.
- F. The unit or lump sum item of work, which involves excavation or trenching shall include all costs for such work. No direct payment will be made for excavation or trenching. All excavation and trenching will be unclassified as to materials which may be encountered; in addition, trenches will be unclassified as to depth. No additional payment will be made for rock or caliche excavation, nor for blasting which the Contractor determines is required for rock or caliche excavations.

- G. Monthly pay requests are due on the 30th of each month, and while pay requests will be accepted prior to this date, pay request processing will not begin until this date for purposes of meeting the Owner's pay request processing obligations. Failure to submit a pay request by this day may be cause for the rejection of the pay request. If rejected, Contractor may have to resubmit the pay request the next month. Should the submittal date fall on a holiday or weekend day during the month, then consider the next working day as the due date.
- H. Note that the information provided in this Section is intended for use as a general description of the breakdown of work to be included in the Bid Schedule. The following descriptions are NOT intended to represent a complete listing of all Work required by the Contract Documents. It is the Bidder's responsibility to make sure that costs for all Work required in the plans and specifications is accounted for in the appropriate Bid Items, whether or not specifically described in this Measurement and Payment section. The Owner is not responsible for Contractor's failure to properly coordinate with Subcontractors and Suppliers regarding the breakdown of Work in these Contract Documents.

1.2 MEASUREMENT AND PAYMENT

- A. Measurement and calculation of quantities for payment to be as indicated in this section.
- B. Unit prices or lump sum amounts shall include full compensation for furnishing all labor, materials, products, tools, equipment, transportation, services, and incidentals; demolition, erection, application, or installation of an item of the Work; overhead and profit and doing all work shown on the Drawings, defined in the Specifications and/or stipulated therein.
- C. Payment covers the cost of incidental work which includes: Quality assurance and quality control program; progress schedule; safety procedure plan; coordination with power company where in close proximity to overhead power lines; all provisions required to provide and maintain full and continuous access to all properties affected by construction operations; submittal processing; replacement and restoration of items damaged by the CONTRACTOR's operations; removal and replacement of landscape materials and irrigation systems equal to or better than existing if disturbed by the CONTRACTOR's operations; and all other necessary work, to complete the work in place.
- D. Bid Schedule: Measurement and payment to be as follows:
 - 1. **Bid Item A1 – Mobilization/Demobilization/Cleanup**
 - a. Measurement for Mobilization and Demobilization will be made on a lump sum basis. For purposes of payment, mobilization shall be 75 percent of the bid price for this item. Mobilization to include all equipment and materials necessary to complete the work including, but not limited to, drill equipment, development equipment, logging, and pump test equipment.
 - b. Payment Covers: Cost of mobilization; demobilization, including final site cleanup; obtaining any additional permits not already obtained by the OWNER. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
 - c. For purposes of payment, Mobilization and Demobilization shall be paid for on a percent complete basis. The lump sum bid price for this bid item shall not

exceed 15 percent of the total bid price.

2. **Bid Item A2 – Remove Existing Pump Equipment**
 - a. Measurement: Measured and paid for on a lump sum basis.
 - b. Payment Covers: Cost to remove existing pump equipment from well. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
3. **Bid Item A3 – Video Camera Survey**
 - a. Measurement: Measured and paid for on a cost per video basis.
 - b. Payment Covers: Cost to video camera survey the existing well. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
4. **Bid Item A4 – Mineral Oil Removal & Disposal**
 - a. Measurement: Measured and paid for on a cost per gallon basis of mineral oil.
 - b. Payment Covers: Costs associated with all labor, materials, supplies, tools, and equipment required to pump off the existing mineral oil from within the well casing and to decant and containerize the recovered mineral oil. Also includes cost of managing and disposing of the mineral oil recovered with the work. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
5. **Bid Item A5 – Well Cleaning (Brush and Bail)**
 - a. Measurement: Measured and paid for on a cost per hour basis.
 - b. Payment Covers: Costs associated with all labor, materials, supplies, tools, and equipment required to brush the existing well casing and bail accumulated sediment as required by Specifications. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
6. **Bid Item A6 – Bailing Sediment/Sludge Disposal**
 - a. Measurement: Measured and paid for on a cost per cubic yard basis.
 - b. Payment Covers: Costs associated with all labor, materials, supplies, tools, and equipment required to containerize sediment/sludge produced during the project from the well. Also includes cost of managing and disposing of the sediments associated with the work. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
7. **Bid Item A7 – Motor Reconditioning**
 - a. Measurement: Measured and paid for on a lump sum basis.
 - b. Payment Covers: Cost associated with all labor, materials, supplies, tools, and equipment required for the motor reconditioning as required by Specifications. This pay item shall constitute full compensation for all labor, equipment, tools, supplies, and materials required to complete this portion of the Work for this construction project.
8. **Bid Item A8 – Vertical Turbine Pump, Complete**
 - a. Payment covers the cost to purchase and install all the pumping and limited electrical equipment inside the building. Installation and materials shall be of the size and type indicated on the Contract Documents.

- b. Measured as a lump sum item.
- c. Payment covers the cost of furnishing and installing the complete pumping system as identified on the Contract Documents and all costs associated with supplying and installing items that includes, but not limited to: vertical turbine pump; PVC sounder tubes; pump column piping; shafting; coatings and linings; well level transducer; reinstallation of the existing pump motor; prepping and coating of the existing discharge head and the installation of the discharge head; connection of all electrical and transducer to existing system for a completed pumping system; welding of the sole plate to the well casing; startup services; restoration of all utilities damaged as a result of operations; and all other work required to complete the installation of the new pump including testing, cleaning, disinfection of pumping equipment and well, and commissioning of the pump.

1.3 GENERAL PROGRESS PAYMENT REQUIREMENTS

- A. A Payment for Work performed shall be in accordance with installed quantities as assessed in comparison to the Schedule of Values and the Construction Schedule. The Engineer will verify measurements and quantities. Each activity necessary to manage and complete the Work is identified on the Contract schedules. Each activity will be assigned its respective value, a portion of the Contract Price, as shown on the Schedule of Values, and detailed cost loaded activity schedule.
- B. Payment for all lump sum costs and services incurred on this Agreement shall be based on the earned value of Work accomplished during the reporting period. Earned value is determined by the completion percentage of each activity as determined by the Schedule of Values and the Construction Schedule applied to the total value of the activity. No construction activity shall be deemed 100 percent complete until the Contractor has completed the physical check out and inspection of the completed Work and has submitted the signed inspection form to the Engineer.
- C. Earned value is derived from the current status of the Contractor Construction Schedule as determined by the monthly schedule status submittals. Each schedule status submittal is reviewed and approved by the Engineer prior to the Contractor obtaining approval for the Summary of Earned Values or quantities installed and the Application for Payment.

1.4 APPLICATION FOR PAYMENT

- A. Submit application for payment on the Owner's form and be certified by signature of an Authorized Officer of the Contractor.
- B. The Application for Payment shall contain all necessary references and attachments that substantiate the invoice for progress payment (e.g., certified payrolls, labor reports, progress schedule data, and Summary of Earned Values). It shall substantiate the invoice for progress payment and shall be preceded or accompanied by the schedule and status data as a condition of payment, in accordance with the Construction Schedule and the Schedule of Values.

1.5 REVIEWS/APPLICATION FOR PAYMENT

- A. Review meetings between the Contractor and the Engineer will be held weekly and within 7 Days prior to the payment application date designated by the Engineer. Three Days prior to the last review meeting of the month, submit an updated schedule and a signed application for payment showing a Summary of Earned Values for the reporting and payment period so that the Engineer can compare earned values to available status data. Make any adjustments to the Master Record Documents, updated schedule, and payment applications required by the Engineer. Upon completion of the adjustments, the Engineer will sign the payment request and forward it to the Owner. The Engineer will determine payment amounts if agreement with the Contractor is not reached.

1.6 PAYMENT FOR SUPPLIES AND MATERIALS

- A. Payment based on the actual cost of supplies, materials and equipment on hand shall be made by the Owner with or without a paid invoice. "Actual cost" of materials shall be the invoice amount, whether paid or not, and shall not include any costs associated with installation, testing, etc. The Contractor shall be entitled to payment of the actual cost of supplies, materials and equipment only if it (1) presents an invoice to the Owner with the application for payment and (2) states in the application for payment that the materials have been delivered and stored in the time and manner specified in the contract between the Contractor and his Supplier or Subcontractor. If Contractor fails to comply with those conditions, the Owner may withhold payment in accordance with the provisions. The Owner expressly reserves the right to withhold retention until Contractor presents to the Owner a paid invoice, or some other proof of payment satisfactory to the Owner, for the Owner's use in verifying the accuracy of the actual cost of the supplies, materials or equipment. If the amount paid does not match the actual cost, the Owner will adjust the amount of retention accordingly. Payment for supplies, materials or equipment on hand does not alter the responsibility of the Contractor for all supplies, materials and equipment until Final Acceptance of the Work.

END OF SECTION

SECTION 01 25 10
PRODUCTS, MATERIALS, EQUIPMENT AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 DEFINITIONS

- A. The word "Products," as used herein, is defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for the Project or taken from stock of previously purchased products.
- B. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work.
- C. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items).
- D. Definitions in this Article are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," "special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- E. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the Work.

1.2 QUALITY ASSURANCE

- A. Source Limitations: To the greatest extent possible for each unit of work, provide products, materials, and equipment of a singular generic kind from a single source.
- B. Compatibility of Options: Where more than one choice is available as options for selection of a product, material, or equipment, select an option, which is compatible with other products, materials, or equipment. Compatibility is a basic general requirement of product, material and equipment selections.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance
 - 1. Deliver and store products, materials, and equipment in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft.
 - 2. Manage delivery schedules to minimize long-term storage of products at Site and overcrowding of construction spaces. In particular, ensure coordination to minimize holding or storage times for flammable, hazardous, easily damaged, or sensitive materials to deterioration, theft, and other sources of loss.

B. Transportation and Handling

1. Transport products by methods to avoid damage. Deliver in undamaged condition in manufacturer's unopened containers and packaging.
2. Furnish equipment and personnel to handle products, materials, and equipment, including those provided by Owner, by methods to prevent soiling and damage.
3. Provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

C. Storage and Protection

1. Products shall be stored in accordance with manufacturer's written instructions and with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature and humidity ranges shall be maintained within tolerances required by manufacturer's recommendations.
2. For exterior storage of fabricated products, products shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering and ventilation shall be provided to avoid condensation.
3. Loose granular materials shall be stored on solid flat surfaces in a well-drained area and shall be prevented from mixing with foreign matter.
4. Storage shall be arranged to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.
5. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.

D. Maintenance of Storage

1. Periodically inspect stored products on a scheduled basis. Maintain a log of inspections and make the log available on request.
2. Comply with manufacturer's product storage requirements and recommendations.
3. Maintain manufacturer-required environmental conditions continually.
4. Ensure that surfaces of products exposed to the elements are not adversely affected and that weathering of finishes does not occur.
5. For mechanical and electrical equipment, provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.
6. Service products on a regularly scheduled basis. Maintain a log of services and submit as a record document prior to acceptance by Owner in accordance with the Contract Documents.

1.4 PROPOSED SUBSTITUTIONS AND "OR EQUAL" ITEMS

A. Substitution and "or equal" determination shall be submitted and evaluated per the General Conditions included in the Contract Documents.

B. Whenever products, materials, or equipment are indicated in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the manufacturer is intended to establish the type, function, and quality required. The Contract Price is understood to be based upon furnishing the item specified.

C. If a named item is not available or a particular supplier is no longer doing business, the following shall apply:

1. In the event that a named supplier is no longer doing business under the name indicated, furnish the specified product from the legal successors to the named supplier.
 2. In the event that a named product is no longer available from the named supplier due to acquisition or sale of the given product line, but the product is available from another supplier, provide the named product. In such cases, submit a substitution request form and include certification from the supplier that the product being supplied is materially and functionally identical to the product named in the Contract Documents.
 3. In the event that the named product is no longer available from the named supplier or any other supplier, notify Owner in writing and Owner will direct Engineer to identify suitable substitute products. Provide one of the suitable substitute products.
- D. The procedure for review by the Engineer will include the following:
1. Wherever a proposed substitution has not been submitted within said 35-day period, or wherever the submission of a proposed substitution material or equipment has been judged to be unacceptable by Engineer, provide the product, material, or equipment indicated in the Contract Documents.
 2. Certify that the proposed substitution will adequately perform the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as that indicated.
 3. Engineer will evaluate each proposed substitution within a reasonable period of time.
- E. Without any increase in cost to Owner, be responsible for, and pay all costs in connection with proposed substitutions and costs of inspections and testing of equipment or materials submitted for review prior to purchase thereof for incorporation in the Work, whether or not Engineer accepts the proposed product, equipment, or material. Reimburse Owner for the charges of Engineer and other authorized representatives for evaluating each proposed substitution.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 73
SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 GENERAL

- A. This Section defines the process whereby the Schedule of Values shall be developed and incorporated into the Construction Progress Schedule as specified in Section 01 32 16 – Construction Progress Schedule. Monthly progress payment amounts shall be determined from the weekly progress updates of the scheduled activities. The schedule of values shall, as a minimum, list the value of every activity on the schedule, and shall include such additional breakdowns as required herein. The values in the Schedule of Values do not establish a commitment by either Contractor or Owner when negotiating changes to the Contract Documents.

1.2 DETAILED SCHEDULE OF VALUES

- A. Prepare and submit a detailed Schedule of Values to Engineer as part of the Construction Progress Schedule submittal. Because the ultimate requirement is to develop a detailed Schedule of Values sufficient to determine appropriate monthly progress payment amounts, sufficient detailed breakdown shall be provided to meet this requirement. The Schedule of Values shall have a one-to-one relationship to the work activities of the Construction Progress Schedule even though additional detailed breakdowns for the Schedule of Values may be required. Engineer will be the sole judge of acceptable breakdowns, details, and descriptions of the values established. If, in the opinion of Engineer, a greater number of Schedule of Values items than proposed is necessary, add the additional items so identified.
- B. After submittal of the Schedule of Values, as part of the Construction Progress Schedule submittal, meet with Engineer and jointly review the schedules. Review the value allocations and extent of detail to determine any necessary adjustments to the values and to determine if sufficient detail has been proposed. Make adjustments deemed necessary to the value allocation or level of detail and submit a revised detailed Schedule of Values within 5 work days from receipt of comments from Engineer.

1.3 CHANGES TO SCHEDULE OF VALUES

- A. Assign values, approved by Engineer, for changes to the Construction Schedule which add activities not included in the original Construction Schedule but are included in the original Work (schedule omissions). Reduce other activity values to provide equal value adjustment increases for added activities as approved by Engineer.
- B. In the event that Contractor and Engineer agree to make adjustments to the original Schedule of Values because of inequities discovered in the original accepted detailed Schedule of Values, increases and equal decreases to values for activities may be made. Engineer may direct changes to the schedule when inequities are discovered and agreement on the reallocation cannot be achieved.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 30 SAFETY

PART 1 - GENERAL

1.1 SUMMARY

- A. Contractor's safety program shall conform to the requirements specified in the General Conditions and Supplementary Conditions.

1.2 DEFINITIONS

- A. For the purposes of this Section, an "active construction area" is any area where construction activities are occurring or construction activities could be considered a potential hazard to people.
- B. A "Designated Safety Officer" or "Safety Representative" for the purposes of this Contract, means anyone who is capable of identifying the existing and predictable hazards in the areas surrounding a construction project or those working conditions at a construction project that are unsanitary or dangerous to employees. A "Designated Safety Officer" has the authority to make prompt corrective measures to eliminate those hazards.

1.3 SUBMITTALS

- A. Demonstrate compliance action with the stipulations of Occupational Safety and Health Administration (OSHA), Mine Safety and Health Administration (MSHA), and other applicable local, state, and federal safety requirements by submitting to Engineer a copy of all safety plans, programs, and permits. Such plans and programs shall include, but are not limited to:
 - 1. Hazard Analysis Prior to Major Activities (job safety analysis, JSA).
 - 2. Emergency Plan.
 - 3. Rigging and Hoisting Plans.
 - 4. Excavation and Trenching Plans.
 - 5. Respiratory Protection Program.
 - 6. Fire Protection Plan.
 - 7. Confined Space Entry Program.
 - 8. Explosives Handling and Storage.
 - 9. Confined Space Entry Program.
 - 10. Electrical Safety (drop cords, temporary power, GFCI's, etc.)
 - 11. Lock Out/Tag Out.
 - 12. Fall Protection.
 - 13. Heavy Equipment Operations.
 - 14. Burning and Welding Operations.
 - 15. Training Plan.
 - 16. Tunneling/Underground/Jacking/Boring Operations.
 - 17. Project Site Rules and Regulations (hazard protection plan).
 - 18. Material Handling (storage-disposal).
 - 19. Fuel Storage and Refueling.
 - 20. Hazard Communication/Right to Know.

21. Subcontractor Requirements.
 22. Ventilation.
 23. Personal Protective Equipment (hearing, eye, face).
 24. Power Transmission/Distribution (temporary and/or permanent).
 25. Traffic Control.
 26. Environmental Controls.
 27. Safety Meetings.
 28. Spill Control Plan.
 29. First Aid Facilities.
- B. Engineer's receipt of safety plans or programs will not relieve Contractor in any way from the full and complete responsibility for safety and training of its personnel, and the onsite personnel of Owner, Engineer, and other visitors to areas of active construction areas. On a daily basis, inform Engineer of changes to the boundaries of the active construction areas.
- C. Be responsible for safety training all personnel who will have access to the active construction areas to meet state, federal, local and Contractor requirements. Maintain reasonable, regularly scheduled training sessions in mutually accessible facilities through entire Contract. Training costs for all personnel and visitors, except those costs associated with training personnel of Contractor, subcontractors, suppliers, and visitors will be considered incidental to other lump-sum portions of the Work and no additional compensation for such training will be provided.
- D. Safety Program Requirements:
1. Safety Representative Requirements:
 - a. Assign a full-time Safety Representative as defined in the General Conditions of the Contract.
 - b. The Safety Representative's duties and responsibilities will be hazard recognition, accidents prevention, new employee orientation (including subcontractors), and the maintaining and supervising of safety precautions and program. This person shall have no other duties. The Safety Representative or a qualified and approved deputy shall be onsite at all times while Work is ongoing.
 - c. Qualifications of the Safety Representative and assigned deputies shall be submitted to Engineer for review. Acceptance of their qualifications by Engineer is required prior to the start of any activity on the Project. The Safety Representative will, as a minimum, meet the requirements of regulations for the Occupational Safety & Health Enforcement Program.
 2. Hazardous Substances:
 - a. Provide Engineer with a list of all hazardous substances anticipated to be brought on-site.
 - b. Maintain on site Material Safety Data Sheets (MSDS) prior to arrival of any hazardous substances on the Project.
 - c. Use storage area(s) as outlined in the spill control plan.
 3. Job Safety Analysis (JSA):
 - a. Outline the sequence of the Work, equipment to be used, identify hazards that may exist or may be created and what procedures and/or safety equipment will be used to eliminate or reduce these hazards. A Scope of Work JSA shall

be prepared and provided to the Engineer prior to the start of unusual, hazardous, or have risk potential activities on the Project. The name of the competent person assigned to this activity will be included on the JSA.

- b. Complete a JSA for any activity, which may be of an unusual nature or involves unique hazards.

4. Reports

- a. Provide to Engineer copies of Contractor's and subcontractor's:
 - 1) First aid, recordable, lost time and near miss, monthly logs.
 - 2) OSHA 200 injury log (annually).
 - 3) Safety meeting reports and topics (weekly).
 - 4) List of competent persons as required by OSHA and the Project Health and Safety Manual for each required task and their qualification as such.
 - 5) Injury and accident reports will be submitted to Engineer within 24 hours of any incident. **Immediate** notification to Engineer of an accident is **required**. Full cooperation with Engineer in accident investigation is required.
- b. Conduct weekly safety inspections. Corrective actions shall be taken within 24 hours to address all deficiencies identified during inspections. Deficiency reports shall be prepared and submitted to Engineer within 48 hours indicating corrective actions taken. Failure to comply with required corrective measures identified in the safety inspection will result in the delayed signing of the monthly application for progress payment by Engineer.
- c. Provide Engineer with a report of any periodic audit of Contractor's safety performance and/or records.

END OF SECTION

SECTION 01 33 20
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. "Submittals" may be shop drawings, schedules, surveys, reports, samples, plans, lists, drawings, documents, findings, programs, manuals, data, or any other item or information required by the Contract Documents to be submitted in accomplishing the Work.
- B. Wherever submittals are required hereunder, all such documents shall be furnished to Engineer.
- C. Be responsible for the accuracy, completeness, and coordination of all submittals. Do not delegate this responsibility in whole or in part to any subcontractor. Submittals may be prepared by the Contractor, subcontractor, or supplier, but the Contractor shall ascertain that each submittal meets the requirements of the Contract and the Project. Ensure that there is no conflict with other submittals and notify Engineer in each case where a submittal may affect the work of another contractor or Owner. Ensure coordination of submittals of related crafts and subcontractors.
- D. Failure to make timely submittals in accordance with the requirements of the Specifications constitutes grounds for Owner to withhold 20 percent of compensation for the equipment to which the submittal is related, or, in the case of information lists, record drawings, investigation findings, safety plans, quality plans, and similar items, Owner may withhold 20 percent of the value of the information in the submittal.

1.2 RELATED SECTIONS

- A. Section 01 11 00 - Summary of Work
- B. Section 01 25 10 – Products, Materials, Equipment and Substitutions
- C. Section 01 29 73 – Schedule of Values
- D. Section 01 31 30 – Safety
- E. Section 01 32 16 – Construction Progress Schedule
- F. Section 01 71 30 – Site Conditions Surveys
- G. Section 01 77 00 – Project Closeout
- H. Section 01 78 39 – Project Record Documents

1.3 PRECONSTRUCTION CONFERENCE SUBMITTALS

- A. At the preconstruction conference referred to in Section 01 11 00 - Summary of Work, submit the following items for review:

1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitute ("Or-Equal") submittals listed in the Bid.
2. A list of all permits and licenses to be obtained, indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.
3. A preliminary Schedule of Values in accordance with Section 01 29 73 – Schedule of Values.
4. A preliminary Construction Project Schedule in accordance with requirements of Section 01 32 16 – Construction Progress Schedule.
5. The names and qualifications of the Designated Safety Representative and Designated Competent Persons.

1.4 SITE CONDITIONS SURVEYS

- A. Submit the site conditions survey data as required in Section 01 71 30 – Site Conditions Surveys.

1.5 PROGRESS REPORTS

- A. Furnish a progress report to Engineer with each Application for Payment. If the Work falls behind schedule, submit additional progress reports at such intervals as Engineer may request.
- B. Each progress report shall include sufficient narrative to describe any current and anticipated delaying factors, effect on the construction schedule, and proposed corrective actions. Any Work reported complete, but which is not readily apparent to Engineer, must be substantiated with satisfactory evidence.
- C. In each progress report, include a list of the activities completed with their actual start and completion dates, a list of the activities currently in progress, and the number of working days required to complete each.

1.6 SHOP DRAWINGS

- A. Wherever called for in the Contract Documents, or where required by Engineer, furnish to Engineer for review, 1 copy of each Shop Drawing Submittal. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, lists, graphs, catalog sheets, data sheets, and similar items. Whenever required to submit design calculations as part of a Submittal, such calculations shall bear the signature and seal of a professional engineer registered in the appropriate discipline in the state of Utah unless otherwise directed.
- B. Submit all Shop Drawings accompanied by the submittal transmittal form included at the end of this Section. Submittals not accompanied by this form, or where all applicable items on the form are not completed, will be returned for resubmittal. Electronic version of the form is available from Engineer.
- C. Organization
 1. A single shop drawing transmittal form shall be used for each item or class of material or equipment for which a submittal is required. At a minimum, separate submittals are required for different Specification Sections except as follows. A single submittal

covering multiple sections will not be accepted, unless the primary specification references other sections for components. Example: If a pump section references other sections for the motor, protective coating, anchor bolts, local control panel, and variable frequency drive, a single submittal would be accepted; a single submittal covering vertical turbine pumps and horizontal split case pumps would not be acceptable.

2. On the transmittal form, index the components of the submittal and insert tabs in the Submittal to match the components. Relate the submittal components to specification paragraph and subparagraph, drawing number, detail number, schedule title, or room number or building name, as applicable.
3. Unless indicated otherwise, terminology and equipment names and numbers used in submittals shall match the Contract Documents.
4. Engineer will assign a single review action to each submittal, which action shall pertain to every part of the submittal as a whole.

D. Format

1. Minimum sheet size shall be 8.5 inches by 11 inches.
2. Maximum sheet size shall be 24 inches by 36 inches.
3. Number every page in a submittal in sequence.
4. Each copy of a printed submittal shall be collated and stapled or bound, as appropriate. Engineer will not collate copies.
5. Electronic copies of submittals shall be assembled into a single PDF file for each submittal.
6. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Sufficient level of detail shall be presented for assessment of compliance with the Contract Documents.
7. Each Submittal shall be assigned a unique number, including the Specification Section under which it is submitted. Submittals shall be numbered sequentially. The submittal numbers shall be clearly noted on the transmittal. Original submittals shall be assigned a numeric submittal number. Resubmittals shall bear an alpha-numeric system which consists of the number assigned to the original submittal for that item followed by a letter of the alphabet to represent that it is a subsequent Submittal of the original. For example, if Submittal 03 20 00-25 requires a resubmittal, the first resubmittal will bear the designation "03 20 00-25A" and the second resubmittal will bear the designation "03 20 00-25B" and so on.

E. Disorganized submittals, which do not meet the requirements above will be returned without review.

F. Except as may otherwise be indicated herein, Engineer will return each submittal, with its comments noted thereon, within 14 calendar days following their receipt by Engineer. For resubmittal of submittals, Engineer will be allowed the same review period as for the original submittal. It is considered reasonable that Contractor will make a complete and acceptable submittal to Engineer by the second submission of an item. Owner reserves the right to withhold monies due to the Contractor to cover additional costs of any review beyond the second submittal.

- G. If a submittal is returned marked "REVISE AND RESUBMIT", revise said submittal and resubmit the required number of copies. Resubmittal of portions of multi-page or multi-drawing submittals will not be allowed. For example, if a Shop Drawing Submittal that consists of ten drawings contains only one drawing that needs to be amended and resubmitted, the submittal as a whole is deemed as "REVISE AND RESUBMIT", and all ten drawings included in the submittal are required to be resubmitted.
- H. If a submittal is returned marked "REJECTED-RESUBMIT", revise said submittal and resubmit the required number of copies. Resubmittal of portions of multi-page or multi-drawing submittals will not be allowed. For example, if a shop drawing submittal that consists of ten drawings contains only one drawing that is rejected and needs to be resubmitted, the submittal as a whole is deemed as "REJECTED-RESUBMIT", and all ten drawings included in the submittal are required to be resubmitted.
- I. Any changes made on a resubmittal, other than those made or requested by Owner or Engineer, shall be identified and flagged on the resubmittal.
- J. Fabrication of an item shall commence only after Engineer has reviewed the pertinent submittals and Engineer has returned copies marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the Contract requirements.
- K. All shop drawing submittals shall be carefully reviewed by an authorized representative of Contractor prior to submission. Sign and date each submittal with a direct statement acknowledging that the equipment or material in the submittal meets all the requirements specified or shown in the Contract Documents without exception. No consideration for review of any submittals will be made for any items, which have not been so certified. All non-certified submittals will be returned without action taken, and any delays caused thereby shall be the total responsibility of Contractor. Submittals, which Contractor wishes to have reviewed that cannot bear this certification because they contain an exception or deviation to the Contract Documents shall be so noted on the transmittal form and shall be submitted in accordance with Section 01 25 10 – Products, Materials, Equipment and Substitutions.
- L. Owner's and/or Engineer's review of shop drawing submittals does not relieve Contractor of the entire responsibility for the correctness of details and dimensions and for compliance with the Contract Documents. Assume all responsibility and risk for any misfits due to any errors in submittals. Be responsible for the dimensions and the design of adequate connections and details.
- M. No changes in the Contract times will be considered for schedule delays resulting from non-compliant submittals.
- N. Within 30 days of the Notice to Proceed, submit a complete list of anticipated submittals, which includes Specification and Drawing references. Update the list with "early start" submittal dates within 15 days of submittal of the Construction Progress Schedule. Submittal dates shall be updated whenever the schedule is updated. Any additional submittals identified after the initial submittal shall be included in the updates.
- O. If an incomplete submittal is made, the submittal may be returned without review. A complete

submittal shall contain sufficient data to demonstrate that the items contained therein comply with the Contract Documents, meet the minimum requirements for submittals as described in the Contract Documents, and include all corrections as required from previous submittals.

1.7 SCHEDULE

- A. The Construction Progress Schedule and reports shall be prepared and submitted to Engineer in accordance with the Construction Progress Schedule requirements per Section 01 32 16 – Construction Progress Schedule.

1.8 SAMPLES

- A. Whenever in the Specifications samples are required, submit not less than 1 samples of each item or material to Engineer for acceptance at no additional cost to Owner.
- B. Samples, as required herein, shall be submitted for acceptance a minimum of 21 days prior to ordering such material for delivery to the jobsite, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delays in the Work.
- C. Individually and indelibly label and tag all samples, indicating thereon all specified physical characteristics and Manufacturer's name for identification. Upon receiving acceptance of Engineer, one set of the samples will be stamped, dated, and returned. Another set of samples will be retained by Engineer, and set of samples will remain at the Project site until completion of the Work.
- D. Unless indicated otherwise, all colors and textures of specified items presented in sample submittals shall be from the manufacturer's standard colors and standard materials, products, or equipment lines. If the samples represent non-standard colors, materials, products, or equipment lines and their selection will require an increase in Contract time or Price, clearly indicate same on the transmittal page of the submittal.

1.9 QUALITY ASSURANCE/QUALITY CONTROL PLAN

- A. Prepare and submit a Quality Assurance/Quality Control Plan for the Work contained in the Contract in accordance with Section 01 45 00 – Quality Control.

1.10 DAILY REPORT

- A. Submit to the Engineer, or designee, a daily report. Deliver report not later than 9:00 A.M. of the work day following the report date and include the following:
 - 1. Day of week, date, Contractor name and Report number.
 - 2. Summary of work in process (segregated by Contractor and Subcontractor).
 - 3. Details of work accomplished including quantities of Work installed.
 - 4. Summary of equipment working and where working.
 - 5. Summary of manpower by work element and Subcontractor.
 - 6. Receipt of major equipment or materials.
 - 7. All required testing performed and, if available, documented results.

1.11 OPERATIONS AND MAINTENANCE MANUAL

- A. Submit technical operation and maintenance information for each item of mechanical, electrical and instrumentation equipment in an organized manner in the *Operations and Maintenance Manual*. It shall be written so that it can be used and understood by the Owner's operation and maintenance staff.
- B. The initial submittal of the *Operations and Maintenance Manual* shall be furnished to Engineer upon delivery of the respective equipment.
- C. The *Operations and Maintenance Manual* shall be subdivided first by specification section number; second, by equipment item; and last, by "Part." "Parts" shall conform to the following (as applicable):
 - 1. Part 1 – Equipment Summary:
 - a. Summary: A summary table shall indicate the equipment name, equipment number, and process area in which the equipment is installed.
 - b. Form: The Contractor will supply an Equipment Summary Form for each item of mechanical, electrical and instrumentation equipment in the Work. Fill in the relevant information on the form and include it in Part 1.
 - 2. Part 2 – Operational Procedures:
 - a. Procedures: Manufacturer-recommended procedures on the following shall be included in Part 2:
 - 1) Installation
 - 2) Adjustment
 - 3) Startup
 - 4) Location of controls, special tools, equipment required, or related instrumentation needed for operation
 - 5) Operation procedures
 - 6) Load changes
 - 7) Calibration
 - 8) Shutdown
 - 9) Troubleshooting
 - 10) Disassembly
 - 11) Reassembly
 - 12) Realignment
 - 13) Testing to determine performance efficiency
 - 14) Tabulation of proper settings for all pressure relief valves, low and high-pressure switches, and other protection devices
 - 15) List of all electrical relay settings including alarm and contact settings
 - 16) Lubrication.
 - 3. Part 3 – Preventive Maintenance Procedures:
 - a. Procedures: Preventive maintenance procedures shall include all manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by leaving the equipment in place.
 - b. Schedules: Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature ranges, shall be covered.
 - 4. Part 4 – Parts List:

- a. Parts List: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included.
 - b. Drawings: Cross-sectional or exploded view drawings shall accompany the parts list.
 - 5. Part 5 – Wiring Diagrams:
 - a. Diagrams: Part 5 shall include complete internal and connection wiring diagrams for electrical equipment items.
 - 6. Part 6 – Shop Drawings:
 - a. Drawings: This part shall include approved shop or fabrication drawings, complete with dimensions.
 - 7. Part 7 – Safety:
 - a. Procedures: This part describes the safety precautions to be taken when operating and maintaining the equipment or working near it.
 - 8. Part 8 – Documentation:
 - a. All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this part.
- D. Furnish to Engineer 4 identical *Operations and Maintenance Manuals*. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose-leaf, vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. Prepare a table of contents indicating all equipment in the manuals. Display the title of each volume on the cover and spine.
- E. *Operations and Maintenance Manuals* shall be submitted in final form not later than the 75 percent of construction completion date. All discrepancies found by Owner or Engineer in the *Operations and Maintenance Manual* shall be corrected within 30 days from the date of written notification.
- F. Incomplete or unacceptable *Operations and Maintenance Manuals* at the 75 percent construction completion point shall constitute sufficient justification to withhold the amount stipulated in paragraph " *Operations and Maintenance Manual Submittals*" of Section 01 77 00 – Project Closeout, from any monies due.

1.12 SPARE PARTS LIST

- A. Furnish to Engineer 5 identical sets of spare parts information for all mechanical, electrical, and instrumentation equipment. Include the current list price of each spare part. Limit the spare parts list to those spare parts which each manufacturer recommends be maintained by Owner in inventory at the plant site. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to facilitate Owner in ordering. Cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents. Bind the spare parts lists in standard size, 3-ring, loose-leaf, vinyl plastic hard cover binders suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches.

1.13 RECORD DOCUMENTS

- A. Prepare and maintain one set of record documents at the Project Site per the requirements of

Section 01 78 39 – Project Record Documents.

1.14 SAFETY PROGRAM

- A. Prepare and submit safety plans, programs, and permits to Engineer in accordance with the provisions of Section 01 31 30 – Safety.
- B. Engineer's receipt of any safety plans, programs or permits will not relieve Contractor in any way from the full and complete responsibility for safety.

1.15 REQUESTS FOR INFORMATION

- A. In the event that Contractor, Subcontractor or supplier, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Documents requires clarification or interpretation by Owner, submit a Request for Information in writing to Engineer. Clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from Owner. In the Request for Information, indicate the interpretation or understanding of the requirement along with reasons for such an understanding.
- B. Engineer will review all Requests for Information to determine whether they are Requests for Information within the meaning of this term. If Engineer determines that the document is not a Request for Information it will be returned, unreviewed as to content, for resubmittal on the proper form and in the proper manner.
- C. Responses from Engineer will not change any requirement of the Contract Documents unless so noted by Engineer in the response to the Request for Information. In the event that a response to a Request for Information is believed to cause a change to the requirements of the Contract Documents, immediately give written notice to Engineer stating why this is believed to be true. Failure to give such written notice immediately shall waive any right to seek additional time or compensation under the Contract.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION (NOT USED)

END OF SECTION

SECTION 01 35 53 SECURITY

PART 1 - GENERAL

1.1 SUMMARY

- A. Protect the active construction areas of the Work, including all material, equipment, field office trailers, and their contents from theft, vandalism, and unauthorized entry.

1.2 DEFINITIONS

- A. For the purposes of this Section, an “active construction area” is any area where construction activities are occurring or construction activities could be considered a potential hazard to people.

1.3 RELATED SECTIONS

- A. Section 01 57 19 – Temporary Environmental Controls

1.4 SUBMITTALS

- A. Provide Engineer with a list of 24-hour emergency phone numbers for Contractor personnel.
- B. Submit to Engineer an updated progressive inventory of materials and equipment received on-site.
- C. Submit log of workmen and visitors to Project Site.

1.5 SECURITY PROGRAM

- A. Protect Work and existing premises, including the field office trailers and their contents, from theft, vandalism, and unauthorized entry during working and non-working hours.
- B. Accept sole responsibility for Project Site security and protection of the Work.
- C. Initiate the security program at job mobilization and maintain the security program throughout construction period.
- D. Limit lighting to basic safety and security requirements, and shield when possible.
- E. Be responsible for the security of storage compound and lay down area, and for all plant material, equipment, and tools at all times.
- F. Prohibit firearms for the Project Site.
- G. Prohibit dogs from the Project Site, with the exception of those clearly used for security purposes within fenced areas.
- H. Erect and maintain temporary security fencing as required to protect the Work, the Project Site, and existing facilities on the Project Site. The location of all temporary security fencing shall be

approved in advance by Engineer.

1. Fence Height: 6 ft
2. Fence Material: Chainlink

- I. Erect and maintain temporary tortoise-proof fencing as described in Section 01 57 19 – Temporary Environmental Controls.

1.6 ENTRY CONTROL

- A. Entry control shall not unreasonably limit the personnel of Owner, Engineer, and their operations and maintenance groups from performing assigned duties. Temporary access limitations will be identified to Engineer and the operations and maintenance groups at least 24 hours prior to such limitation.
- B. Restrict entry of unauthorized persons and vehicles into Project Site.
- C. Allow entry only to authorized persons with proper identification.
- D. When requested by Owner, implement a security badge system for the Project Site, approved by Owner.
- E. Maintain a log of workmen and visitors and make log available to Owner on request. This log shall be submitted to Engineer biweekly or as necessary.
- F. Require all visitors to sign the visitor log acknowledgment of the project rules included in this Section. A copy of the project rules shall be given to each visitor. Submit copies of these forms to Engineer biweekly.
- G. Contractor has the right to refuse access to the Project Site or require that a person or vehicle be removed from the Project Site if found violating any of the project rules.
- H. Give jobsite security orientation training to all affected employees, including subcontractor employees. Employee participation in the security orientation shall be acknowledged by their respective individual signatures affixed to an orientation roster.

1.7 PROJECT SITE SECURITY SERVICES

1. Contractor will be responsible of the site and all security measures to ensure safety and security of the site.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 30
SITE CONDITIONS SURVEYS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements to document conditions of the Project Site and adjacent properties before construction begins and after completion of the Work. Methods include still photographs, digital video recordings, and topographic surveys.

1.2 SUBMITTALS

- A. Submit all photographs and digital videos data of the preconstruction conditions to Engineer for record purposes prior to, but not more than three weeks before, commencement of any construction activities.

1.3 CLOSEOUT SUBMITTALS

- A. Complete and submit all digital videos and still photographs of the postconstruction conditions to Engineer prior to final inspection by Owner and Engineer.
- B. Submit one copy of the disk media.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION

3.1 EXAMINATION

- A. Conduct thorough preconstruction and postconstruction Site conditions surveys of the entire Project. Site conditions surveys shall consist of photographs and digital video recordings. Sufficient photographs, supplemented by digital video, shall be provided and submitted to Engineer to resolve any damage claims, which may arise due to the construction of this Project
- B. Digital video or photographic surveys shall include, but not be limited to, all access roads used to transport material or equipment to and from the Site and elevation of roadways, drives, walks, and buildings.
- C. As a minimum, note preconstruction and postconstruction conditions and perform digital video surveys of the following:
 - 1. Areas used to access the Site or haul materials and equipment to the Site.
 - 2. All Work areas, including, but not limited to, access corridors, disposal areas, and staging areas.
 - 3. Any work completed by other contractors at the Site that will be impacted or otherwise affected by Work of this Project.

- D. Supplement digital video surveys with still photographs as required to document the original condition and location of existing features and facilities.

END OF SECTION

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contract closeout, including final cleaning, preparation, and submittal of closeout documents, warranties and bonds, and final completion certification.
- B. Closeout submittals and submittal forms in both hard copy and electronic format.

1.2 RELATED SECTIONS

- A. Section 01 78 39 – Project Record Documents

1.3 SUBMITTALS

- A. Closeout Documents: Submit the following closeout documents prior to making a written request for Final Completion.
 - 1. Project record drawings and documents per Section 01 78 39 – Project Record Documents.
 - 2. Shop drawings.
 - 3. Keys and keying schedule.
 - 4. Post construction survey record documents, where required.
 - 5. Final Operation and Maintenance Manuals.
 - 6. Maintenance stock items; spare parts and special tools.
 - 7. Written warranties and bonds where required.
 - 8. Bonds for roofing or maintenance, if indicated.
 - 9. Release of liens or release of claims forms submitted by all subcontractors and suppliers, if requested by Owner
- B. Evidence of Compliance With Inspections and Other Requirements of Governing Authorities: Submit the following:
 - 1. Special Inspection Reports.
 - 2. Release from each affected property owner or agency indicating final acceptance.
- C. Operation and Maintenance Manuals
 - 1. One percent of the contract price will be withheld from any monies due as progress payments, if at the 75 percent construction completion point, the approved *Operations and Maintenance Manual* complying with Section 01 33 20- Contractor Submittals has not been submitted. The aforementioned amount will be withheld by Owner as the agreed, estimated value of the approved *Operations and Maintenance Manuals*. Any such retention of money for failure to submit the approved *Operations and Maintenance Manuals* on or before the 75 percent construction completion point shall be in addition to the retention of any payments due under General Conditions of the Contract.

- D. Final Change Order: A final Change Order shall be submitted and processed if required. Final payment and close-out procedures shall comply with requirements of the Contract Documents.

1.4 CLOSEOUT TIMETABLE

- A. Establish dates for equipment testing, acceptance periods, and on-site instructional periods as required under the Contract Documents. Such dates shall be established not less than one week prior to beginning any of the required activities, to allow Owner, Engineer, and their authorized representatives sufficient time to schedule attendance at such activities.

1.5 COMPLETION PROCEDURES

- A. When Contractor believes Substantial Completion has been achieved, request in writing to Engineer that Substantial Completion be recognized as having been achieved and request that Owner issue a Certificate of Substantial Completion. Prior to making such request, the following must be complete:
 - 1. Work necessary for the safe, proper, and complete use or operation of the facility as intended.
 - 2. Punch list of items remaining to be completed, for submission with the request for issuance of a Certificate of Substantial Completion.
 - 3. Submit and receive acceptance of accurate record drawings for all work completed to date.
 - 4. Submit and receive acceptance of all specified warranties, bonds, guarantees and operation and *Operations and Maintenance Manuals*.
 - 5. Complete all required vendor training, testing, and where required, start-up.
 - 6. Deliver all required spare parts, maintenance stock items, and special tools.
 - 7. Complete equipment and communications system testing successfully.
- B. Upon receipt of the request, Engineer and designated representatives will review the request, the Work, and the above requirements to determine whether Substantial Completion has been achieved. If this review fails to support Substantial Completion, Engineer will notify Contractor in writing citing the reasons for rejection. If Engineer determines that Substantial Completion has been achieved, the following procedures will be followed:
 - 1. Engineer, his/her representative, and user representatives will review the Work and the punch list to assure all deficiencies are noted on a final punch list.
 - 2. Engineer will schedule and conduct a pre-final walk-through of the facility with representatives of Owner, Engineer, Contractor, and others, for the purpose of formally reviewing the Work, the final punch list, and the readiness of the Work for use. A copy of the final punch list will be furnished to all participants and any additional items noted during the walk-through will be added to the list.
 - 3. Upon completion of the pre-final walk-through, Engineer will prepare a request to Owner establishing the date for Substantial Completion as date of the walk-through, provided the walk-through has verified that the Work is in fact ready for use and occupancy by Owner for its intended purpose. Upon approval of this request by Owner, the facility will be considered Substantially Complete.
- C. Final Completion will be deemed to have occurred when Work is completed including the following:

1. All final punch list items have been corrected, signed off by Contractor and Engineer, and demonstrated to Owner during a final walk-through.
 2. All updates to record drawings, and *Operations and Maintenance Manuals* have been made.
 3. Demobilization and site cleanup are complete.
 4. Facilities and/or equipment have been properly demonstrated to be functioning as required.
 5. Owner has received releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.
 6. New permanent cylinders and key blanks for all locks have been provided to Owner.
- D. Certificate of Final Completion
1. When all items have been completed or corrected, submit written documentation to Engineer that the entire Work is complete in accordance with the Contract Documents and request final inspection.
 2. Upon completion of final inspection by Owner and Engineer, Owner will either prepare a Certificate of Final Completion of the entire Work or advise all parties of Work not satisfactorily complete. If necessary, repair or replacement and inspection procedures will be repeated until Owner accepts the Work and issues a Certificate of Final Completion.
- E. Partial Utilization may be desired at Owner's option, as described in the General Conditions. If Partial Utilization is requested, the same procedure for completion of that portion of the Work as indicated in paragraphs A and B above, will be used.

1.6 CLOSE-OUT PROCEDURE

- A. Engineer and Contractor shall meet and resolve all outstanding issues including, but not limited to:
1. Claims and adjustments for time or costs
 2. Outstanding, unused allowances
 3. Procedures for handling warranty issues.
- B. A Final Change Order shall be processed if required. Final payment and close out procedures shall comply with all requirements of the Contract Documents.

1.7 MAINTENANCE AND GUARANTEE

- A. Comply with the maintenance and guarantee requirements contained in General Conditions of the Contract.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless Contractor has obtained a statement in writing from the affected private authority or public agency releasing Owner from further responsibility in connection with such repair or resurfacing. Submit such release(s) to Engineer.
- C. Make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly, the Owner reserves the

right to do the Work and the Contractor and his surety shall be liable to the Owner for the cost thereof.

1.8 BOND

- A. Furnish a Performance Bond as required by General Conditions of the Contract.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION

3.1 FINAL CLEANING

- A. Certificate of Final Completion of the Work by Owner will be withheld until requirements for final cleanup of the Project Site are complete as follows:
1. Perform final cleaning prior to inspections for final acceptance.
 2. Employ skilled workers who are experienced in cleaning operations.
 3. Use cleaning materials that are recommended by manufacturers of surfaces to be cleaned.
 4. Avoid scratching, discoloring, and otherwise damaging surfaces being cleaned.
 5. Clean roofs.
 6. Broom clean and power wash exterior paved surfaces and rake clean other surfaces of sitework. Police yards and grounds to keep clean.
 7. Remove dust, cobwebs, and traces of insects and dirt.
 8. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces, fixtures, and Equipment.
 9. Remove nonpermanent protection and labels.
 10. Polish finish hardware.
 11. Wash and shine mirrors.
 12. Polish glossy surfaces to clear shine.
 13. Clean ducts, blowers, and coils when units were operated without filters during construction.
 14. Clean light fixtures and replace burned-out or dim lamps.

3.2 WASTE DISPOSAL

- A. Remove temporary structures and facilities and arrange for and dispose of surplus materials, waste products, and debris as follows:
1. Prior to making disposal on private property, obtain written permission from owner of such private property.
 2. Do not fill ditches, washes, or drainage ways which may create drainage problems.
 3. Do not create unsightly or unsanitary nuisances during disposal operations.
 4. Maintain disposal site in safe condition and good appearance.
 5. Complete leveling and clean-up prior to final acceptance of the Work.

3.3 TOUCH-UP AND REPAIR

- A. Touch up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for final acceptance.
- B. Refinish or replace entire surfaces that cannot be touched-up or repaired satisfactorily.

3.4 DEMOBILIZATION

- A. Demobilization shall include moving plant and equipment, field trailers, construction materials, debris, and so forth from the Site as well as performing final cleanup.
 - 1. Disturbed areas shall be restored to their original state or better.
 - 2. Permanent improvements damaged during construction operations shall be repaired or replaced at no additional cost to Owner.
 - 3. Remove all equipment, materials, waste, and debris from the site and restore site to original condition upon completion of construction.
 - 4. The work area shall be restored to its original or better condition and shall be inspected and approved by Engineer.

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Maintain at the Site for Owner, one record copy of the Drawings, Specifications, Operation and Maintenance manuals, coordination drawings, and Shop Drawings that are clearly marked with a red pen to indicate all changes and or revisions resulting from, but not limited to, the following:
 - 1. Actual Project as constructed.
 - 2. Addenda.
 - 3. Change Orders and other modifications.
 - 4. Engineer's instructions.
 - 5. Field revisions.
 - 6. Requests for Information (RFI).
 - 7. All other changes.
- B. Give special attention to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings.
- C. Record drawings shall be supplemented by any detailed sketches as necessary or directed to fully indicate the Work, as actually constructed.
- D. Section Includes:
 - 1. Maintenance of Documents and Samples
 - 2. Marking Devices.
 - 3. Recording.
 - 4. Close-out Submittal Delivery.

1.2 RELATED SECTIONS

- A. 01 77 00 - Project Closeout

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

- B. Store documents and samples in field office apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Provide locked cabinet or secure storage space for storage of samples.
- E. Maintain documents in clean, dry, legible condition and in good order. Keep record documents separate from those used for construction.
- F. Make documents and samples available at all times for reference by Engineer and Owner.

- G. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by change order drawings or final shop drawings, and by including appropriate reference information describing the change orders by number and the shop drawings by manufacturer, drawing, and revision numbers.
- H. During progress meetings, record documents may be reviewed to ascertain that changes have been recorded.
- I. Updated Drawings, when provided by Engineer, will be substituted for the hand markups provided Contractor prints the applicable Drawings and inserts them into the record set each month.
- J. Copies of the record drawings will be audited regularly by Engineer after the month in which the Notice to Proceed is given as well as on completion of the Work. Failure to properly maintain record drawings in a up-to-date condition may result in the withholding of payments due at the sole discretion of Owner.

1.4 MARKING DEVICES

- A. Use a red color pen for recording all information to all documents defined herein.

1.5 RECORDING

- A. Label each document "CONFORMING TO CONSTRUCTION RECORD" in neat large red printed letters.
- B. Record information concurrently with construction progress, at the time the material or equipment is installed. Do not conceal any work until required information is recorded.
- C. Drawings shall be legibly marked to record actual construction per the following:
 - 1. Record actual depths of various elements of foundations in relation to finish first floor datum.
 - 2. Record actual as-built depths, horizontal and vertical location, (at every direction change and a maximum of 100 feet intervals on straight runs), of underground pipes, duct banks, and other buried utilities. Reference horizontal location to Project coordinate system and vertical elevations to Project datum.
 - 3. Identify and record specific details of pipe connections, location of existing buried features and utilities located during excavation, and the final locations of piping, equipment electrical conduits, manholes, and pull boxes (horizontal coordinates and vertical elevation).
 - 4. Identify and record location of spare conduits including beginning, ending, and routing through pull boxes, and manholes. Record spare conductors, including number and size, within spare conduits, and filled conduits.
 - 5. Record actual schedules, lists, layout drawings, and wiring diagrams.
 - 6. Record field changes of dimension and detail.
 - 7. Record changes made by instruction from Engineer or by Change Order.
 - 8. Record details not on original Contract Drawings.

- D. Specifications and Addenda shall be legibly marked to record:
 - 1. Manufacturer, trade name, catalog number, and supplier for each product and item of equipment actually installed.
 - 2. Changes made by instruction from Engineer or by Change Order.
- E. Record potholing data and installation of marker balls.
- F. All surveying for record documents shall be performed by a licensed surveyor.

1.6 CLOSEOUT SUBMITTALS

- A. At Contract closeout, deliver complete record documents to Engineer as required in Section 01 77 00 - Project Closeout. Final payment will not be acted upon until the record drawings have been prepared and delivered to Engineer.
- B. The information submitted will be incorporated by Engineer into final drawings to be provided to Owner. Be responsible for the accuracy of submitted construction information. Engineer will assume that the information provided by Contractor is correct and faithfully represents actual construction.
- C. This submittal shall include the record paper set along with 2 CDs. Each CD shall contain .pdf files and .dwg files of each drawing.
- D. Prepare submittal with transmittal letter containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Title and number of each record as-built document.
 - 5. Signature of Contractor's authorized representative and a statement that certifies that the record documents are accurate and reflect what was actually installed during construction.

PART 2 - PRODUCTS (NOT USED) PART 3 -

EXECUTION (NOT USED)

END OF SECTION

SECTION 01 91 14
EQUIPMENT TESTING AND STARTUP

PART 1 - GENERAL

1.1 SUMMARY

- A. Equipment testing and startup are required for satisfactory completion of the Contract and, therefore, shall be completed within the Contract Time.
- B. Section Includes:
 - 1. Startup Plan
 - 2. Certificates of Installation and Startup Services
 - 3. Record Keeping
 - 4. Factory Performance Testing
 - 5. Field Performance Testing
 - 6. Special Tools and Lubricating Equipment
 - 7. Startup
 - 8. Lubrication

1.2 DEFINITIONS

- A. Component Test and Check Out is the verification that each component of the Work is in compliance with the Contract Documents and is ready to perform its intended function.
- B. Subsystem Test and Startup is the verification that a discrete group of related components is functioning as intended within itself and is ready to perform its intended function in the overall system.
- C. System End-To-End Test and Startup is the operation and verification that all related components and subsystems are functioning as intended and are ready for final commissioning and operation.
- D. Commissioning is placing a complete system or project into service.

1.3 SUBMITTALS

- A. Submit startup plan a minimum of 90 days prior to beginning startup procedures.
 - 1. Submit and have an approved detailed and coordinated startup plan for each piece of equipment, subsystem, and the entire system.
 - 2. The Plan and Progress Schedule shall include the following activities:
 - a. Manufacturer's services and startup dates.
 - b. Submittal dates for certificates of installation and startup services.
 - c. Operator training dates for each phase.
 - d. Submittal of operation and Maintenance manuals.
 - e. Functional test dates.
 - f. Operational performance test dates.
 - g. Post operational performance test dates.

3. The plan shall include test logs for each item of equipment and each system. Include testing of alarms, control circuits, capacities, speeds, flows, pressures, vibrations, sound levels, and other parameters.
 4. Provide summary of shutdown requirements for existing systems which are necessary to complete startup of new equipment and systems.
 5. Revise and update startup plan based upon review comments, actual progress, and to accommodate changes in the sequence of activities.
 6. System startup plan shall be coordinated with Owner's operations staff and Engineer to ensure operational intent is achieved.
- B. Submit certified copies of factory test reports.
- C. Startup Records:
1. Maintain and submit the following records generated during each phase of startup defined above in article titled Definitions:
 - a. Daily logs of equipment testing identifying all tests conducted and outcome.
 - b. Logs of time spent by manufacturer's representatives performing services on the Site.
 - c. Equipment lubrication records.
 - d. Electrical phase, voltage, and amperage measurements.
 - e. Insulation resistance measurements.
 - f. Data sheets of control loop testing, including testing and calibration of instrumentation devices and setpoints.
 - g. Detailed, point-by-point, sensor/controlled device/field device to PLC to HMI screen witnessed validation checklist for all telemetry and SCADA tags utilizing a fully functional network or other telemetry system available at the Owner's plant or other Owner-designated facility.
- D. Certificates of Installation and Startup Services
1. At completion of installation and functional testing, furnish Certificate of Installation and Startup Services, signed by manufacturer, Contractor, and Owner's authorized representatives. Each form shall be completed for individual pieces of equipment in a timely manner as construction proceeds.
 2. Submit 3 original copies of each completed form to Engineer.
 3. Certify that:
 - a. Equipment has been properly installed, adjusted, aligned, and lubricated.
 - b. Equipment is free of any stresses imposed by connecting piping or anchor bolts.
 - c. Equipment is suitable for satisfactory full-time operation under full load conditions.
 - d. Equipment operates within the allowable limits for vibration.
 - e. Controls, protective devices, instrumentation, and control panels furnished as part of the equipment package are properly installed, calibrated, and functioning.
 - f. Control logic for startup, shutdown, sequencing, interlocks, and emergency shutdown has been tested and is properly functioning.
 - g. For remotely monitored and controlled devices, functionality shall not be certified until indication and controls are tested using local and remote SCADA based indications.

4. Sign and submit for acceptance the forms and field manufacturer reports along with the manufacturer's representative prior to proceeding with System End-To-End Test and Startup.

PART 2 - PRODUCTS

2.1 FACTORY PERFORMANCE TESTING

- A. Test equipment for proper performance at the point of manufacture or assembly.
- B. Demonstrate equipment meets specified performance requirements.
- C. Submit certified copies of factory test results to Engineer for review and approval.
- D. Do not ship equipment until certified copies of factory test reports have been approved by Engineer. Written acceptance of factory test results does not constitute final acceptance.

2.2 FIELD PERFORMANCE TESTING

- A. Furnish the services of an experienced and authorized representative of the manufacturer of each item of equipment indicated in the equipment schedules (excluding manually-operated valves smaller than 24 inches in size, injectors, tanks, batch-type disc meters, and rotameters, and any other minor items of equipment specifically exempted by Engineer in writing), who shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. In each case, arrange to have the manufacturer's representative revisit the job site as often as necessary until any and all trouble is corrected and the equipment installation and operation are satisfactory to Engineer.
- B. Require that each manufacturer's representative furnish to Engineer a written report addressed to Owner certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been operated satisfactorily under full-load conditions.
- C. Be responsible for scheduling all operations testing, including the End-To-End Testing performed with other contractors associated with the RTU controls and communications. Be advised that Engineer and Owner's operating personnel will witness operations testing and that the manufacturer's representative shall be required to instruct Owner's operating personnel in correct operation and maintenance procedures. Such instruction shall be scheduled at a time arranged with Owner at least two weeks in advance and shall be performed while the respective manufacturer's equipment is fully operational. On-site instruction shall be given by qualified persons who have been made familiar in advance with the equipment and systems. Prior to scheduling any operations testing, furnish *Operations and Maintenance Manuals* required by the Contract Documents.
- D. Notify the Engineer at least three Work Days in advance of each equipment test.
- E. Furnish all personnel, power, water, chemicals, fuel, oil, grease, and all other necessary equipment, facilities, and services required for conducting the tests.

2.3 SPECIAL TOOLS AND LUBRICATING EQUIPMENT

- A. Furnish, according to manufacturer's recommendations, special tools required for checking, testing, parts replacement, and maintenance. Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics, including valve keys and stems.
- B. Time of Delivery: Submit special tools and lubricating equipment to Engineer when unit is placed into operation and after operating personnel have been properly instructed in operation, repair, and maintenance of equipment.
- C. Quality: Provide tools and lubricating equipment of a quality comparable to what the equipment manufacturer uses.

PART 3 - EXECUTION

3.1 STARTUP

- A. Startup is a highly complex operation requiring the combined technical expertise of Contractor, manufacturers, subcontractors, Engineer, and Owner. Coordinate all parties necessary for the successful plant startup.
- B. Be responsible for the complete test, check out, startup, and commissioning of all elements of the Project. Verify these activities through daily inspection reports, test records, on-site vendor certifications, and by other appropriate means. The test and startup requirements specified in this Section are complementary to those indicated elsewhere in the Contract Documents.
- C. Conduct all test, check out, and startup requirements indicated in the Contract Documents and provide documentation of same to Engineer prior to commissioning. Where vendor on-site inspections are required prior to or during startup, require vendor to provide a written statement that the installation and check out is complete and proper and that the item(s) are ready for startup and/or commissioning.
- D. It is not the intent of Engineer to instruct Contractor in the startup; however, Engineer will be available prior to and during startup to provide technical support to the Contractor.
 - 1. As part of the plan for the 7-day test, define, subject to Engineer's approval, what will constitute a failing test. At a minimum, a test shall be considered to have failed if any of the following events occur at any time during the 7-day functional test.
 - a. Failure of a pumping unit or motor.
 - b. Performance of a pumping unit (including pump and motor) outside of its specified acceptable ranges for vibration, noise, temperature, cavitation, efficiency, and capacity.
 - c. A failure of any ancillary component or system that cannot be returned to service within 30 minutes of failure.
 - d. Three failures of an ancillary component or system regardless of the amount of time it takes to return it to service and regardless of whether or not the failures are due to the same cause.
 - e. Three failures of equipment of the same model, regardless of the amount of

time it takes to return each to service and regardless of whether or not the failures are due to the same cause.

2. During the performance of the functional test, it shall not be acceptable to bypass, deactivate, or in any way disable a protective device, alarm, or control to facilitate completion of the test.
 3. If variable speed pumps are provided as part of the construction, each pump shall be run under automatic control during the functional test to verify the ability to operate as required by the Contract Documents provided the communications system is available. If the communication is not available, Engineer will prescribe the method and flow rates at which the functional test will be performed.
 4. Provide adequate staff on Site to operate the facility and make factory personnel available to assist in resolving problems as needed at no additional cost to Owner.
 5. Take readings every hour during the functional test to record equipment operation, operating speeds, flow rates, temperature of equipment components, system pressures, operating voltage, current, power draw of each operating unit, and any problems encountered during the previous hour.
- E. Furnish operating personnel for the duration of the startup. Additionally, furnish all water, power, chemicals, and other consumables required for the test.
- F. All defects in materials or workmanship, which appear during this test period, shall be immediately corrected. Time lost for equipment repairs, wiring corrections, control point settings, or other reasons, which actually interrupt the startup may, at the discretion of Engineer, be justifiable cause for extending startup test duration.
- G. During startup, furnish the services of authorized representatives of the manufacturers, in addition to those services required under operations testing, as necessary, to correct faulty equipment operation.
- H. During startup, keep records of the operations in accordance with the instructions of Engineer.

END OF SECTION

DIVISION 2
EXISTING CONDITIONS

SECTION 02 32 30
SPECIAL CONDITIONS FOR WELL WORK

PART 1 – PROJECT DESCRIPTION

- 1.1 GENERAL: This project involves investigating the condition of a culinary production well and subsequently cleaning, reequipping, and testing of the Well for Jordan Valley Water Conservancy District herein called OWNER. The culinary production well, referred to as the 7700 South 700 East Well, is located in Sandy City within Salt Lake County, Utah. The project shall consist of removing the existing pump equipment (motor, column and pump), performing video surveys of the well, after which the project is to include; brush and bailing of the well, well disinfection, and re-equipping the well with a new pump and column/shaft. Site location map is included in the FIGURES. The CONTRACTOR shall take care to perform the work herein without causing damage to the site/well and to ensure the safety of all workers at the job site. The work to be performed under this project shall consist of furnishing all labor, materials, equipment, tools, supplies, and incidental items necessary or required to complete the work in all respects as shown in the FIGURES and as herein specified. All work, materials, and services not expressly shown or called for in the Contract Documents which may be necessary to complete the construction of the work in good faith shall be performed, furnished, and installed by the CONTRACTOR as though originally so specified or shown, at no increase in cost to the OWNER.
- 1.2 This project shall be bid based on a lump sum/unit costs as stated in the Bid Schedule. The amounts of work to be done and materials or services to be furnished under contract are noted in the list attached to the Bid Schedule. Quantities are estimates only and shall not be taken as an expressed or implied statement that the actual amount of material or work will correspond to the estimates. Adjustments for overruns and/or underruns shall be made on the values in the Bid Schedule. The OWNER reserves the right to increase or decrease certain items from the work or materials by up to 25 percent if found desirable or expedient by the OWNER, and the CONTRACTOR is cautioned against unbalancing of the bid by prorating overhead into a few items only when there are a large number of items in the proposal. The overhead and indirect charges should be prorated on all items. In the event the Specifications define work to be accomplished for which the proposal does not provide a specific pay item, its costs shall be considered as part of the cost Mobilization/Demobilization/Cleanup.
- 1.3 The Work hereunder will be constructed under both a unit price and lump sum contract items. The contract time shall be as specified in the Agreement.

PART 2 – SPECIFICATIONS

- 2.1 The Specifications included in these Contract Documents establish the performance and quality requirements for materials and equipment, and the minimum standards for quality of workmanship and appearance. Any questions on interpretation of any portion of these Specifications should be directed to and determined by the ENGINEER or their representative.

PART 3 – REASONABLY IMPLIED PARTS OF THE WORK SHALL BE DONE ALTHOUGH ABSENT FROM SPECIFICATIONS

- 3.1 Specific tasks not completely described in these Specifications that are necessary or normally required as part of the work described, or that are necessary or required to make each installation satisfactorily or legally operable, shall be performed by the CONTRACTOR as incidental work without extra cost to the OWNER, as if fully described in these Specifications. The expense of such work shall be included in the applicable prices for the work described.

PART 4 – SEQUENCE OF OPERATIONS AND COMPLETION OF WORK

4.1 HOURS AND TIME OF WORK

- A. Construction activities, except those described below, shall be conducted between the hours of 7:00 a.m. and 7:00 p.m. daily, except Saturdays, Sundays and legally designated holidays during which no work will be allowed unless otherwise designated. Work hours shall conform to Salt Lake County and Sandy City ordinances and restrictions or local noise permit requirements, whichever is more restrictive. Special permission must be requested and granted, by the OWNER, for conducting work other than during the hours specified. Such permission, if granted, may require the CONTRACTOR to reimburse the OWNER for extra costs for premium pay for construction observation and other OWNER furnished support.

4.2 SCHEDULING

- A. Plan the work and carry it out with minimum interference to adjacent land users. Prior to starting the work, confer with the OWNER and its representatives to develop an approved work schedule which will allow minimal interference.
- B. CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

PART 5 – SITE CONDITIONS

5.1 SITE ACCESS

- A. The OWNER has the responsibility to provide legal access to the well site. The CONTRACTOR has the responsibility to provide physical access to the well site.

5.2 SITE INVESTIGATION AND REPRESENTATION

- A. The CONTRACTOR acknowledges satisfaction as to the nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, access to the site, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

The CONTRACTOR further acknowledges satisfaction as to character, quality, and quantity of surface and subsurface materials to be encountered from his inspection of the site and from reviewing any available records of other exploratory work. Failure by the CONTRACTOR to become acquainted with the physical conditions of the site and all the available information will not relieve the CONTRACTOR from responsibility for properly estimating the difficulty or cost of successfully performing the work.

- B. The CONTRACTOR warrants that as a result of examination and investigation of all the aforesaid data, the CONTRACTOR can perform the work in a good and workmanlike manner and to the satisfaction of the OWNER. The OWNER assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract and (2) the Contract expressly provides that the responsibility thereof is assumed by the OWNER.

5.3 INFORMATION ON SITE CONDITIONS

- A. If the OWNER or its representatives provide information concerning subsurface conditions or surface topography, neither the OWNER nor its representatives assume any responsibility whatever in respect to the sufficiency or accuracy of borings, or of the logs of test borings, or of other investigations that have been made, or of the interpretations made thereof, and there is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations are representative of those existing throughout such area, or any part thereof, or that unforeseen developments may not occur.

5.4 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

- A. Where the CONTRACTOR's operations could cause damage or inconvenience to telephone, television, power, oil, gas, or water systems, the CONTRACTOR shall make all arrangements necessary for the identification and protection of these utilities and services.
- B. The CONTRACTOR shall be solely and directly responsible to the owners and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage that may result from the drilling operations under the Contract Documents. Neither the OWNER nor the ENGINEER, their officers or agents shall be responsible to the CONTRACTOR for damages as a result of the CONTRACTOR's failure to identify and protect utilities encountered in the work.
- C. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to drilling operations, CONTRACTOR shall immediately notify the proper authority. The CONTRACTOR shall cooperate with proper authority. The CONTRACTOR shall cooperate with said authority in restoration of service as promptly as possible.
- D. Prior to starting any excavations, the CONTRACTOR shall (at least 48 hours in advance) call Blue Stakes Utility Locator Service toll free at 800-662-4111 (811 locally) and provide all necessary data relative to the proposed excavation. Confirm the location of any potential utilities in the vicinity to avoid them.

5.5 INTERFERING STRUCTURES

- A. Protect any and all existing structures from damage, whether underground or above ground. Where existing fences, gates, buildings, utilities, or any other structures must be removed to properly carry out the work, or are damaged during the work, they shall be restored at the CONTRACTOR's expense to their original condition and to the satisfaction of the property owner.

5.6 EASEMENTS AND RIGHT-OF WAYS

- A. The work will be located on property owned by Jordan Valley Water Conservancy District. The CONTRACTOR shall confine the development operations to within the property limits.
- B. It shall be the CONTRACTOR's responsibility to obtain such right-of-way additional to that specified or indicated to be provided as he may require to perform the work required to be performed under the contract.
- C. All compensation to be received by the CONTRACTOR for moving, maintaining, and restoring structures and improvements in accordance with the provisions hereof, and for complying with all the requirements prescribed herein, shall be included in the Bid Schedule.
- D. Neither the terms thereof nor anything shown on the DRAWINGS, in connection with rights-of-way provided by the OWNER shall be construed to entitle the CONTRACTOR to conduct operations in said right-of-way in violation of any county ordinances or regulations restricting interference with watercourses and drainage channels. The CONTRACTOR shall take adequate precautions against obstructing storm water flow in any affected watercourse or channel, and shall not deposit excavated material anywhere that might interfere with or be subject to erosion from such flow.
- E. Nothing herein shall be construed to entitle the CONTRACTOR to exclusive use of any public street or way during performance of the contract work, and he shall so conduct his operations as not to interfere unnecessarily with authorized work of utility companies or other agencies in such streets and ways.

5.7 MAINTENANCE OF EXISTING IMPROVEMENTS

- A. Unless otherwise indicated on the FIGURES or specified herein, or otherwise called for by the OWNER thereof, all water, sewer, gas, or oil lines, lighting, power, or communication lines, or other surface or sub-surface structures of any nature that may be affected by the work shall be maintained by the CONTRACTOR and shall not be disturbed, disconnected, or damaged by him during the progress of the work.
- B. In the event the CONTRACTOR, in the performance of the work, should disturb, disconnect or damage any of the above, he shall bear all expense of whatever nature arising from such disturbances or the replacement or repair thereof. When said damage causes an unscheduled interruption of service, the CONTRACTOR shall immediately alert the utility company involved and shall make the necessary arrangements with the utility company to expedite repairs. Reconstruction shall be of the same types of materials and to the same or better quality as that which existed prior to the start of construction.
- C. The CONTRACTOR shall not disturb nor move fences, trees, shrubbery, or other planting along the access routes or adjacent to the well site, except after approval by the OWNER. Any such

improvements moved, disturbed or damaged shall be restored by the CONTRACTOR to a condition at least as good as when he entered upon the work.

- D. All public and private streets, roads, and driveways and other paved areas damaged or excavated by the CONTRACTOR shall be reconstructed by him with materials, and to a degree of quality at least equal to that which existed prior to the beginning of the project; but in no case shall elements of restoration be inferior to the applicable requirements set forth elsewhere in these specifications.

5.8 FIELD RELOCATION

- A. During the progress of construction, it is expected that minor relocations of the work will be necessary. Such relocations shall be made only by direction of the OWNER or its representatives. If existing structures are encountered which prevent the construction, and which are not properly shown on the Drawings, notify the OWNER before continuing with the construction in order that the OWNER may make such field revisions as necessary to avoid conflict with the existing structures. If the CONTRACTOR shall fail to so notify the OWNER when an existing structure is encountered, and shall proceed with the construction despite this interference, he shall do so at his own risk.

PART 6 – TEMPORARY CONSTRUCTION UTILITIES AND FACILITIES

6.1 TEMPORARY WATER

- A. The CONTRACTOR is responsible for obtaining water and bearing all costs associated with obtaining a temporary water supply to conduct the work. All water requirements costs will be included in the CONTRACTOR's bid. The OWNER has a water source available onsite for use on the project. Connections vary from 1-inch to 2-inch supply. Hydrants are available from other entities if needed.
- B. The CONTRACTOR is responsible for installing temporary pipe, valves, and other appurtenances necessary to convey water to the site from any temporary water service connection obtained by the CONTRACTOR.

6.2 TEMPORARY ELECTRIC POWER

- A. Electrical power may or may not be available at the site. The CONTRACTOR is responsible for meeting its own power requirements. All power requirements cost will be included in the CONTRACTOR's bid.

6.3 SANITARY FACILITIES

- A. The CONTRACTOR shall provide and maintain sanitary facilities for his employees and his lower-tier Subcontractors' employees that will comply with the regulations of the local and state departments of health and safety. Cost of portable toilets and other appurtenances shall be included in CONTRACTOR's bid.

6.4 TELEPHONE

- A. Telephone service shall be established at the well site prior to conducting work and until all production well drilling, logging, construction, developing, and testing is complete. The purpose of this service is to allow the OWNER and ENGINEER to communicate with the CONTRACTOR's representatives or the ENGINEER's onsite personnel. A temporary telephone service or mobile telephone service are acceptable alternatives. The telephone shall be audible/visual to the driller at all times and the number shall be provided to the OWNER and ENGINEER. All telephone costs will be included as a part of the CONTRACTOR's mobilization bid.

PART 7 – SAFETY AND CONVENIENCE

7.1 CONSTRUCTION SAFETY PROGRAM

- A. The CONTRACTOR shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The CONTRACTOR shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.
- B. The duty of the OWNER and its representatives to conduct construction review of the CONTRACTOR's performance is not intended to include a review or approval of the adequacy of the CONTRACTOR's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

7.2 SAFETY EQUIPMENT

- A. The CONTRACTOR, as part of his safety program, shall maintain at his office or other well-known place at the jobsite, safety equipment applicable to the work as prescribed by the governing safety authorities, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of any person who may be injured on the jobsite.
- B. The CONTRACTOR shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work.
- C. The performance of all work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards and the like, shall be in accordance with the applicable governing safety authorities.

7.3 ACCIDENT REPORTS

- A. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the OWNER. In addition, the CONTRACTOR must promptly report in writing to the OWNER all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.
- B. If a claim is made by anyone against the CONTRACTOR or any lower-tier Subcontractor on account of any accident, the CONTRACTOR shall promptly report the facts in writing to the

OWNER, giving full details of the claim.

7.4 TRAFFIC MAINTENANCE AND SAFETY

- A. Comply with all rules and regulations of the state, county, and city authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by express permission of the OWNER. Conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project, and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

7.5 PROTECTION OF PROPERTY

- A. Protect stored materials, cultivated trees and crops, and other items located adjacent to the proposed work. Notify property owners affected by the construction at least 48 hours in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business. Maintain site surface drainage during construction.

7.6 FIRE PREVENTION AND PROTECTION

- A. The CONTRACTOR shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The CONTRACTOR shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

PART 8 – PRESERVATION, RESTORATION, AND CLEANUP

8.1 SITE RESTORATION AND CLEANUP

- A. At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.
- B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether these are on private property, or on state, county, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition. Replace topsoiled areas raked and graded to conform to their original contours.
- C. All existing drainage ditches and culverts shall be reopened and graded and natural drainage restored. Restore culverts broken or damaged to their original condition and location.

8.2 FINISHING OF SITE, BORROW, AND STORAGE AREAS

- A. Upon completion of the project, all areas used by the CONTRACTOR shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain.

8.3 REMOVAL OF ROCK FROM FINISHED SURFACES

- A. Remove and dispose of all loose rock and boulders larger than 2-inch diameter occurring on the finished surfaces as a result of the construction operations.

8.4 STREET CLEANUP DURING CONSTRUCTION

- A. Thoroughly clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation.

8.5 DUST PREVENTION

- A. Give all unpaved streets, roads, detours, or haul roads used in the construction area an approved dust-preventive treatment or periodically water to prevent dust. Applicable environmental regulations for dust prevention shall be enforced.
- B. During the performance of all work included in the contract or any operations appurtenant thereto, whether on public rights-of-way, easements provided by the OWNER or on private property, the CONTRACTOR shall furnish all the labor, equipment, and means required and shall carry out proper and efficient measures wherever and as often as necessary to prevent his operations from producing dust in amounts damaging to property or causing a nuisance to persons living nearby or occupying buildings in the vicinity. Inadequate dust control by the CONTRACTOR may result in substantial CONTRACTOR liability, as specified in the following paragraph.
- C. The CONTRACTOR shall be held liable for any damage resulting from dust originating from his operations whether on public rights-of-way, OWNER's right-of-way or on other property. All compensation to be received for dust abatement shall be included in the CONTRACTOR's bid.

PART 9 – MATERIALS AND WORKMANSHIP

- 9.1 The CONTRACTOR shall, except as specifically stated in the Contract Documents, provide all labor, materials, equipment, tools, and other facilities and services necessary for proper completion of all work under the Contract Documents.

9.2 MAINTENANCE AND GUARANTEE

- A. The CONTRACTOR hereby guarantees that the entire work constructed by him under the contract will meet fully all requirements thereof as to quality of workmanship and of materials furnished by him.
- B. The CONTRACTOR hereby agrees to make at his own expense any repair or replacement made necessary by defects in materials or workmanship supplied by him that becomes evident within a two-year period after date of final payment, and to restore to full compliance with the

requirements of these specifications, including all test requirements, any part of the plant facilities or appurtenant works which during said two-year period is found to be deficient with respect to any provision of the specifications.

- C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written orders for the same from the OWNER. If the CONTRACTOR fails to make repairs and replacements within 5 days upon notification, the OWNER may contract with others for performance of the work and the CONTRACT and his surety shall be liable to the OWNER for the cost thereof.
- 9.3 Wherever in these Specifications the word "approved" appears, it shall be understood to mean "as approved by the OWNER or authorized representative." Where approvals are required, the CONTRACTOR shall keep a written signed record of those approvals and report such approvals in the daily logs.
- 9.4 The CONTRACTOR is advised that other contractors or subcontractors may be working at the site during drilling. The CONTRACTOR shall coordinate work with other ongoing activities at the site.
- 9.5 Since the site may be accessible to the general public, inquiries as to the nature of the work are a possibility. All such inquiries by individuals or news media shall be politely referred to the OWNER.
- 9.6 SPECIALIST
 - A. A person, partnership, firm, or corporation of established reputation (or if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the Contract Documents, or otherwise performing Work required by the Contract Documents.
 - B. Where the Specifications require the installation by a Specialist, that term shall also be deemed to mean either the manufacturer of the item, a person, partnership, firm, or corporation licensed by the manufacturer, or a person, partnership, firm, or corporation who will perform the Work under the manufacturer's direct supervision.

PART 10 – SUBMITTALS DURING CONSTRUCTION

10.1 GENERAL

- A. Requirements in this section are in addition to any specific submittal requirements as set forth in Specification sections of these Contract Documents.
- B. Review, acceptance, or approval of substitutions, schedules, Shop Drawings, lists of materials, and procedures submitted or requested by the CONTRACTOR shall not add to the Contract amount, and all additional costs which may result therefrom shall be solely the obligation of the CONTRACTOR.
- C. The OWNER is not precluded, by virtue of review, acceptance, or approval, from obtaining a credit for construction savings resulting from allowed concessions in the work or materials thereof.

- D. It shall not be the responsibility of the OWNER or its representatives to provide engineering or other services to protect the CONTRACTOR from additional costs accruing from such approvals.
- E. After checking and verifying all field measurements, CONTRACTOR shall submit to ENGINEER and/or its representatives, in accordance with the schedule for submittals for review, submittals which shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submittal. The data shown shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to enable OWNER to review the information.
- F. All samples shall have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.
- G. Before submission of each submittal, CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each submittal with other submittals and with the requirements of the work and the Contract Documents.
- H. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the submittal may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each shop drawing submitted to OWNER for review and approval of each such variation.
- I. OWNER's review will be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions.
- J. ENGINEER 's review of submittals shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called OWNER's attention to each such variation at the time of submission and OWNER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the shop drawing or sample approval; nor will any approval by OWNER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions herein.
- K. Where a shop drawing or sample is required by the Specifications, any related work performed prior to ENGINEER's review and approval of the pertinent submission shall be the sole expense and responsibility of CONTRACTOR.
- L. The CONTRACTOR shall furnish a mark-up set of drawings indicating "As-Built" conditions, which shall reflect actual construction details of the well.

- M. Prior to the commencement of work at the site, a preconstruction meeting will be held at a mutually agreed upon time and place. The meeting shall be attended by the CONTRACTOR, its superintendent and its subcontractors as appropriate. Others attending will include the OWNER and the ENGINEER. Unless previously submitted, the CONTRACTOR shall bring to the meeting: construction schedules and a breakdown of contract price.

10.2 SUBMITTAL PROCEDURES

- A. Transmit an electronic copy of each submittal to the OWNER or its representative. A specific submittal address (email address) and person will be arranged upon award of the Contract.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- C. Identify project, CONTRACTOR, Project Title, Specification section number, description of the submittal, and reference to the Specifications Section and paragraph number being addressed, including products, units and assemblies, as appropriate.
- D. Apply CONTRACTOR's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Contract Documents.
- E. Information documenting the experience of fabricators and manufacturers of materials and equipment to be supplied shall be submitted to the ENGINEER with shop drawing submittals as herein specified.
1. Information for 3 or more projects including the purchaser, size and type of product provided, date of installation, and the name, address and phone number of a contact person knowledgeable of the project shall be included in these submittals. Experience requirements for manufacturers and fabricators shall be in accordance with the Notice to Bidders.
 2. The company name, address, phone number and name of a contact person of the local service representative of each manufacturer of equipment to be supplied shall be identified in the shop drawing submittals as herein specified.
 3. At a time sufficiently early to allow review as hereinafter specified and to accommodate the rate of construction progress required under the contract, the CONTRACTOR shall submit to the ENGINEER for review, complete shop, assembly and layout drawings of the fabricated materials to be furnished and installed under the contract.
 4. Said drawings shall indicate type of steel proposed to be used and five copies shall be submitted prior to manufacture or fabrication of the respective articles.
- F. Transmit submittals in accordance with final schedule of submittals.
- G. Revise and resubmit submittals as required, identify all changes made since previous submittal. Revisions shown of said shop assembly, or layout drawings, equipment drawings or catalogue data necessary to meet the requirements of the specifications shall not be taken as the basis of claims for extra charges. The CONTRACTOR shall accept such revisions or submit others for the ENGINEER to review. When delay is caused by the resubmission of details, the CONTRACTOR shall not be entitled to any damages or extensions of time on account of such delay.
- H. Submittals will be acted upon by the ENGINEER as promptly as possible, and transmitted to the

CONTRACTOR not later than 15 working days after receipt by the ENGINEER.

- I. As soon as practicable after acceptance by the ENGINEER of any data or shop, assembly, or layout drawing a final submittal shall be made with all corrections noted by the ENGINEER incorporated. This final submittal shall be clearly noted in CONTRACTOR's submittal as being a final submittal of accepted drawings or data and shall consist of clear legible pdf copies of all information. Final submittals shall be forwarded to the ENGINEER. No Fabrication or other work shall be performed in advance of the receipt of the final accepted drawings and data. The CONTRACTOR shall not deviate in any way from the design, details, or dimensions shown on said final drawings or data without written consent of the ENGINEER.

10.3 SCHEDULES

- A. Submit estimated progress schedule and preliminary schedule of submittals in duplicate to OWNER.
- B. Show complete sequence of construction by activity, identifying work of separate stages, and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- C. Progress schedule shall provide a workable plan for monitoring the progress of all elements of the work, establish the critical elements of work, and forecast potential problems in maintaining the specified completion dates.
- D. Progress schedule shall indicate submittal dates, and product manufacture and delivery dates.
- E. Preliminary schedule of submittals shall indicate the submittals required by Specification section number with brief description, and starting and completion dates for respective submittal preparation by the CONTRACTOR, and submittal review by the OWNER.
- F. Revise and resubmit as required, identify all changes made from previous schedule submittal.

PART 11 – INSPECTIONS AND TESTS OF MATERIALS

- 11.1 The CONTRACTOR shall furnish the OWNER full information as to the progress of the work in its various parts and shall give the OWNER timely notice of the CONTRACTOR's readiness for inspection. When practicable, inspection will be made during the manufacture of articles. The CONTRACTOR shall furnish, without additional charge, all reasonable facilities and assistance for the safe and convenient inspection and tests required by the OWNER.
- 11.2 Final inspection and acceptance of the articles or materials may be made after delivery at the site of the work and at the expense of the OWNER. In the event that any material at the site of the work is rejected on account of failure to pass inspection or test, the CONTRACTOR shall replace same promptly. Final inspection will be made as promptly as practicable but may not in all cases be made prior to construction or final assembly.
- 11.3 The OWNER shall have the right at all times and places to reject articles and/or materials to be furnished hereunder which, in any respect, fail to meet the requirements or these specifications, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the work at the site. If the observer, through an oversight or

otherwise, has accepted material or work which is defective or which is contrary to the specifications, such material, no matter in what stage or condition of manufacture, delivery, or erection may be rejected by the OWNER. Compliance with the specifications is distinctly a duty of the CONTRACTOR and shall not be avoided by act or omission on the part of the OWNER's observer.

- 11.4 Rejected articles and/or materials shall be removed promptly after notification, to a satisfactory distance from the vicinity of the accepted articles and/or materials at the expense of the CONTRACTOR. Any adjustments, corrections or repairs found necessary after the delivery of articles or materials, including all additional handling and shipping shall be paid for by the CONTRACTOR.

PART 12 – PERMITS, LICENSES, LAWS AND REGULATIONS

12.1 PERMITS AND LICENSES

A. WELL CONSTRUCTION PERMIT

1. Well construction permit applications are not required for the project. However, the CONTRACTOR shall, within 10 days after completing the well redevelopment and testing, submit all information required by the Utah Division of Water Rights Pump Installation Report (Pump Log).
2. The CONTRACTOR shall contact the Utah Division of Water Rights and Utah Division of Drinking Water to determine their inspection requirements (if any) and notify them according to their requirements, so they can inspect construction operations according to their requirements. If after inspection, the well is defective and ordered to be abandoned by the ENGINEER, then the CONTRACTOR shall obtain a permit from Utah Division of Water Rights according to their requirements for abandonment. All costs for compliance will be included in the CONTRACTOR's bid, and no additional compensation will be made for compensation in accordance with the permit requirements.

B. NOISE PERMIT

1. The CONTRACTOR shall comply with all federal, state, and local laws, regulations, and ordinances related to noise abatement and bear all costs associated with compliance and permitting.

12.2 LAWS AND REGULATIONS

- A. The CONTRACTOR shall comply with all federal, state, and local laws, regulations, and ordinances related to conducting the work and bear all costs associated with compliance.

PART 13 – ENVIRONMENTAL MITIGATION REQUIREMENTS

13.1 AIR QUALITY

- A. All earth material excavated, stockpiled, or transported shall be wetted regularly to control dust emissions.
- B. Vehicle speed on unpaved access roads shall be limited to 15 miles per hour.

- C. Vehicle traffic areas shall be wetted regularly to control dust. Watering should occur at least twice daily with complete coverage, preferably in late morning and after work is done for the day.
- D. Trucks transporting earth materials offsite shall maintain a minimum two-foot freeboard.
- E. All material transported offsite shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- F. Equipment engines shall be maintained in good condition and in proper tune as per manufacturer's specifications.
- G. All diesel-powered equipment should be turned off when not in use for more than 30 minutes and gasoline-powered equipment should be turned off when not in use for more than 5 minutes.
- H. Roadways in the vicinity of construction access points shall be swept as necessary to prevent the accumulation of silt.

13.2 SOIL QUALITY

- A. Machinery fluids, such as oil, fuel, hydraulic oil, brake fluid, etc., shall not be allowed to spill or leak onto the ground. In such case that spills occur the contaminated soil shall be removed and disposed of according to relevant environmental regulations and replaced with clean soil.

13.3 WATER QUALITY

- A. All drilling fluids, drill cuttings, and water generated during the modification/rehabilitation, well construction, well development and well testing shall meet the requirements of Section 33 20 00 2094 DEVELOPMENT FLUIDS AND PUMPED WATER DISPOSAL.
- B. All machinery used in or above the well itself shall be maintained in proper working order as to prevent contamination of well water from lubricating fluids.

PART 14 – PROJECT MEETINGS

14.1 PRECONSTRUCTION CONFERENCE

- A. Prior to commencement of work at the site, a preconstruction conference will be held at a mutually agreed time and place which shall be attended by the CONTRACTOR, its superintendent, and its subcontractors as appropriate.
- B. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date, which may include the following: CONTRACTOR's tentative schedules; transmittal, review, and distribution of CONTRACTOR's submittals; processing applications for payment; maintaining record documents; critical work sequencing; field decisions and change orders; use of project site, office and storage areas, security, housekeeping, and OWNER's needs; major equipment deliveries and priorities; and CONTRACTOR's assignments for safety and first aid.

- C. The ENGINEER will preside at the preconstruction conference and will arrange for keeping the minutes and distributing the minutes to all persons in attendance.

14.2 PROGRESS MEETINGS

- A. The CONTRACTOR shall schedule and hold regular on-site progress meetings at least weekly and at other times as required by the ENGINEER or as required by the progress of work. The CONTRACTOR, ENGINEER, and all subcontractors active on the site shall be represented at each meeting. The CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturer's, and other subcontractors.
- B. The ENGINEER shall preside at the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings will be to review the progress of work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

END OF SECTION

SECTION 02 67 60 WELL DISINFECTION

PART 1 – GENERAL

- 1.1 GENERAL: This section covers disinfection of the production well in order to remove bacteriological contamination that may cause the well water to be unsafe for human consumption.
- 1.2 REFERENCES: The latest edition of the following publications form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
 - A. American Water Works Association (AWWA) AWWA C-654 -Disinfection of Wells.
 - B. State of Utah Public Drinking Water Regulations, Division of Drinking Water, latest edition.
 - C. State of Utah Administrative Rules for Water Well Drillers, as found in R655 of the Utah Administrative Code.

PART 2 – MATERIALS

- 2.1 Disinfecting products shall consist of a chlorine solution using a calcium or sodium hypochlorite compound that will easily dissolve or mix with the water in the well. The strength of the chlorine solution shall be such that the desired chlorine residual of at least 50 mg/L may be readily achieved through the entire length of the well. Documentation by the CONTRACTOR referencing this residual shall be submitted to the OWNER.
- 2.2 If directed, pH-controlled chlorination products materials may be required to increase the effectiveness of the disinfecting process.
- 2.3 All chemicals and other products used shall conform to NSF Standard 60 for use with public drinking water facilities.

PART 3 – EXECUTION

- 3.1 Specific CONTRACTOR shall carry out adequate cleaning procedures immediately preceding disinfection where evidence indicates that normal well construction and development work have not adequately cleaned the well. All oil, grease, soil, and other materials, which could harbor and protect bacteria from disinfectants, shall be removed from the well.
- 3.2 The AWWA C-654 standard and the latest edition of the State of Utah Public Drinking Water Regulations will be used as a reference for the disinfection procedure.
- 3.3 The well shall be disinfected with a chlorine solution using a calcium or sodium hypochlorite compound that will easily dissolve and mix with the water in the well. The strength of the chlorine solution shall be such that the desired chlorine residual of at least 50 mg/L may be readily achieved through the entire length of the well.

- 3.4 Disinfected water shall be circulated throughout the well. Most of the flow should be returned to the well for recirculation. When returning water to the well, the flow should be directed to the well casing so as to completely wet that portion above the static water level. The solution shall remain in contact with the well casing above the static water level for at least 30 minutes.
- 3.5 After the 30-minute recirculation period, the disinfecting solution shall be allowed to stand in the well for at least one hour and then pumped until a distinct chlorine odor is detected at the pump discharge. Then discontinue pumping for 24 hours after chlorine odor is detected before beginning pumping tests. If a chlorine odor is still detected at the end of the pumping tests, continue pumping until all traces of chlorine are removed.
- 3.6 The CONTRACTOR shall neutralize disinfected water discharged from the well in accordance with all rules and regulations for the discharge location. The CONTRACTOR is responsible for preventing any damage to facilities, plant and animal life in the receiving stream, storm drain or other facility.
- 3.7 When well disinfection is complete, the CONTRACTOR shall make arrangements to collect water quality samples for bacteriological analysis.
 - a. Two bacteriological samples will be obtained at a minimum time interval of 30 minutes. Both samples must pass.
 - b. In the event that the bacteriological test fails, the CONTRACTOR shall re-disinfect the well and retest the well at no additional cost to the OWNER.

END OF SECTION

DIVISION 33
SITE WORK

SECTION 33 20 00 2015
MOBILIZATION/DEMobilIZATION/CLEANUP

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Work to be performed under this Section includes the work necessary to mobilize, demobilize, and clean up the well site related to the cleaning, chemical treatments, development, and testing of the 7700 South 700 East well.

PART 2 - PRODUCT

2.1 GENERAL

- A. Provide all temporary and permanent materials, equipment, and labor required to accomplish the work as specified.
- B. The Drilling or Workover Rig shall be capable of removing and re-installing the well pump, working at depths of up to 1020 feet, be equipped with high-speed winch line to facilitate bailing, brushing and swabbing, and be capable of producing a spudding action during dual swabbing and simultaneous pumping.

2.2 SECURITY FENCE

- A. A security fence shall be constructed for the protection of materials, tools, and equipment of the CONTRACTOR and lower-tier subcontractors. At completion of the work, remove fence from the site and restore the area. The security fence shall be constructed at the sole expense of the CONTRACTOR.
- B. The CONTRACTOR shall provide access at any time and any necessary keys/code to the ENGINEER.

2.3 PARKING FACILITIES

- A. Parking facilities for personnel working on the project will be limited. Confine employee parking to each well site.

2.4 NOISE CONTROL FACILITIES

- A. Where applicable, the CONTRACTOR will obtain a noise permit from Salt Lake County and/or the corresponding city (Sandy). The CONTRACTOR will be fully responsible for compliance to the permit and the CONTRACTOR shall demonstrate compliance with the noise control requirements. A copy of the Salt Lake County, Sandy City noise regulations are located in Appendix A.
- B. Diesel engine acoustical enclosure of steel framed, fiberglass filled panels shall be required for all drill rigs, work-over rigs, compressors and pumps. Where these engines are not properly

isolated to prevent noise in the supporting structure, this secondary noise shall be mitigated such as by the use of acoustical skirts for drill rig trailers. High performance mufflers shall be used on all diesel engines in regular use on the drill site.

- C. The well is located adjacent to residential homes. Efforts shall be taken especially if overnight activity occurs, to minimize excessive noise from reaching nearby houses.

PART 3 – EXECUTION

3.1 WELL CLEANING AND REDEVELOPMENT

- A. Set up the well drill/workover rig and related other equipment within the area designated by the ENGINEER. Accomplish all required work in accordance with applicable portions of these Specifications.

3.2 CONSTRUCTION LAYOUT

- A. Set up construction facilities in a neat and orderly manner within designated area. Accomplish all required work in accordance with applicable portions of these Specifications. Confine operations to work area shown.
- B. Some obstructions may not be shown. Bidders are advised to carefully inspect the existing facilities before preparing their bids. The removal and replacement of minor obstructions such as electrical conduits, water, waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.
- C. Major obstructions encountered that are not shown on the DRAWINGS, or could not have been foreseen by visual inspection of the site prior to bidding, should immediately be brought to the attention of the ENGINEER. The ENGINEER will make a determination for proceeding with the work.

3.3 CONTAMINATION PRECAUTIONS

- A. Avoid contamination of the project area. Do not dump waste oil, rubbish, or other similar materials on the ground.

3.4 DISPOSAL OF MATERIAL

- A. The CONTRACTOR shall be responsible for disposal of all fluids, solids, development water, and test waters as further described in these Specifications.

3.5 CLEANUP OF CONSTRUCTION AREAS

- A. During execution of the work, the CONTRACTOR shall daily clean the site, and public access roads and dispose of waste materials, debris, and rubbish to assure that grounds, and public and private properties are maintained free from accumulations of waste materials and rubbish. CONTRACTOR will provide containers for collection and disposal of waste materials, rubbish, and debris.

- B. Upon completion and acceptance of the work, remove from the site the development/pump rig and related equipment and all debris, unused materials, temporary construction buildings, and other miscellaneous items resulting from or used in the operations. Replace or repair any facility that has been damaged during the construction work. Restore the site to its original condition prior to construction of this project.

END OF SECTION

SECTION 33 20 00 2070
VIDEO CAMERA SURVEYS

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. Work to be performed under this Section includes the work necessary to make the video camera surveys. A video camera survey will be conducted prior to any work performed in the well to assess a baseline condition. Additional video camera surveys may be performed after development phases and before the installation of the permanent pump.

1.2 NOTIFICATION TO THE ENGINEER

- A. The CONTRACTOR shall be responsible to give the ENGINEER 24-hour advance notice prior to beginning a video camera survey for the well.

1.3 SUBMITTALS DURING CONSTRUCTION

- A. The CONTRACTOR shall submit each video camera surveys for the well as specified below.

PART 2 – PRODUCT

2.1 GENERAL

- A. Provide all temporary and permanent materials, supplies, tools, equipment, and labor required to accomplish the work as specified.

PART 3 – EXECUTION

3.1 GENERAL

- A. After removal of the existing pump, a color video camera survey shall be run the full depth of the well by the CONTRACTOR. A second video camera survey will be conducted following the brushing and bailing of the well. A third video survey may be completed prior to the installation of the permanent pump at the direction of the ENGINEER. The proposed camera survey shall receive the ENGINEER's approval before being performed. Nonfunctioning video equipment or poor-quality video due to equipment malfunction or defects may be rejected and need to be re-performed at no additional cost to OWNER. The survey shall be performed in the presence of the ENGINEER.
- B. In the event a clear video is not available, clearing the well with a flocculent will be required to obtain a good quality video survey. Prior to conducting the video survey, the CONTRACTOR shall clear the well with an NSF certified flocculent. The CONTRACTOR shall mix 1 quart of Baroid EZ Mud, or approved equivalent, with 55 gallons of potable water and pour it into the well. The CONTRACTOR shall then pour 5 gpm of potable water from a chlorinated municipal source into the well for a 12-hour period (3,600 gallons water). The well clearing procedure shall be used prior to each video performed on the project.

- C. After clearing the well with the flocculent solution and potable water, a color video camera survey shall be performed the full depth of the well by the CONTRACTOR.
- D. The equipment used shall produce a DVD/digital video with an automatic depth indication at 1/10-foot intervals. The beginning and end of the video shall contain the date and well name. The DVD disks and box or flash drive shall be labeled clearly with the date and well name. The video camera shall have vertical down-hole and horizontal side-hole viewing capability. Horizontal side-hole viewing shall be controllable to allow viewing at any angle within a 360-degree rotation.
 - 1. A dynamic vertical down-hole view video shall be run from the top of the well to the bottom of the well at a speed not exceeding 30 feet per minute.
 - 2. The video camera during the dynamic vertical down-hole view run shall be interrupted at the direction of the ENGINEER for periodic static horizontal side-hole viewing.
- E. The CONTRACTOR shall provide the ENGINEER with the original DVD or flash drive video and two additional copies on DVD or flash drive within 48 hours of the completion of the survey.
- F. The ENGINEER and OWNER reserve the right to inspect the video for quality, and the well for damage to the well screen and casing. If damage to the casing or screen are found and the cause is due to work performed by the CONTRACTOR, the CONTRACTOR shall bear the cost for the necessary repairs and the cost of resurveying the well.

END OF SECTION

SECTION 33 20 00 2071
WELL CLEANING

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. Work to be performed under this Section includes the labor, supplies, tools, materials, and equipment necessary for the cleaning of the well using a cable-tool drilling rig, well workover rig, or other ENGINEER-approved development rig. The rig shall be equipped with high-speed winch line to facilitate bailing, brushing, and be capable of spudding action.
- B. Water and generated during bailing shall be disposed of as specified in 33 20 00 2094 DRILLING FLUIDS, CUTTINGS, AND PUMPED WATER DISPOSAL.
- C. The total well cleaning time (brushing and bailing) is estimated in the Bid Schedule for the well. However, the ENGINEER shall be the sole judge as to when well cleaning is complete and may therefore increase or decrease the total cleaning time. Time will be counted when the well cleaning tools are working in the well.

1.2 NOTIFICATION TO THE ENGINEER

- A. The CONTRACTOR shall be responsible to give the ENGINEER 24-hour advance notice prior to beginning well cleaning by brushing and bailing.

PART 2 – PRODUCT

2.1 GENERAL

- A. Provide all temporary and permanent materials, supplies, tools, equipment, and labor required to accomplish the work as specified.

2.2 BRUSHING AND BAILING EQUIPMENT

- A. Furnish a steel wire brush and bailer, and all necessary appurtenant equipment necessary for cleaning the well. The wire brush shall be of sufficient diameter and stiffness to effectively clean the well casing and stainless-steel wire-wrap screen. A photo of an acceptable wire brush is below. The CONTRACTOR must verify the casing diameter prior to beginning work. Should the integrity of the screen appear to be fragile, the ENGINEER may direct that a nylon brush be used
- B. The well casing reduces with depth, starting with 20-inch diameter, 16-inch, and then 12-inch. The depths for the reduction in casing diameter shall be identified and recorded with the initial well video.



- C. Furnish a bailer, and all necessary appurtenant equipment necessary to clean the well. The bailer shall have a minimum diameter of 6-inches and be a bottom loading device and be used to remove accumulated sediment in the bottom of the well. The bailer shall be capable of picking up material and resealing to remove the sediment from the well.

PART 3 – EXECUTION

3.1 GENERAL

- A. Tag the bottom of the well with a weighted wire line or other suitable measuring device and record it as the initial condition of the Well.
- B. The CONTRACTOR shall notify the ENGINEER and make the necessary arrangements for conducting well cleaning. The time required for brushing and bailing will be recorded by the hour with one-half hour intervals as the smallest units of time credited to the CONTRACTOR. The time to be recorded for well cleaning shall commence when the equipment is installed in the well and is placed in operation, and shall end when cleaning is stopped at the direction of the ENGINEER. No time will be recorded for delays resulting from equipment stuck in the hole; equipment breakdown; or failure to conduct the operations in a diligent and workmanlike manner by which the desired results could ordinarily be expected.
- C. Lower the wire brush into the Well on a solid string of drill pipe or an approved wireline setup, running the brush at a sufficient rate to dislodge scale/sediment without damaging the well structure. Once brushing is completed, bail the Well using a high-speed wire line. Each bailer pass shall go to the bottom of the well. Bail all accumulated materials from the Well and attempt to clean to the original depth of **1002 feet**.
- D. Disposal of water produced during development and the collected solids is the responsibility of the CONTRACTOR and shall be done in accordance with all applicable laws and regulations. Solids settling may be required before the water is discharged to the discharge location, as well as adherence to other State of Utah requirements. The CONTRACTOR shall obtain all permits that are required for disposal of the waste materials.

- E. Tag the bottom of the well with a weighted wire line or other suitable measuring devise and record it. The total amount of material removed from the well during bailing shall be recorded in the Driller's log.

END OF SECTION

SECTION 33 20 00 2094
DEVELOPMENT FLUIDS AND PUMPED WATER DISPOSAL

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. Work to be performed under this Section includes the labor, supplies, tools, materials, and equipment necessary to dispose all fluids and water generated during well cleaning and treatments.
- B. Costs associated with the disposal of development fluids and water generated during well development shall be included in the unit cost for development.

1.2 PERMITS, LAWS, AND REGULATIONS

- A. The CONTRACTOR shall comply with all applicable permits, laws, and regulations in disposing of fluids, solids, and water generated during well development and disinfection. The permits, laws and regulations shall include, but not be limited to all federal, state, and local laws, regulations, and ordinances related to disposing of materials generated in constructing wells.

1.3 SUBMITTALS DURING CONSTRUCTION

- A. The CONTRACTOR shall submit the following:
 - 1. If applicable, or requested by the ENGINEER, approved chain-of-custody form(s) demonstrating compliance with federal, state, and local laws, regulations, and ordinances related to disposing of materials generated during well development.

PART 2 – PRODUCT

2.1 GENERAL

- A. Provide all temporary and permanent materials, supplies, tools, equipment, and labor required to accomplish the work as specified.

2.2 OWNER-SUPPLIED FACILITIES

- A. The OWNER will make available to the CONTRACTOR the use of an existing location to directly discharge well development water. The location(s) to discharge water are shown on the attached FIGURES. The CONTRACTOR is responsible for supplying the transmission piping and other appurtenances to convey the water from the well to the designated discharge point. The CONTRACTOR is responsible to ensure the discharge water meets all applicable water quality standards prior to discharge.

PART 3 – EXECUTION

3.1 DISCHARGE WATER FROM DEVELOPMENT BY PUMPING AND WELL TESTING

- A. All well development fluids, disinfection treatment fluids, development and testing water shall be contained onsite in appropriate containers, such as Baker tanks, Frac tanks, or equivalent until such time water quality suitable for discharge is achieved in accordance with State of Utah regulations. If water quality of the well cleaning and development fluids is suitable in accordance with State of Utah regulation, the fluids can be discharged to the OWNER-designated location(s). Frac tanks shall be used for all fluids removed from the Well to remove sand/sediment. Neutralization and dechlorination of the water removed from the well will be necessary. Soda ash, or an approved neutralizer, will be used in appropriate amounts by the CONTRACTOR to neutralize the acid treatment to meet discharge requirements. Sodium thiosulfate, or similar, will be used in appropriate amounts by the CONTRACTOR to dechlorinate to meet discharge requirements.
- B. The water remaining after separation that meets State of Utah water quality standards shall be discharged to the OWNER-designated location(s). The CONTRACTOR shall discharge water so as not to create erosion or cause turbidity in any downstream surface water channel or basin.
- C. The solid matter removed from the well shall be removed from the site by the CONTRACTOR and disposed offsite in accordance with applicable ordinances and regulations of governmental agencies having jurisdiction.
- D. It is the CONTRACTOR's responsibility to minimize impacts to access and use of private and public road by the transmission piping and discharge stream. Use of ramps, earthen berms, or similar means for pipeline crossings of public and private accesses shall be employed. In addition, caution signs and speed restrictions shall be employed where public right-of-ways are impacted. The CONTRACTOR shall coordinate ramps and signage with the OWNER.

END OF SECTION

DIVISION 43
GAS, LIQUID, AND STORAGE

**SECTION 43 20 10 PUMPS,
GENERAL**

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. The Contractor shall provide all pumps and pumping appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The provisions of this Section shall apply to all pumps and pumping equipment except where otherwise indicated in the Contract Documents.
- C. Unit Responsibility: A single manufacturer shall be made responsible for furnishing the Work and for coordination of design, assembly, testing, and installation of the Work of each pump Section; however, the Contractor shall be responsible to the Owner for compliance with the requirements of each pump Section. Unless otherwise indicated, the single Manufacturer shall be the Manufacturer of the pump.
- D. Single Manufacturer: Where two or more pump systems of the same type or size are required, the pumps shall all be produced by the same Manufacturer.

1.2 CONTRACTOR SUBMITTALS

- A. General: Submittals shall be furnished in accordance with Section 01 33 20 - Contractor Submittals.
- B. Shop Drawings: Shop drawings shall contain the following information:
 - 1. Pump name, identification number, and specification Section number.
 - 2. Performance data curves showing head, capacity, horsepower demand, NPSH required, and pump efficiency over the entire operating range of the pump. The equipment Manufacturer shall indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the design flow conditions and the maximum and minimum flow conditions. A family of performance curves at intervals of 100 rpm from minimum speed to maximum speed shall be provided for each centrifugal pump equipped with a variable frequency drive.
 - 3. The Contractor shall require the Manufacturer to indicate on the performance curves the limits recommended for stable operation without surge, without cavitation, and without vibration (except vibration within specified allowable limits). The stable operating range shall be as wide as possible based on actual hydraulic and mechanical measurements taken during the factory performance tests of the pumps.
 - 4. Assembly and installation drawings including shaft size, seal, coupling, bearings, anchor bolt plan, part nomenclature, material list, outline dimensions, and shipping weights.
 - 5. Data, in accordance with Section 26 20 00 – Low Voltage AC Induction Motors, for the electric motor proposed for each pump.
 - 6. Elevation of proposed Local Control Panel showing panel-mounted devices, details of enclosure type, single line diagram of power distribution, and current draw of panel,

- and list of all terminals required to receive inputs or to transmit outputs from the Local Control Panel.
- 7. Wiring diagram of field connections with identification of terminations between Local Control Panels, junction terminal boxes, and equipment items.
- 8. Complete electrical schematic diagram.
- C. Operation and Maintenance Manual: The Manual shall contain the required information for each pump Section.
- D. Spare Parts List: A Spare Parts List shall contain the required information for each pump Section.
- E. Factory Test Data: Signed, dated, and certified factory test data for each pump system which requires factory testing, submitted before shipment of equipment.
- F. Certifications
 - 1. Manufacturer's certification of proper installation.
 - 2. Contractor's certification of satisfactory field testing.

1.3 QUALITY ASSURANCE

- A. Factory Testing: The following tests shall be conducted on each indicated pump system:
 - 1. Motors: All motors of sizes 100 hp and larger shall be assembled, tested, and certified at the motor factory and the working clearances checked to insure that all parts are properly fitted. The tests shall be in accordance with ANSI/IEEE 112 - Test Procedure for Polyphase Induction Motors and Generators, and ANSI/IEEE 115 - Test Procedure for Synchronous Machines, including heat run and efficiency tests. All computations shall be recorded and certified and dated copies of the test results shall be furnished.
 - 2. Pumps: The Manufacturer's certified test motor shall be acceptable to test the pump. Testing of prototype models will not be acceptable. Testing shall be performed in accordance with the Hydraulic Institute grade B1 standard. The following minimum test data shall be submitted:
 - a. Hydrostatic test data
 - b. A minimum of five hydraulic test readings between shutoff head and 25 percent beyond the maximum indicated capacity, recorded on data sheets as defined by the Hydraulic Institute.
 - c. Pump curves showing head, flow, bhp, efficiency, and NPSH requirements.
 - d. Certification that the pump horsepower demand did not exceed the rated motor hp beyond the 1.0 service rating at any point on the curve.
 - 3. Factory Witnessed Tests: Witness tests are not required.
- B. Warranty: Unless otherwise specified, each pump shall be supplied with manufacturer's standard warranty of one (1) year from final completion of the project or (18) months from date of manufacture/shipment date.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Compliance with the requirements of the individual pump Sections may necessitate modifications to the Manufacturer's standard equipment.
- B. Performance Curves: All centrifugal pumps shall have a continuously rising curve. In no case shall the required horsepower at any point on the performance curve exceed the rated horsepower of the motor or engine, or encroach on the service factor.
- C. No cavitation shall be allowed in pumps operating within the stable operating range for the specified operating conditions. For the purposes of this provision, cavitation shall be recognized and accepted as being present in a pumping unit if cavitation noise can be perceived either by the human ear or by acoustic instruments or devices. The presence or absence of cavitation noise shall be verified by the Owner during both the factory performance tests of the pumps and during operation of the pumps up to the end of the warranty period. To assist in revealing potential cavitation during the factory performance tests, in addition to all other required tests, the Manufacturer shall force the pumps to operate at the specified minimum net positive suction head available for each of the following conditions: minimum flow rate, design flow rate and head, and maximum flow rate.
- D. All components of each pump system provided under the pump Sections shall be entirely compatible. Each unit of pumping equipment shall incorporate all basic mechanisms, couplings, electric motors, variable frequency controls if required, necessary mountings, and appurtenances.

2.2 MATERIALS OF CONSTRUCTION

- A. All materials shall be suitable for the intended application; materials not specified shall be high-grade, standard commercial quality, free from all defects and imperfection that might affect the serviceability of the product for the purpose for which it is intended, and shall conform to the following requirements:
 - 1. Cast iron pump casings and bowls shall be of austenitic ductile iron, conforming to ASTM A 439 - Specification for Austenitic Ductile Iron Castings, or equal.
 - 2. Bronze pump impellers shall conform to ASTM B 62 - Specification for Composition Bronze or Ounce Metal Castings, or B 584 - Specification for Copper Alloy Sand Castings for General Applications, where dezincification does not exist.
 - 3. Stainless steel pump shafts shall be Type 416 or 316. Miscellaneous stainless steel parts shall be of Type 316.
 - 4. All anchor bolts, nuts, and washers that are not buried or submerged shall be hot-dip galvanized, unless otherwise specified in individual pump Sections. Buried or submerged bolts, nuts, and washers shall be stainless steel in accordance with Section 05 50 00 – Metal Fabrications.
- B. Materials in contact with potable water shall be listed as compliant with NSF Standard 61.

2.3 PUMP COMPONENTS

- A. Flanges: Suction and discharge flanges shall conform to ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800 or B16.5 - Pipe Flanges and Flanged Fittings Dimensions.
- B. Lubrication: Vertical pump shafts of clean water pumps shall be product water-lubricated, unless otherwise specified. Deep-well pumps and pumps with dry barrels shall have water-or oil-lubricated bearings and seals and enclosed lineshafts. Pumps for other process fluids shall be lubricated as indicated.
- C. Handholes: Handholes on pump casings shall be shaped to follow the contours of the casing to avoid any obstructions in the water passage.
- D. Vortex Suppressors: Vertical pumps with marginal submergence shall be provided with vortex suppressors.
- E. Drains: All gland seals, air valves, cooling water drains, and drains from variable frequency drive equipment shall be piped to the nearest floor sink, or drain, with galvanized steel pipe or copper tube, properly supported with brackets.
- F. Grease Lubrication: For all vertical propeller, mixed-flow, and turbine pumps, other than deep well pumps, of bowl sizes 10-inches and larger, the Contractor shall provide a stainless steel tube attached to the column for grease lubrication of the bottom bearing.
- G. Stuffing Boxes: Where stuffing boxes are indicated for the pump seal, they shall be of the best quality, using the Manufacturer's suggested materials best suited for the specific application. For drainage and liquids containing sediments, the seals shall be fresh-water flushed, using lantern rings.
1. Unless otherwise specified, the packing material shall be interlaced Teflon braiding, containing 50 percent ultrafine graphite impregnation to satisfy the following:
 - a. Shaft speeds - up to 2500 rpm
 - b. Temperature - up to 500 degrees F
 - c. pH range - 0 to 14.
 2. If fresh water is not available, the seal shall be flushed with product water cleaned by a solids separator as manufactured by John Crane Co., Lakos (Claude Laval Corp.), or equal.
- H. Mechanical Seals: Mechanical seals shall be fresh water-flushed unless indicated otherwise; in which case product water cleaned by a solids separator as above shall be used. Mechanical seals shall be as manufactured by the following, or equal:
- | Type | Manufacturer |
|-----------------------------|---|
| Water Pumps
Hot and Cold | Single seals:
John Crane, Type I, 21;
Borg-Warner Type L;
Chesterton |
- I. Where indicated, a buffer fluid must be circulated a minimum 20 psi above discharge pressure, or as required by the Manufacturer, in order to maintain reliable seal performance.

- J. Mechanical seals for all services other than chemicals and corrosives shall be equipped with nonclogging, single coil springs and nonsliding, internal, secondary elastomers. Metal parts shall be Type 316 stainless steel, Alloy 20, or Hastelloy B or C.

2.4 PUMP APPURTENANCES

- A. Nameplates: Each pump shall be equipped with a stainless steel nameplate indicating serial numbers, rated head and flow, impeller size, pump speed, and Manufacturer's name and model number. Dimension and flow information shall be in metric units, followed by English units in parentheses.
- B. Solenoid Valves: The pump Manufacturer shall provide solenoid valves on the water or oil lubrication lines and on all cooling water lines. Solenoid valve electrical ratings shall be compatible with the motor control voltage.
- C. Gauges: all pumps (except sample pumps, sump pumps, and hot water circulating pumps) shall be equipped with pressure gauges installed at pump discharge lines. Pump suction lines shall be provided with compound gauges. Gauges shall be located in a representative location, where not subject to shock or vibrations, in order to achieve true and accurate readings.
 - 1. Where subject to shock or vibrations, the gauges shall be wall-mounted or attached to galvanized channel floor stands and connected by means of flexible connectors.
 - 2. Pressure and compound gauges shall be provided in accordance with contract documents.

PART 3 - EXECUTION

3.1 SERVICES OF MANUFACTURER

- A. Inspection, Startup, and Field Adjustment: Where required by the individual pump Sections, an authorized service representative of the Manufacturer shall visit the site for the number of days indicated in those Sections to witness the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation.
 - 1. Installation of the equipment.
 - 2. Inspection, checking, and adjusting the equipment.
 - 3. Startup and field testing for proper operation.
 - 4. Performing field adjustments to ensure that the equipment installation and operation comply with the specified requirements.
- B. Instruction of the Owner's Personnel
 - 1. Where required by the individual pump Sections, an authorized training representative of the Manufacturer shall visit the site for the number of days indicated in those Sections to instruct the Owner's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment. Instruction shall be specific to the models of equipment provided.
 - 2. The representative shall have at least two years' experience in training. A resume for the representative shall be submitted.

3. Training shall be scheduled a minimum of three weeks in advance of the first session.
4. Proposed training material and a detailed outline of each lesson shall be submitted for review. Comments shall be incorporated into the material.
5. The training materials shall remain with the trainees.
6. The Owner may videotape the training for later use with the Owner personnel.

3.2 INSTALLATION

- A. General: Pumping equipment shall be installed in accordance with the Manufacturer's written recommendations.
- B. Alignment: All equipment shall be field tested to verify proper alignment, operation as specified, and freedom from binding, scraping, vibration, shaft runout, or other defects. Pump drive shafts shall be measured just prior to assembly to ensure correct alignment without forcing. Equipment shall be secure in position and neat in appearance.
- C. Lubricants: The Contractor shall provide the necessary oil and grease for initial operation.

3.3 PROTECTIVE COATING

- A. Materials and equipment shall be coated as required in Section 09 90 00 – Protective Coatings and Linings.

3.4 FIELD TESTS

- A. Where required by the individual pump Sections, each pump system shall be field tested after installation to demonstrate satisfactory operation without excessive noise, vibration, cavitation, or overheating of bearings.
- B. The following field testing shall be conducted:
 1. Startup, check, and operate the pump system over its entire speed range. Vibration shall be within the amplitude limits recommended by the Hydraulic Institute Standards at a minimum of four pumping conditions defined by the Engineer.
 2. Obtain concurrent readings of motor voltage, amperage, pump suction head, and pump discharge head for at least four pumping conditions at each pump rotational speed. Check each power lead to the motor for proper current balance.
 3. Determine bearing temperatures by contact type thermometer. A run time of at least 20 minutes shall precede this test, unless insufficient liquid volume is available.
 4. Electrical and instrumentation tests shall conform to the requirements of the Sections under which that equipment is indicated.
- C. Field testing will be witnessed by the Engineer. The Contractor shall furnish 5 days advance notice of field testing.
- D. In the event any pumping system fails to meet the test requirements, it shall be modified and retested as above until it satisfies the requirements.
- E. After each pumping system has satisfied the requirements, the Contractor shall certify in writing that it has been satisfactorily tested and that all final adjustments have been made.

Certification shall include the date of the field tests, a listing of all persons present during the tests, and the test data.

- F. The Contractor shall bear all costs of field tests, including related services of the Manufacturer's representative, except for power and water which the Owner will bear. If available, the Owner's operating personnel will provide assistance in field testing.

END OF SECTION

SECTION 43 24 03
VERTICAL TURBINE PUMPS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall provide vertical turbine pumps and drives with associated appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 43 20 10 – Pumps, General apply to this Section.
- C. The Supplier shall examine the Site conditions, intended application, and operation of the pump system and recommend the pump that will best satisfy the indicated requirements.

1.2 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Submittals shall be made in accordance with Section 01 33 20 – Contractor Submittals and Section 43 20 10 – Pumps, General.
- B. Spare Parts List: The Contractor shall obtain from the manufacturer and submit at the same time as Shop Drawings a list of manufacturer suggested spare parts for each piece of equipment specified. The Contractor shall also furnish the name, address and telephone number for the nearest distributor for each piece of equipment.
- C. Operation and Maintenance Manual: Provide technical operation and maintenance manuals in accordance with Section 01 33 20 – Contractor Submittals.

1.3 QUALITY ASSURANCE

- A. All pumps shall be factory tested in accordance with Section 43 20 10 – Pumps, General.
- B. Provide pump manufacturer's standard warranty which starts one (1) year upon final completion of the project.

PART 2 - PRODUCTS

2.1 GENERAL

A. Pump Identification:

Pump Name	7700 S 700 E
Location	Well House Building

2.2 OPERATING CONDITIONS

- A. The Work of this Section shall be suitable for long term operation under the following conditions:

Parameter	Units	Value
Duty		Continuous
Motor Starter/Drive		RVSS
Ambient environment		Indoors
Ambient temperature	Deg F	35 to 110
Ambient relative humidity	%	20 to 95
Fluid service		Potable Water
Fluid temperature	Deg F	40 to 75
Fluid pH range		7.0 to 8.0
Fluid specific gravity		1.0
Fluid viscosity	absolute centipoise at 60 deg F	1.14
Project site elevation	ft, msl	4458
Static water surface in well	ft, msl	4295
Minimum water surface in well (low water level/drawdown)	ft, msl	4170

2.3 PERFORMANCE REQUIREMENTS

A. Pump shall meet the following minimum performance requirements:

Parameter	Units	Value
Design flow capacity	gpm	2,150
Design flow head TDH	ft	540
Design flow minimum efficiency	%	83
Minimum efficiency at maximum flow	%	80
NPSH required	ft	Required to be 20 ft minimum less than NPSHa at all points on the pump curve
Maximum pump speed	rpm	1800
Maximum motor speed	rpm	1800
*Motor size	HP	400

B. Pump Dimensions

Parameter	Units	Value
Column Length	ft	375
Column diameter	inch	12
*Discharge diameter	inch	12
Discharge flange rating ANSI	psi	150
*Minimum column shaft diameter	inch	2-3/16
Minimum bowl shaft diameter	inch	2-3/16
Maximum bowl diameter	inch	14.5

****The existing pump, shafting, pump column piping and tubing shall all be removed and replaced. The existing US motor shall be removed and reinstalled. The existing discharge head shall be removed, prepped and recoated/lined per specifications.***

2.4 MATERIALS OF CONSTRUCTION

A. Each vertical turbine pumps shall conform to the following requirements:

Bowls	Cast-iron, lined with vitreous enamel having a total thickness of 10 mils. The exterior surfaces of the bowl units shall be coated with System No. 1 to the specified DFT's in accordance with Section 09 90 00 – Protective Coatings and Linings
Impeller	Bronze statically and dynamically balanced
Impeller shaft method of connection	Type 316 stainless steel impeller lock collet
Wear rings	Heat Treated 17-4 stainless steel – Non-galling with impeller wear rings heat treated to a hardness of at least 50 BHN above the bowl wear rings
Bowl shaft	Stainless steel, Type 17-4
Suction bell	Cast iron bell, with bottom bearing and streamlined ribs, lining and coating, see bowls
Column	Column pipe shall comply with ASTM A53 Grade B steel pipe with a minimum wall thickness of 0.330 inch. Column sections shall not exceed 20 feet in length and shall be interchangeable. Each section shall be equipped with butt threaded coupling and column pipe suitable for the pump shutoff head. Friction pipe loss shall not exceed 5 feet per 100 feet based on the rated capacity of the pump.
Line shaft and couplings	C1045 carbon steel, turned, ground and polished. Furnished in interchangeable sections not over 20 feet in length to properly match the discharge column. Line shaft shall be coupled with 1215 carbon steel couplings.
Shaft lubrication	Oil Lubricated
Shaft seal	Stretch assembly, steel.
Shaft enclosing tube	Shaft enclosing oil tube materials and dimensions shall conform with ASTM A53 or A120, Schedule 80 steel, machined to AWWA E101 tolerances and pressure tested to 1100 psi, minimum.
Line shaft bearings	Line shaft bearings shall be highest quality bearing bronze, oil lubricated, self-centering, with turnout lugs or other suitable feature to enable easy removal and installation, and spiral oil grooves. Maximum spacing 10 feet.
Discharge head	Existing discharge head shall be used, see coatings section below
Motor shaft coupling	Enclosed
Bowl and suction bearings	Marine bronze bearings with suction sand collar
Strainer	Stainless steel cone strainer

Nameplates	Stainless-steel nameplate giving the manufacturer's model and serial number, rated capacity, head, speed, and all other pertinent data shall be attached to the pump. An additional nameplate shall be provided and attached to the discharge head that indicates pump manufacturer, pump model and serial number, pump flow rate, TDH, and top of bowl elevation.
Coatings	Coatings and application shall conform to Section 09 90 00 – Protective Coatings and Linings. Discharge head shall be coated using System No. 4 and lined using System No. 1 to the specified DFTs. Pump columns shall be uncoated and unlined. Pump bowls shall be lined and coated as specified above.

2.5 ELECTRICAL REQUIREMENTS

- A. The pump supplier shall disconnect the existing pump motor prior to removal of the existing pump. The pump supplier shall transport and pay for reputable motor shop to recondition the motor and perform bench test. After installation of the new pump, the pump supplier shall reinstall the motor and make all connections to the electrical system for a complete and operable system.
- B. Reconditioning of the motor shall include replacement of the upper and lower bearings, machine work on the bearing housings, insulation coating of the windings, and balancing of the rotor. Recoat the motor exterior to be the same as the existing motor color before reconditioning was performed.
- C. Existing Motor Parameters:

Manufacturer	US Motor
Motor Size	400 HP
Voltage	460 V, 3-phase
Motor speed	1800 rpm
Type	CFV
Frame	689
Serial Number	1237652
Temperature Rating	40° C
Upper Bearing	4-7230GM
Lower Bearing	1-6320JC3

2.6 WELL CONNECTIONS

- A. Pump supplier shall furnish and install a new well level transducer, Endress+Hauser Waterpilot FMX21, scaled to 150 psi and is NSF certified. The transducer unit shall be mounted through the pump discharge head with a sounder tube terminating at the top of the bowl assembly. Transducer cable shall be terminated within an existing junction box located at the pump discharge head, contractor to field verify the required length of transducer cable. Salvage existing transducer to Owner. The estimated cable length beyond well head is 10 feet.

- B. The discharge head has two existing 1" penetrations, two are used for the existing transducer and a spare. Each tube shall be removed and two new 1-1/4" PVC Schedule 80 flush thread tubes shall be installed from the top of the pump bowls up through the discharge head. The connection to the discharge head will need to be modified to accept the larger 1-1/4" tubes.

2.7 CONTROLS & INSTRUMENTATION

- A. Pumps shall be controlled per the existing well requirements.

2.8 MANUFACTURER'S, NO OR EQUAL:

- A. The pump shall be manufactured by one of the following companies. However, listing of a pump manufacturer does not warrant that their respective equipment or capabilities can or will meet the specifications, or that the Engineer has reviewed or approved technical information from every manufacturer. The named firms are believed to be reputable, long-term manufacturers of high-quality equipment. The successful pump supplier shall be required to meet the performance and technical requirements of this and related specifications, irrespective of any differences in standard materials, components and/or means and methods used to manufacture the equipment. The manufacturer shall have an operating service center and/or authorized repair facility located within 100 miles of the pump station which shall have been in continuous active operation for at least 5 years. The following manufacturers may be considered upon submittal review and approval.

- i. Fairbanks Morse
- ii. Floway
- iii. Flowserve
- iv. National Pump
- v. Peerless Pump

PART 3 - EXECUTION

3.1 SERVICES OF MANUFACTURER

- A. Inspection, Startup, and Field Adjustment: The service representative of the manufacturer shall be present at the Site for 3 working days, to furnish the services required by Section 43 20 10 – Pumps, General.
- B. Instruction of Owner's Personnel: The training representative of the manufacturer shall be present at the Site for 1 work day to furnish the services required by Section 43 20 10 – Pumps, General.
- C. For the purposes of this paragraph, a work day is defined as an 8 hour period at the Site, excluding travel time. All on-site work hours shall be coordinated with the Owner and/or General Contractor.
- D. The Engineer may require that the inspection, startup, and field adjustment services above be furnished in 3 separate trips.

END OF SECTION

FIGURES

WELL LOCATION



Figure 1: Well Site - 7692 South 700 East, Sandy City, Utah

ATTACHMENTS

ATTACHMENT A
NOISE ORDINANCE INFORMATION

- **Sandy City – Chapter 7-2**

7-2-1. Declaration of Policy.

WHEREAS, the making of creation of excessive, unnecessary or unusually loud noises within the limits of Sandy City is a condition which has existed for some time and the extent and magnitude of such noises is increasing; and

WHEREAS, the making, creation or maintenance of such excessive, unnecessary or unusually loud noises which are prolonged, unusual or unreasonable in their time, place and use affect and are a detriment to public health, comfort, convenience, safety and welfare of the residents of Sandy City;

THEREFORE, the necessity in the public interest for the provisions and prohibitions hereinafter contained and enacted is declared as a matter of public policy, and the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, convenience, safety, welfare, and the peace and quiet of the inhabitants of Sandy City.

7-2-2. Contracts.

Sandy City shall not enter into any written agreement, purchase order or instrument requiring a commitment for the expenditure of funds in return for work, labor, services, supplies, equipment, materials or any combination thereof unless such agreement, purchase order or instrument contains provisions requiring full compliance with this ordinance.

7-2-3. Definitions and Standards.

All terminology used in this ordinance and not defined below shall be in conformance with applicable American National Standards Institute Publications, including but not limited to Sl. 1-1960, R 171, or those from its successor publications or bodies. For the purposes of this ordinance, certain words and phrases used herein are defined as follows:

- A-Weighted Sound Pressure Level: The sound pressure level as measured with a sound level meter using the A-weighting network. The standard notation is dB(A) or dBA.
- Ambient Sound Pressure Level: The sound pressure level of the all-encompassing noise associated with a given environment, usually a composite of sounds from many sources. It is also the A-weighted sound pressure level exceeded 90 percent of the time based on a measurement period which shall not be less than 10 minutes.
- Continuous Sound: Any sound which exists essentially without interruption, for a period of 10 minutes or more.
- Cyclically Varying Noise. Any sound which varies in sound level such that the same level is obtained repetitively at reasonably uniform intervals of time.
- Decibel: Logarithmic and dimensionless unit of measure often used in describing the amplitude of sound. Decibel is denoted dB.
- Device: Any mechanism which is intended to produce or which actually

produces noise when operated or handled.

- Dynamic Braking Device (Commonly referred to as Jacobs Brake): A device used primarily on trucks for the conversion of the engine from an internal combustion engine to an air compressor for the purpose of braking without the use of wheel brakes.
- Emergency Work: Work made necessary to restore property to a safe condition following a public calamity, or work required to protect persons or property from an imminent exposure to danger.
- Emergency Vehicle: A motor vehicle used in response to a public calamity or to protect persons or property from an imminent exposure to danger.
- Impulsive Noises: A noise containing excursions usually less than one second, or sound pressure level using the fast meter characteristics.
- Motor Vehicles: Any vehicle which is self- propelled by mechanical power, including but not limited to passenger cars, trucks, truck-trailers, semi-trailers, campers, motorcycles, minibikes, go-carts, snowmobile and racing vehicles.
- Muffler: An apparatus consisting of a series of chambers of baffle plates designed for the purpose of transmitting gases while reducing sound emanating from such apparatus.
- Noise Disturbance: Any sound which annoys or disturbs any reasonable person with normal sensitivities, or which injures or endangers the comfort, repose, health, hearing, peace and safety of other persons.
- Noise: Any sound which is unwanted or which causes or tends to cause an adverse psychological or physiological effect on human beings.
- Percentile Sound Pressure Level:
 - Tenth Percentile Noise Level 11 the A- weighted sound pressure level that is exceeded 10 percent of the time in any measurement period (such as the level that is exceeded for 1 minute in a 10 minute period) and is denoted L10.
 - Ninetieth Percentile Noise Level - the A- weighted sound pressure level that is exceeded 90 percent of the time in any measurement period (such as the level that is exceeded for 9 minutes in a 10 minute period) and is denoted L90.
- Person: Any human being, firm, association, organization, partnership, business, trust, corporation, company, contractor, supplier, installer, user, owner or operator, including any municipal corporation or its officers or employees.
- Plainly Audible Noise: Any noise for which the information content of that noise is unambiguously transferred to the listener, such as but not limited to understanding of spoken speech, comprehension of whether a voice is raised or normal, or comprehension of musical rhythms.
- Property Boundary: An imaginary line exterior to any enclosed structure, at the ground surface, and its vertical extension, which separates the real property owned by one person from that owned by any other person.

- Public Right-of-Way: Any street, avenue, boulevard, highway, or alley or similar place which is owned or controlled by a public governmental entity.
- Pure Tone: Any sound which can be distinctly heard as a single pitch or a set of single pitches. For the purpose of measurement, a pure tone shall exist of the one- third octave band sound pressure level in the band when the tone exceeds the arithmetic average of the sound pressure levels of the two contiguous one- third octave bands by 5 dB for frequencies of 500 Hz and above, by 8 dB for frequencies between 160 and 400 Hz, and by 15 dB for frequencies less than or equal to 125Hz.
- Repetitive Impulse Noise: Any noise which is composed of impulsive noises that are repeated at sufficiently slow rates such that a sound level meter set at "fast" meter characteristic will show changes in sound pressure level greater than 10 dB(A).
- Sound: A temporal and spatial oscillation in pressure, or other physical quantity, in a medium with interval forces that causes compression and rarefaction of that medium and which propagates at finite speed to distant points.

7-2-4. Noised Prohibited.

- General Prohibitions.: In addition to the specific prohibitions outlined in subpart (b) below and Section 5 and 11 of this chapter, it shall be unlawful for any person to make, continue, or cause to be made or continued any noise disturbance within the limits of Sandy City. It shall not be a defense to a violation of the subpart that the noise disturbance when created was in a district that would allow for such disturbance if the noise created affects persons outside the use district from which the noise originates, as a noise disturbance as defined herein.
 - Specific Prohibitions: The following acts are declared to be in violation of this chapter.
 - Horns and Signaling Devices. Sounding of any horn or signaling device on any truck, automobile, motorcycle, emergency vehicle or other vehicle on any street or public place within the City except as a danger warning signal as provided in the vehicle codes of Sandy City and the State of Utah, or the sounding of any such signaling device for an unnecessary and unreasonable period of time.
 - Radios, Television Sets, Tape Players, Compact Disc Players, Musical Instruments, and Similar Devices.
Using, operating, or permitting, the use or operation of any radio receiving set, musical instrument, television, phonograph, drum, or other machine or device for the production or reproduction of sound:
 - between the hours of 10 p.m. and 7 a.m. in a way that is plainly audible at the property boundary of the source; or
 - on public property or on a public right-of-way at any time so as

to be plainly audible 50 feet (15.25 meters) from the device. Permits to exceed the limits of Section 7-2-4 (b)(2)(B) may be issued for special events on public property by the Director upon approval from the agency operating the public property.

- Public Loudspeakers. Using or operating a loudspeaker sound amplifying equipment in a fixed or movable position or mounted upon any sound vehicle in or upon any street, alley, sidewalk, park, place, or public property for the purpose of commercial advertising, giving instructions, directions, talks, addresses, lectures, transmitting music to any persons or assemblages of persons, in such a manner as to violate Section 5 or cause a noise disturbance unless a permit as provided by Section 8 is first obtained.
- Hawkers and Peddlers. Selling anything by outcry within any area of the City zoned primarily for residential uses in such a manner as to violate Section 5 or cause a noise disturbance. The provisions of this section shall not be construed to prohibit the selling by outcry of merchandise, food, and beverages at licensed sporting events, parades, fairs, circuses, and other similar licensed public entertainment events.
- Loading Operation. Loading, unloading, opening or otherwise handling boxes, crates, containers, garbage containers or other objects between the hours of 9:00 p.m. and 7:00 a.m. the following day in such a manner as to violate Section 5 or cause a noise disturbance.
- Construction Work. Operating, or causing to be used or operated any equipment used in construction, repair, alteration or demolition work on buildings, structures, streets, alleys, or appurtenances thereto:
 - In residential or commercial land use districts between the hours of 9:00 p.m. and 7:00 a.m. the following day;
 - In any land use district where such operation exceeds the sound level limits for an industrial land use as set forth in Section 5.
- Domestic Power Equipment. Operating or permitting to be operated any power equipment rated 5 horsepower or less used for home or building repair or grounds maintenance, including but not limited to power saw, sander, lawn mower, garden equipment or snow removal equipment, in residential or commercial zones:
 - Outdoors between the hours of 9:00 p.m. and 7:00 a.m. the following day;
 - Any such power equipment which emits a sound pressure level in excess of 74 dB(A) measured at a distance of 50 feet (15 meters).
- Commercial Power Equipment. Operating or permitting to be operated, any power equipment, except construction equipment used for construction activities, rated more than 5 horsepower, including but not limited to chain saws, pavement breakers, log chippers, powered hand tools:

- In residential or commercial land use districts between the hours of 9:00 p.m. and 7:00 a.m. the following day;
- In any land use district if such equipment emits a sound pressure level in excess of 82 dB(A) measured at a distance of 50 feet (15 meters).
- Enclosed Places of Public Entertainment. Operating or permitting to be operated in any place of public entertainment any loudspeaker or other source of sound which produces, at a point that is normally occupied by a customer, maximum sound pressure levels of 100 dB(A) as read with slow response on a sound level meter, unless a conspicuous and legible sign at least 225 square inches in area is posted near each public entrance stating: "WARNING: SOUND LEVELS MAY CAUSE HEARING IMPAIRMENT." This provision shall not be construed to allow the operation of any loudspeaker or other source of sound in such a manner as to violate Section 5 of this chapter.
- Fireworks or Explosives. The use of explosives or fireworks or the firing of guns or other explosive devices so as to be audible across a property boundary or on a public space or right-of-way, without first obtaining a permit as provided by Section 8. This provision shall not be construed to permit conduct prohibited or authorized by other statutes, o

7-2-5. Use Districts Noise Levels.

- Maximum Permissible Sound Levels. It shall be a violation of this chapter for any person to operate or permit to be operated any stationary source of sound in such a manner as to create a ninetieth percentile sound pressure level (L90) of any measurement period (which shall not be less than 10 minutes unless otherwise provided in this ordinance) which exceeds the limits set forth for the following receiving land use districts when measured at the boundary or at any point within the property affected by the noise:

Use District	9 p.m. - 7 a.m.	7 a.m. - 9 p.m.
Residential	50 dB(A)	55 dB(A)
Commercial - Agricultural	55 dB(A)	60 dB(A)
Industrial	75 dB(A)	80 dB(A)

When a noise source can be identified and its noise measured in more than one land use category, the limits of the most restrictive use shall apply at the boundaries between different land use categories.

- Correction for Duration of Sound.
 - It shall be a violation of this chapter for any person to operate, or permit to be operated, any stationary source of sound within any land use

district which creates a tenth percentile sound pressure level (L10) greater than 15 dB(A) above the ambient sound pressure level (L90) of any measurement period. Such period shall not be less than 10 minutes.

- Correction for Character of Sound.

- For any stationary source of sound which emits a pure tone, cyclically varying sound or repetitive impulsive sound the limits set forth in subsection (a) above shall be reduced by 5 dB(A).

- Notwithstanding compliance with part (1) of this subsection, it shall be a violation of this ordinance for any person to operate or permit to be operated any stationary source of sound which emits a pure tone, cyclically varying or repetitive impulsive sound which creates a noise disturbance.

7-2-6. Sound Level Measurement.

Sound level measurements shall be made with a sound level meter using the "A" weighting scale, in accordance with standards promulgated by the American National Standards Institute or other reasonable standards adopted and tested by the Salt Lake City- County Health Department.

7-2-7. Exemptions.

The following uses and activities shall be exempt from noise level regulations:

- Noise of safety signals, warning devices and emergency pressure relief valves.
- Noise resulting from any authorized emergency vehicle when responding to an emergency call or acting in time of emergency.
- Noise resulting from emergency work.
- Noise resulting from lawful fireworks and noisemakers used for celebration of an official holiday.
- Noise resulting from the starting of school busses at the Jordan School District Maintenance Facility. Includes the idling of engines during the safety inspection prior to early morning departure for normal school operations.
- Any noise resulting from activities of temporary duration permitted by law for which a license or permit has been approved by Sandy City or the Director of the Salt Lake City-County Health Department in accordance with Section 8 herein.

7-2-8. Permit.

Applications for a permit for relief from the noise restrictions in these ordinances on the basis of undue hardship may be made to Sandy City through the Mayor's Cabinet or the Salt Lake City-County Health Department. Any permit granted by Sandy City or the Director of the Salt Lake City-County Health Department or their authorized representative shall contain all conditions upon which said permit has been granted, including but not limited to the effective dates, any time of day, location, sound pressure level, or equipment limitation. The relief requested may be granted upon good and sufficient showing:

- That additional time is necessary for the applicant to alter or modify his activity or operation to comply with this chapter; or
- That the activity, operation or noise source will be of temporary duration and cannot be done in a manner that would comply with this chapter; and
- That no reasonable alternative is available to the applicant.

The City or Board of Health may prescribe any reasonable conditions or requirements deemed necessary to minimize adverse effects upon a community or the surrounding neighborhood.

7-2-9. Motor Vehicle Noise.

- No person shall drive or move or cause or knowingly permit to be driven or moved a motor vehicle or combination of vehicles at any time in such a manner as to exceed the following noise limits for the category of motor vehicle shown below. Noise shall be measured at a distance of at least 25 feet (7.5 meters) from the near side of the nearest lane(s) being monitored and at a height of at least 4 feet (1.2 meters) above the immediate surrounding surface.

Sound Pressure Level, dB(A)

Speed Limit Speed Limit 40 MPH or less Over 40 MPH

Motor vehicles with a manufacturer's gross vehicle weight rating (GVWR) or gross combination weight rating

(GCWR) of 10,000 pounds or more, or any combination of vehicles towed by such motor vehicle. 90 94

Any other motor vehicle or any combination of vehicles towed by any motor vehicle. 80 84

- This section shall apply to the total noise from a vehicle or combination of vehicles and shall not be construed as limiting or precluding the enforcement of any other provisions of this title relating to motor vehicle mufflers for noise control.

- No person shall operate or cause to be operated any motor vehicle unless the exhaust of such vehicle is:
 - Free from defects which affect sound reduction;
 - Equipped with a muffler or other noise dissipative device; and
 - Not equipped with any cut-out, by-pass or similar device.
- These provisions shall be enforced consistent with law set forth in Title 41 of the Utah Code Annotated, as amended.

7-2-10. Enforcement Responsibility.

The Salt Lake City-County Health Department shall have primary responsibility with appropriate law enforcement agencies as it relates to vehicular sources.

7-2-11. Violation.

Any person violating any provision of this chapter shall be guilty of an infraction. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

7-2-12. Additional Remedies.

Violations of Sections 4 through 9 of this chapter are deemed and declared to be a nuisance, and as such may be subject to summary abatement by means of a restraining order or injunction by a court of competent jurisdiction.

7-2-13. Severability.

If any provision, clause, sentence or paragraph of this chapter or the application thereof to any person or circumstance shall be held to be invalid, such invalidity shall not affect the other provisions or applications of this chapter which can be given effect independent from the invalid provision or application, and to this end the provisions of this chapter are hereby declared to be severable.

ATTACHMENT B
WELL DRILLER'S REPORT

WELLPRT Well Log Information Listing

Version: 2003.09.18.00 Rundate: 10/09/2003 08:24 AM

Utah Division of Water Rights

Water Well Log

LOCATION:

N 734 ft W 82 ft from SE CORNER of SECTION 30 T 2S R 1E BASE SL Elevation: 4453.00 feet
7700 S. 700 E.

DRILLER ACTIVITIES:

ACTIVITY # 1 NEW WELL
START DATE: 05/25/1960 COMPLETION DATE: 09/22/1960

BOREHOLE INFORMATION:

Depth(ft)		Diameter(in)	Drilling Method	Drilling Fluid
From	To			
0	1002	20	CABLE	

LITHOLOGY:

Depth(ft)		Lithologic Description	Color	Rock Type
From	To			
0	2	SAND		
2	4	SAND, GRAVEL		
4	30	SAND		
30	32	OTHER		CONGLOMERATE
32	40	SAND		
40	70	CLAY	BLUE	
70	76	SAND		
		CEMENTED		
76	78	WATER-BEARING, GRAVEL		
78	90	SAND, GRAVEL		
		CEMENTED		
90	105	CLAY	LT. BROWN	
105	115	OTHER		CONGLOMERATE
		HARD		
115	176	OTHER		CONGLOMERATE
176	183	SAND		
183	190	CLAY, SAND		
190	200	SAND		
200	209	SAND, GRAVEL		
		GRAVEL UP TO 4"		
209	220	CLAY	GRAY	
220	240	SAND		
		CEMENTED		
240	260	OTHER		CONGLOMERATE
		HARD		
260	297	SAND		
		CEMENTED		
297	299	CLAY		
299	325	SAND		
		CEMENTED		
325	329	CLAY		
		STICKY		
329	359	OTHER		
		HARD		
359	363	CLAY		

363	374	STICKY SAND CEMENTED	
374	383	CLAY STICKY	BROWN
383	388		
388	395	HARD CLAY STICKY	
395	406	OTHER	CONGLOMERATE
406	408	GRAVEL	
408	438	CLAY STICKY	
438	466	SAND CEMENTED SAND	
466	510	CLAY STICKY	
510	569	CLAY,OTHER STICKY CLAY WITH STREAKS OF CONGLOMERATE	CONGLOMERATE
569	580	OTHER HARD CONGLOMERATE	CONGLOMERATE
580	608	CLAY STICKY	
608	617	OTHER HARD	CONGLOMERATE
617	620	CLAY STICKY	
620	630	OTHER HARD	CONGLOMERATE
630	648	CLAY,SAND STICKY CLAY WITH SAND	
648	657	SAND,GRAVEL CEMENTED SAND AND GRAVEL	
657	660	CLAY STICKY	
660	661	SAND,GRAVEL CEMENTED	
661	687	CLAY,SAND,GRAVEL STICKY CLAY WITH GRAVEL AND FINE SAND	
687	689	GRAVEL CEMENTED GRAVEL	
689	697	CLAY STICKY CLAY	
697	710	OTHER	CONGLOMERATE
710	720	CLAY STICKY	
720	728	SAND,GRAVEL CEMENTED SAND & GRAVEL	
728	734	CLAY STICKY	
734	742	SAND,GRAVEL CEMENTED SAND AND GRAVEL	
742	797	CLAY,SAND STICKY CLAY FINE SAND	
797	827	SAND CEMENTED SAND & LOOSE SAND	
827	834	CLAY STICKY	
834	835	SAND HARD CEMENTED SAND	
835	851	CLAY STICKY	
851	872	SAND HARD CEMENT SAND	
872	890	CLAY STICKY	
890	893	SAND HARD CEMENTED SAND	
893	895	CLAY STICKY	
895	915	SAND HARD CEMENTED SAND	
915	920	CLAY STICKY CLAY	
920	925	SAND CEMENTED SAND	

925	930	CLAY
		STICKY
930	934	SAND
		CEMENTED SAND
934	949	CLAY
		STICKY
949	956	SAND
		CEMENTED SAND
956	963	CLAY
		STICKY
963	965	SAND
		CEMENTED
965	971	CLAY
		STICKY
971	972	SAND, GRAVEL
		CEMENTED SAND & GRAVEL
972	978	CLAY
		STICKY
978	981	SAND
		CEMENTED
981	986	CLAY
		STICKY
986	990	SAND
		CEMENTED
990	1002	CLAY
		STICKY

WATER LEVEL DATA:

Date	Time	Water Level (feet)	Status
		(-)above ground	
09/22/1960		73.00	STATIC

CONSTRUCTION - CASING:

Depth(ft)	Material	Gage(in)	Diameter(in)
From	To		
0	346	NEW	20
0	1002	NEW	12
1	806	NEW	16

CONSTRUCTION - SCREENS/PERFORATIONS:

Depth(ft)	Screen(S) or Perforation(P)	Slot/Perf. siz	Screen Diam/Length	Perf(in)	Screen Type/# Perf.
From	To				
560	580	PERFORATION	.375	3	
608	617	PERFORATION	.375	3	
620	630	PERFORATION	.375	3	
648	661	PERFORATION	.375	3	
687	689	PERFORATION	.375	3	
697	718	PERFORATION	.375	3	
720	728	PERFORATION	.375	3	
734	742	PERFORATION	.375	3	
851	872	PERFORATION	.375	3	
890	1002	PERFORATION	.375	3	

WELL TESTS:

Date	Test Method	Yield (CFS)	Drawdown (ft)	Time Pumped (hrs)
09/22/1960	PUMP	5.013	40	60

WATER QUALITY DATA AVAILABLE

ATTACHMENT C
STANDARD REQUIREMENTS AND CITATIONS AND
UDWQ WATER DISCHARGE FACT SHEET

ATTACHMENT C
STANDARD REQUIREMENTS AND REGULATORY CITATIONS

This section contains standard requirements and citations from UAC R309 and UAC R655, as provided by the staff of the DDW. The CONTRACTOR is required to adhere to these State of Utah requirements and citations. Sentences in "*italics*" indicate if the citation is not applicable to the project.

CONTRACTOR shall comply with the following requirements if applicable:

R309-515-6 (5) Outline of Well Approval Process.

Well PER, Plans, and Specifications Approval

- (a) Well drilling shall not commence until both of the following items are submitted and receive a favorable review:
 - (i) a Preliminary Evaluation Report on source protection issues as required by R309-600-13, and
 - (ii) engineering plans and specifications governing the well drilling, prepared by a licensed well driller holding a current Utah Well Drillers License or prepared, signed, and stamped by a licensed professional engineer or professional geologist licensed to practice in Utah.;
- (b) Inspection of Well Sealing During Construction.
 - (i) Authorized Individuals
 - (A) The following individuals are authorized to witness the well sealing procedure for a public drinking water well:
 - (I) an engineer or a geologist from the Division of Drinking Water;
 - (II) a district engineer of the Department of Environmental Quality;
 - (III) an authorized representative of the Division of Water Rights; or,
 - (IV) an individual having written authorization from the Director and meeting the below listed criteria.
 - (B) At the time of the well sealing an individual, who is authorized per (i)(A)(IV), shall present to the well driller a copy of the letter authorizing him or her to witness a well sealing on behalf of the Division of Drinking Water. A copy of this letter shall be appended to the witness certification letter.
 - (C) At least three days before the anticipated well sealing, the well driller shall arrange for an authorized witness listed in (i)(A) above to witness the procedure. (See R309-515-6(6)(i)).
 - (ii) Obtaining Authorization
 - (A) To be authorized per (i)(A)(IV) above to witness a well sealing procedure, an individual must have no relationship to the driller or the well's owner. The individual must have at least five years professional experience designing wells, supervising well drilling or other equivalent experience associated with well drilling or well sealing that is acceptable to the Director.
 - (B) Individuals, desiring the Director's authorization to witness a well sealing procedure, shall provide the following information to the Director for review over his or her signature attesting to the correctness of the information:
 - (I) a detailed description of the applicant's experience with well drilling projects, including number of years of experience and type of work. Three references confirming this professional experience are required.
 - (II) evidence of licensure as a professional engineer or professional geologist in Utah.

(III) no relationship may exist between a person authorized to witness well sealings and a well driller that would serve as the basis for suspicion of favoritism, leniency, or punitive action in the performance of this task. Examples of such relationships would be family; former long-term employment associations; business partnerships, either formal or informal; etc. The Director's decision, with right of appeal as provided in R305-7, shall be accepted relative to what constitutes a conflict of interest or a relationship sufficient to disqualify an applicant from all or specific witness opportunities.

(IV) An acknowledgement that he/she would not be acting as an agent or employee of the State of Utah and any losses incurred while acting as a witness would not be covered by governmental immunity or Utah's insurance.

(VI) Willingness to follow established protocols and attend such training events as may be required by the Director.

(VII) Complete with a minimum 75 percent passing grade, an examination on water well drilling rules, as offered by the Division of Water Rights.

(C) The Director may rescind the authorization if an individual fails to comply with the criteria or conditions of authorization listed above.

Guidance: A conflict of interest occurs whenever a duty, such as acting in the interest of the public, intersects with a personal desire (either positive or negative), such as monetary gain or a personal relationship, requiring a decision to be made between them. Each individual faced with a conflict between acting in the public's interest or acting for personal benefit is expected to act in the public's interest as it relates to sealing a well. Questions relating to possible conflicts may be referred to the Director.

(iii) Well Seal Certification

The individual witnessing the well sealing procedure shall provide a signed letter, including the following information, to the Director within 30 days of the well sealing:

(A) certification that the well sealing procedure met all the requirements of Rule R309-515-6(6)(i);

(B) the water right under which the well was drilled and the well driller's license number;

(C) the public water system name (if applicable);

(D) the latitude and longitude of the well and method used for its determination;

(E) the well head's approximate elevation;

(F) casing diameter(s), length(s), and material(s);

(G) the size of the annulus between the borehole and casing;

(H) a description of the sealing process including the sealing material used, its volume, density, method of placement, and depth from surface; and,

(I) the names and company affiliations of other individuals observing the sealing procedure including, but not limited to, the well driller, the well owner, and/or a consultant.

(c) After completion of the well drilling, the following information shall be submitted and receive a favorable review before water from the well can be introduced into a public water system:

(i) a copy of the "Report of Well Driller" as required by the State Engineer's Office which is complete in all aspects and has been stamped as received by the same;

- (ii) a copy of the letter from the authorized individual described in R309-515-6(5)(b) above, indicating inspection and confirmation that the well was grouted in accordance with the well drilling specifications and the requirements of this rule;
 - (iii) a copy of the aquifer drawdown test data, as a minimum, including the yield versus drawdown test data, as described in R309-515-6(10)(b) along with comments and interpretation by a licensed professional engineer or licensed professional geologist of the graphic drawdown information required by R309-515-6(10)(b)(vi)(E);
 - (iv) a copy of the chemical analyses required by R309-515-4(5);
 - (v) acceptable evidence that the water system owner has a legal right to divert water for the proposed use(s) from the well source(s);
 - (vi) a copy of complete plans and specifications prepared, signed, and stamped by a licensed professional engineer covering the well housing, equipment, and diversion piping necessary to introduce water from the well into the distribution system; and
 - (vii) a bacteriological analysis of water obtained from the well after installation of permanent equipment, disinfection, and flushing.
- (d) An Operation Permit shall be obtained in accordance with R309-500-9 before any water from the well is introduced into a public water system.

R309-515-6 (6) Well Materials, Design and Construction

Well Interior Surfaces

- (a) ANSI/NSF Standards 60 and 61 Certification.
All interior surfaces must consist of products complying with ANSI/NSF Standard 61. This requirement applies to drop pipes, well screens, coatings, adhesives, solders, fluxes, pumps, switches, electrical wire, sensors, and all other equipment or surfaces which may contact the drinking water.
All substances introduced into the well during construction or development shall be certified to comply with ANSI/NSF Standard 60. This requirement applies to drilling fluids (biocides, clay thinners, defoamers, foamers, loss circulation materials, lubricants, oxygen scavengers, viscosifiers, weighting agents) and regenerants.
- (b) Permanent Steel Casing Pipe shall:
 - (i) be new single steel casing pipe meeting AWWA Standard A-100, ASTM or API specifications and having a minimum weight and thickness as given in Table 6 found in R655-4-11.2.3 of the Utah Administrative Code (Administrative Rules for Water Well Drillers, adopted April 11, 2011, Division of Water Rights);
 - (ii) have additional thickness and weight, if minimum thickness is not considered sufficient to assure reasonable life expectancy of the well;
 - (iii) be capable of withstanding forces to which it is subjected;
 - (iv) be equipped with a drive shoe when driven;
 - (v) have full circumferential welds or threaded coupling joints; and
 - (vi) project at least 18 inches above the anticipated final ground surface and at least 12 inches above the anticipated pump house floor level. At sites subject to flooding, the top of the well casing shall terminate at least three feet above the 100-year flood level or the highest known flood elevation, whichever is higher.
- (c) Non-Ferrous Casing Material.
The use of any non-ferrous material for a well casing shall receive prior approval of the Director based on the ability of the material to perform its desired function.
Thermoplastic water well casing pipe shall meet AWWA Standard A100-06 and shall bear the logo NSF-wc indicating compliance with NSF Standard 14 for use as well casing.

Guidance: Approval for non-ferrous well casing will be determined considering well depth, formations, temperatures, corrosion potential, well seal material, and other pertinent information.

(d) Disposal of Cuttings.

Cuttings and waste from well drilling operations shall not be discharged into a waterway, lake, or reservoir. The rules of the Utah Division of Water Quality must be observed with respect to these discharges.

(e) Packers.

Packers, if used, shall be of material that will not impart taste, odor, toxic substances, or bacterial contamination to the well water. Lead or partial lead packers are specifically prohibited.

(f) Screens.

The use of well screens is recommended where appropriate and, if used, they shall:

- (i) be constructed of material resistant to damage by chemical action of groundwater or cleaning operations;
- (ii) have size of openings based on sieve analysis of formations or gravel pack materials;
- (iii) have sufficient diameter to provide adequate specific capacity and low aperture entrance velocities;

Guidance: Usually the entrance velocities should not exceed 0.1 fps.

(iv) be installed so that the operating water level remains above the screen under all pumping conditions; and,

(v) be provided with a bottom plate or wash-down bottom fitting of the same material as the screen.

(g) Plumbness and Alignment Requirements.

Every well shall be tested for plumbness and vertical alignment in accordance with AWWA Standard A100. Plans and specifications submitted for review shall:

- (i) have the test method and allowable tolerances clearly stated in the specifications; and,
- (ii) clearly indicate any options the design engineer may have if the well fails to meet the requirements. Generally, wells may be accepted if the misalignment does not interfere with the installation or operation of the pump or uniform placement of grout.

(h) Casing Perforations.

The placement of perforations in the well casing shall:

- (i) be located, as far as practical, to permit the uniform collection of water around the circumference of the well casing; and,
- (ii) be of dimensions and size to restrain the water bearing soils from entrance into the well.

(i) Well Sealing Techniques and Requirements.

For all public drinking water wells, the annulus between the outermost well casing and the borehole wall shall be sealed with grout to a depth of at least 100 feet below the ground surface unless an "exception" is issued by the Director (see R309-500-4(1)). If more than one casing is used, including a conductor casing, the annulus between the outermost casing and the next inner casing shall be sealed with grout (meeting the sealing materials requirements of R309-515-6(i)(ii) herein) or with a water tight steel ring having a thickness equal to that of the permanent well casing and continuously welded to both casings. If a public drinking water well will be equipped with a pitless adapter or unit, a well seal shall be installed to a minimum depth of 110 feet to take into account the top 10 feet of compromised seal interval.

Guidance: This is required in order to prevent the seepage of undesirable surface or shallow ground water along the casing into the water bearing aquifer. The Division

of Water Rights Administrative Rules for Water Wells Rule R655-4-11.7.5, Pitless Adapters/Units states, "A cement grout seal shall not be allowed within the pitless unit or pitless adapter sealing interval. The pitless adapter or unit sealing interval shall be sealed with unhydrated bentonite. The pitless adapter or unit, including the cap or cover, pitless case and other attachments, shall be designed and constructed to be watertight to prevent the entrance of contaminants into the well from surface or near-surface sources." Therefore, a cement seal should not be used in the future pitless interval as a cement seal would need to be chipped and broken away from the casing when the pitless area is excavated and installed which could lead to casing damage. A bentonite seal must be used in the future pitless interval.

The following shall apply to all drinking water wells:

(i) Consideration During Well Construction.

(A) Sufficient annular opening shall be provided to permit a minimum of two inches of grout between the outermost permanent casing and the drilled hole, taking into consideration any joint couplings.

(B) The casing(s) must be placed to permit unobstructed flow and uniform thickness of grout.

Guidance: For the purpose of determining the dimension of the annular opening between the drilled hole and or any carrier casing or permanent casing which may be used, the nominal pipe dimension of casing or hole can be used. Centralizers, casing spacers, or welded guides are recommended to center the casing and to provide uniform grout thickness.

(ii) Sealing Materials.

(A) Neat Cement Grout.

Cement, conforming to ASTM Standard C150, and water, with no more than six gallons of water per sack of cement, shall be used for two-inch openings. Additives may be used to increase fluidity subject to approval by the Director.

(B) Concrete Grout.

Equal parts of cement conforming to ASTM Standard C150, and sand, with not more than six gallons of water per sack of cement, may be used for openings larger than two inches.

(C) Clay Seal.

Where an annular opening greater than six inches is available, a seal of swelling bentonite meeting the requirements of R655-4-11.4.2 may be used when approved by the Director.

(iii) Application.

(A) When the annular opening is less than four inches, grout shall be installed under pressure, by means of a positive displacement grout pump, from the bottom of the annular opening to be filled.

(B) When the annular opening is four or more inches and 100 feet or less in depth, and concrete grout is used, it may be placed by gravity through a grout pipe installed to the bottom of the annular opening in one continuous operation until the annular opening is filled.

(C) All temporary construction casings shall be removed prior to or during the well sealing operation. Any exceptions shall be approved by the State Engineer's Office, and evidence of State Engineer's Office's approval shall be submitted to the Director (see R655-4-11.4.3.1 for conditions concerning leaving temporary surface casing in place). A temporary construction casing is a casing not intended to be part of the

permanent well.

(D) When a "well in a protected aquifer" classification is desired, the grout seal shall extend from the ground surface down to at least 100 feet below the surface, and through the protective clay layer (see R309-600-6(1)(x)).

(E) After cement grouting is applied, work on the well shall be discontinued until the cement or concrete grout has properly set, usually a period of 72 hours.

Guidance: "Public Water Supply Well Grouting Requirements and Procedures" is available on the Division's website as additional information for grout placement.

(j) Water Entered Into Well During Construction.

Any water entering a well during construction shall not be contaminated and should be obtained from a chlorinated municipal system. Where this is not possible, the water must be treated to produce a 100 mg/l free chlorine residual in accordance with R655-4-11.6.5.

(k) Gravel Pack Wells.

The following shall apply to gravel packed wells:

(i) the gravel pack material shall be of well-rounded particles, at least 90 percent siliceous material, no more than five percent acid solubility, smooth and uniform, free of foreign material, properly sized, washed, and then disinfected immediately prior to or during placement;

(ii) the gravel pack shall be placed in one uniform continuous operation;

(iii) refill pipes, when used, shall be Schedule 40 steel pipe incorporated within the pump foundation and terminated with screwed or welded caps at least 12 inches above the pump house floor or concrete apron;

(iv) refill pipes located in the grouted annular opening shall be surrounded by a minimum of 1.5 inches of grout;

(v) protection shall be provided to prevent leakage of grout into the gravel pack or screen; and,

(vi) any casings not withdrawn entirely shall meet requirements of R309-515-6(6)(b) or R309-515-6(6)(c).

R309-515-6 (7) Well Development

Well Development

(a) Every well shall be developed to remove the native silts and clays, drilling mud or finer fraction of the gravel pack.

(b) Development should continue until the maximum specific capacity is obtained from the completed well.

(c) Where chemical conditioning is required, the specifications shall include provisions for the method, equipment, chemicals, testing for residual chemicals, and disposal of waste and inhibitors.

(d) Where blasting procedures may be used the specifications shall include the provisions for blasting and cleaning. Special attention shall be given to assure that the grouting and casing are not damaged by the blasting.

R309-515-6 (8) Well Capping

Capping Requirements.

(a) The well shall be securely capped in accordance with R655-4-14.1 until permanent equipment can be installed.

(b) At all times during the progress of work the contractor shall provide protection to prevent tampering with the well or entrance of foreign materials.

Guidance: A welded metal plate or a threaded cap is the preferred method for capping a completed well until permanent equipment is installed.

R309-515-6 (9) Well Abandonment

Well Abandonment.

(a) Test wells and groundwater sources which are to be permanently abandoned shall be abandoned in accordance with R655-4-14.

(b) Wells to be abandoned shall be sealed to prevent undesirable exchange of water from one aquifer to another. Preference shall be given to using a neat cement grout. Where fill materials are used, which are other than cement grout or concrete, they shall be disinfected and free of foreign materials. When an abandoned well is filled with cement-grout or concrete, these materials shall be applied to the well hole through a pipe, tremie, or bailer.

R309-515-6 (10) Well Assessment

Well Assessment.

(a) Step Drawdown Test.

Preliminary to the constant-rate test required below, it is recommended that a step-drawdown test (uniform increases in pumping rates over uniform time intervals with single drawdown measurements taken at the end of the intervals) be conducted to determine the maximum pumping rate for the desired intake setting.

(b) Constant-Rate Test.

A "constant-rate" yield and drawdown test shall:

(i) be performed on every production well after well development and prior to placement of the permanent pump,

(ii) have the test methods clearly indicated in the specifications,

(iii) have a test pump with sufficient capacity that when pumped against the maximum anticipated drawdown, it will be capable of pumping in excess of the desired design discharge rate,

(iv) provide for continuous pumping for at least 24 hours or until stabilized drawdown has continued for at least six hours when test pumped at a "constant-rate" equal to 1.5 times the desired design discharge rate,

(v) provide the following data:

(A) capacity vs. head characteristics for the test pump (manufacturer's pump curve),

(B) static water level (in feet to the nearest tenth, as measured from an identified datum; usually the top of casing),

(C) depth of test pump intake,

(D) time and date of starting and ending test(s),

Guidance: It is recommended to monitor any existing wells in the area during the pump test to perform a more useful aquifer test and determine if there will be interference from other wells.

(vi) For the "constant-rate" test provide the following at time intervals sufficient for at least ten essentially uniform intervals for each log cycle of the graphic evaluation required below:

(A) record the time since starting test (in minutes),

(B) record the actual pumping rate,

(C) record the pumping water level (in feet to the nearest tenth, as measured from the same datum used for the static water level),

(D) record the drawdown (pumping water level minus static water level in feet to the

nearest tenth),

- (E) provide graphic evaluation on semi logarithmic graph paper by plotting the drawdown measurements on the arithmetic scale at locations corresponding to time since starting test on the logarithmic scale, and
- (vii) Immediately after termination of the constant-rate test, and for a period of time until there are no changes in depth to water level measurements for at least six hours, record the following at time intervals similar to those used during the constant-rate pump test:
 - (A) time since stopping pump test (in minutes),
depth to water level (in feet to the nearest tenth, as measured from the same datum used for the pumping water level).
- (c) Safe Yield. If the aquifer drawdown test data show that the drawdown has stabilized, the Director will consider 2/3 of the pumping rate used in the constant-rate test as the safe yield of the well. The safe yield is used to determine the number of permanent residential connections or ERCs that a well source can support.

R309-515-6 (11) Well Disinfection

Well Disinfection.

Every new, modified, or reconditioned well including pumping equipment shall be disinfected before being placed into service for drinking water use. These shall be disinfected according to AWWA Standard C654-03 and A100-06 as modified to incorporate the following as a minimum standard:

- (a) the well shall be disinfected with a chlorine solution of sufficient volume and strength and so applied that a concentration of at least 50 parts per million is obtained in all parts of the well and comes in contact with equipment installed in the well. This solution shall remain in the well for a period of at least eight hours, and
- (b) a satisfactory bacteriologic water sample analysis shall be obtained prior to the use of water from the well in a public water system.

R309-515-6 (13) Well House Construction

The use of a well house is strongly recommended, particularly in installations utilizing above ground motors.

In addition to applicable provisions of R309-540, well pump houses shall conform to the following:
Well Casing Projection Above (Eventual) Floor

- (a) Casing Projection Above Floor.

The permanent casing for all ground water wells shall project at least 12 inches above the pump house floor or concrete apron surface and at least 18 inches above the final ground surface.

However, casings terminated in underground vaults may be permitted if the vault is provided with a drain to daylight sized to handle in excess of the well flow and surface runoff is directed away from the vault access.

Well Casing Termination at Flood Sites

- (d) Well Casing Termination at Flood Sites.

The top of the well casing at sites subject to flooding shall terminate at least 3 feet above the 100 year flood level or the highest known flood elevation, whichever is higher (refer to R309-515-6(6)(b)(vi)).

R309-600-6 Protected Aquifer Status

(x) "Protected aquifer" means a producing aquifer in which the following conditions are met:

- (i) A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer;
- (ii) the PWS provides data to indicate the lateral continuity of the clay layer to the extent of zone two; and
- (iii) the public-supply well is grouted with a grout seal that extends from the ground surface down to at least 100 feet below the surface, and for a thickness of at least 30 feet through the protective clay layer.

R309-600-6 Replacement Well

"Replacement well" means a public-supply well drilled for the sole purpose of replacing an existing public-supply well which is impaired or made useless by structural difficulties and in which the following conditions are met:

- (i) the proposed well location shall be within a radius of 150 feet from an existing ground-water supply well, as defined in R309-600-6(1)(k); and
- (ii) the PWS provides a copy of the replacement application approved by the State Engineer (refer to Section 73-3-28 of the Utah Code Annotated).

R655-4-4.1 Authorization to Drill

Authorization to Drill Well

The OWNER shall provide the driller with a start card.

4.1 Authorization to Drill

The well driller shall make certain that a valid authorization or approval to drill exists before engaging in regulated well drilling activity. Authorization to drill shall consist of a valid 'start card' based on any of the approvals listed below. Items 4.1.1 through 4.1.12 allow the applicant to contract with a well driller to drill, construct, deepen, replace, repair, renovate, or abandon exactly one well at each location listed on the start card or approval form. The drilling of multiple borings/wells at an approved location/point of diversion is not allowed without authorization from the state engineer's office. Most start cards list the date when the authorization to drill expires. If the expiration date has passed, the start card and authorization to engage in regulated drilling activity is no longer valid. If there is no expiration date on the start card, the driller must contact the state engineer's office to determine if the authorization to drill is still valid. When the work is completed, the permission to drill is terminated. Preauthorization or pre-approval of pump installation/repair work, well cleaning, development, testing, and disinfection is not required. A well renovation permit is required if an existing well is to be modified by activities such as deepening, casing/seal/gravel pack repair/renovation, liner installation, pitless adapter/unit installation, and perforating/screen installation. A well renovation permit is not required if the well is not modified by activities such as cleaning, development, testing, disinfection, and pump work.

4.1.1 An approved application to appropriate.

4.1.2 A provisional well approval letter (also known as a Rush Letter Approval).

An approved provisional well letter grants authority to drill but allows only enough water to be diverted to determine the characteristics of an aquifer or the existence of a useable groundwater source.

4.1.3 An approved permanent change application.

4.1.4 An approved exchange application.

4.1.5 An approved temporary change application.

4.1.6 An approved application to renovate or deepen an existing well.

4.1.7 An approved application to replace an existing well.

4.1.8 An approved monitor well letter.

An approved monitor well letter grants authority to drill but allows only enough water to be diverted to monitor groundwater.

4.1.9 An approved heat exchange well letter.

4.1.10 An approved cathodic protection well letter.

4.1.11 An approved non-production well construction application.

4.1.12 Any letter or document from the state engineer directing or authorizing a well to be drilled or work to be done on a well.

R655-4-4.2 Well Start Card

The OWNER shall provide the driller with a start card.

4.2 Start Cards

4.2.1 Prior to commencing work to drill, construct, deepen, replace, repair, renovate, clean, or develop any well governed by these administrative rules, the driller must notify the state engineer of that intention by transmitting the information on the "Start Card" to the state engineer by telephone (leaving a voice mail is acceptable notification), by facsimile (FAX), by hand delivery, or by e-mail (with completed Start Card scanned and attached to e-mail). Thereafter, a completed original Start Card must be sent to the state engineer by the driller after it has been telephoned in (including voice mail). A completed original Start Card does not need to be sent to the state engineer by the driller after it has been faxed or E-mailed. A copy of the Start Card should be kept at the drill site at all times regulated activity is being conducted.

4.2.2 A specific Start Card is printed for each well drilling approval and is furnished by the state engineer to the applicant or the well owner. The start card is preprinted with the water right or non-production well number, owner name/address, and the approved location of the well. The state engineer marks the approved well drilling activity on the card. If a Start Card is stamped with 'Special Conditions', the licensee shall contact the state engineer's office to determine what the special drilling conditions or limitations are; then implement them in the drilling and construction of the well. The driller must put the following information on the card:

- a. The date on which work on the well will commence;
- b. The projected completion date of the work;
- c. The well driller's license number;
- d. The licensed well driller's signature.

4.2.3 When a single authorization is given to drill wells at more than one point of diversion, a start card shall be submitted for each location to be drilled.

4.2.4 Following the submittal of a start card, if the actual start date of the drilling activity is postponed beyond the date identified on the start card, the licensed driller must notify the state engineer of the new start date.

4.2.5 A start card is not required to abandon a well. However, prior to commencing well abandonment work, the driller is required to notify the state engineer by telephone, by facsimile, or by e-mail of the proposed abandonment work. The notice must include the location of the well. The notice should also include the water right or non-production well number associated with the well and the well owner if that information is available.

4.2.6 A start card or pre-notification is not required to perform pump installation and repair work on a well.

R655-4-4.3 Well Driller Requirements

Well Driller Requirements

4.3 General Requirements During Construction

4.3.1 The well driller or pump installer shall have the required penal bond continually in effect during the term of the license; otherwise the license will become inactive.

4.3.2 The well driller's/pump installer's license number or company name exactly as shown on the license must be prominently displayed on each well drilling/pump rig operated under the license. If the company name is changed the licensee must immediately inform the state engineer of the change in writing.

4.3.3 A licensed well driller or a registered drill rig operator must be at the well site whenever the following aspects of well construction are in process: advancing the borehole, setting casing and screen, placing a filter pack, constructing a surface seal, or similar activities involved in well deepening, renovation, repair, cleaning, developing, testing, disinfecting, capping, pitless installation, or abandoning. All registered drill rig operators working under a well driller's license must be employees of the well driller and must use equipment either owned by or leased by the licensed well driller.

4.3.3.1 A licensed pump installer or a registered pump rig operator must be at the well site whenever the following aspects of pump work are in process: pump removal, pump installation, modification to the well head including capping, sealing, and pitless adapter/unit installation, or similar activities on and within the well involving pump installation/repair. Inasmuch as a licensed pump installer is allowed to clean, develop, test, and disinfect a regulated well, these activities must be performed in the presence of a licensed pump installer or registered pump rig operator. All registered pump rig operators working under a pump installer's license must be employees of the pump installer and must use equipment either owned by or leased by the licensed pump installer.

4.3.3.2 A registered drill rig operator who is left in responsible charge of advancing the borehole, setting casing and screen, placing a filter pack, constructing a surface seal, or similar activities involved in well deepening, renovation, repair, cleaning, developing, testing, disinfecting, capping, pitless installation, or abandoning must have a working knowledge of the minimum construction standards and the proper operation of the drilling rig. The licensed well driller is responsible to ensure that a registered operator is adequately trained to meet these requirements.

4.3.3.3 A registered pump rig operator who is left in responsible charge of pump installation or repair must have a working knowledge of the minimum construction standards and the proper operation of the pump rig. The licensed well driller or pump installer is responsible to ensure that a registered operator is adequately trained to meet these requirements.

4.3.4 State engineer provisions for issuing cease and desist orders (Red Tags)

4.3.4.1 Construction Standards: The state engineer or staff of the Division of Water Rights may order that regulated work on a well cease if a field inspection reveals that the construction does not meet the minimum construction standards to the extent that the public interest might be adversely affected.

4.3.4.2 Licensed Drilling Method: A cease work order may also be issued if the well driller is not licensed for the drilling method being used for the well construction.

4.3.4.3 Incompetent Registered Operator: If, during a field inspection by the staff of the Division of Water Rights, it is determined that a registered operator in responsible charge does not meet these requirements, a state engineer's red tag (see Section 4.3.4) shall be placed on the drilling rig or pump rig and the drilling/pump operation shall be ordered to shut down. The order to cease work shall remain effective until a qualified person is available to perform the work.

4.3.4.4 No licensee or registered operator on site: If, during a field inspection by the staff of the Division of Water Rights, it is determined that neither a licensee or registered operator are one

site when regulated well activity is occurring, the state engineer may order regulated well work to cease.

4.3.4.5 General: The state engineer's order shall be in the form of a red tag which shall be attached to the drilling/pump rig. A letter from the state engineer shall be sent to the licensee to explain the sections of the administrative rules which were violated. The letter shall also explain the requirements that must be met before the order can be lifted.

4.3.4.6 A licensee may appeal a Cease and Desist order by:

4.3.4.6.1 submitting to the Division a written statement clearly and concisely stating the specific disputed facts, the supporting facts, and the relief sought; or

4.3.4.6.2 requesting a hearing on the issue according to the provisions of R655-4-7.

4.3.4.7 A Cease and Desist Order shall remain in force during the pendency of the appeal.

4.3.5 When required by the state engineer, the well driller or registered operator shall take lithologic samples at the specified intervals and submit them in the bags provided by the state engineer.

4.3.6 A copy of the current Administrative Rules for Water Wells should be available at each well construction site for review by the construction personnel. Licensed well drillers/pump installers and registered operators must have proof of licensure or registration with them on site during regulated well activity.

4.3.7 Prior to starting construction of a new well, the licensed driller shall investigate and become familiar with the drilling conditions, geology of potential aquifers and overlying materials, anticipated water quality problems, and know contaminated water bearing zones that may be encountered in the area of the proposed drilling activity.

R655-4-4.4 Removing Drill Rig from Well Site.

4.4 Removing Drill Rig From Well Site.

4.4.1 A well driller shall not remove his drill rig from a well site unless the well drilling activity is properly completed or abandoned in accordance with the construction standards in Sections 9 thru 12.

4.4.2 For the purposes of these rules, the regulated work on a well will be considered completed when the well driller removes his drilling rig from the well site. The regulated pump work on a well will be considered completed when the pump installer removes his pump rig from the well site.

4.4.3 The well driller may request a variance from the state engineer to remove a drill rig from a well prior to completion or abandonment. This request must be in written form to the state engineer. The written request must provide justification for leaving the well incomplete or un-abandoned and indicate how the well will be temporarily abandoned as provided in Section R655-4-14 and must give the date when the well driller plans to continue work to either complete the well or permanently abandon it.

R655-4-4. Official Well Driller's Report (Well Logs)

4.5 Official Well Driller's Report (Well Log)

4.5.1 Within 30 days of the completion of regulated work on any well, the driller shall file an official well driller's report (well log) with the state engineer. The blank well log form will be mailed to the licensed well driller upon receipt of the information on the Start Card as described in Subsection 4.2.

4.5.2 The water right number or non-production well number, owner name/address, and the approved location of the well will be preprinted on the blank well log provided to the well driller. The driller is required to verify this information and make any necessary changes on the

well log prior to submittal. The state engineer will mark the approved activity (e.g., new,

replace, repair, deepen) on the well log. The driller must provide the following information on the well log:

- a. The start and completion date of work on the well;
- b. The nature of use for the well (e.g., domestic, irrigation, stock watering, commercial, municipal, provisional, monitor, cathodic protection, heat pump, etc.);
- c. The borehole diameter, depth interval, drilling method and drilling fluids utilized to drill the well;
- d. The lithologic log of the well based on strata samples taken from the borehole as drilling progresses;
- e. Static water level information to include date of measurement, static level, measurement method, reference point, artesian flow and pressure, and water temperature;
- f. The size, type, description, joint type, and depth intervals of casing, screen, and perforations;
- g. A description of the filter pack, surface and interval seal material, and packers used in the well along with necessary related information such as the depth interval, quantity, and mix ratio;
- h. A description of the finished wellhead configuration;
- i. The date and method of well development;
- j. The date, method, yield, drawdown, and elapsed time of a well yield test;
- k. A description of pumping equipment (if available);
- l. Other comments pertinent to the well activity completed;
- m. The well driller's statement to include the driller name, license number, signature, and date.

4.5.3 Accuracy and completeness of the submitted well log are required. Of particular importance is the lithologic section which should accurately reflect the geologic strata penetrated during the drilling process. Sample identification must be logged in the field as the borehole advances and the information transferred to the well log form for submission to the state engineer.

4.5.4 An amended well log shall be submitted by the licensed driller if it becomes known that the original report contained inaccurate or incorrect information, or if the original report requires supplemental data or information. Any amended well log must be accompanied by a written statement, signed and dated by the licensed well driller, attesting to the circumstances and the reasons for submitting the amended well log.

R655-4-4.6 Official Well Abandonment Reports (Abandonment Logs)

4.6 Official Well Abandonment Reports (Abandonment Logs)

4.6.1 Whenever a well driller is contracted to replace an existing well under state engineer's approval, it shall be the responsibility of the well driller to inform the well owner that it is required by law to permanently abandon the old well in accordance with the provisions of Section R655-4-14.

4.6.2 Within 30 days of the completion of abandonment work on any well, the driller shall file an abandonment log with the state engineer. The blank abandonment log will be mailed to the licensed well driller upon notice to the state engineer of commencement of abandonment work as described in Subsection R655-4-4(4.2.5).

4.6.3 The water right number or non-production well number, owner name/address, and the well location (if available) will be preprinted on the blank abandonment log provided to the well driller. The driller is required to verify this information and make any necessary changes

on the abandonment log prior to submitting the log. The driller must provide the following information on the abandonment log:

- a. Existing well construction information;
- b. Date of abandonment;
- c. Reason for abandonment;
- d. A description of the abandonment method;
- e. A description of the abandonment materials including depth intervals, material type, quantity, and mix ratio;
- f. Replacement well information (if applicable);
- g. The well driller's statement to include the driller name, license number, signature, and date.

4.6.4 When a well is replaced and the well owner will not allow the driller to abandon the existing well, the driller must briefly explain the situation on the abandonment form and submit the form to the state engineer within 30 days of completion of the replacement well.

R655-4-4.7 Official Pump Installation Report (Pump Logs)

4.7 Official Pump Installation Report (Pump Log).

4.7.1 Soon after the completion of regulated pump work on any well, the licensee shall file an official pump installation report (pump log) with the state engineer. If well disinfection is the only activity on a well, a pump log need not be filed with the state engineer. Blank pump log forms will be available to the licensee at any Division office, requested by mail, or downloaded from the Division's website (www.waterrights.utah.gov).

4.7.2 Pertinent information to be included on the pump log by the licensee shall consist of:

- a. The water right number or non-production well number;
- b. the well owner name and address;
- c. The approved point of diversion or location of the well;
- d. The start and completion date of work on the well;
- e. The nature of use for the well (e.g., domestic, irrigation, stock watering, commercial, municipal, provisional, monitor, cathodic protection, heat pump, etc.);
- f. Pertinent well details including casing diameters/depths, total well depth, well intake depth intervals, wellhead configuration including pitless adapter/unit configuration if applicable;
- g. A detailed description of pump-related work performed on or in the well including pump setting depth, pump type, pumping rate, valving, drop piping, jointing, capping, testing, sealing, disinfection, and pitless adapter/unit installation;
- h. Static water level information to include date of measurement, static level, measurement method, reference point, artesian flow and pressure, and water temperature;
- i. A description of the finished wellhead configuration;
- j. The date, method, yield, drawdown, and elapsed time of a well yield test;
- k. Other comments pertinent to the well activity completed;
- m. The pump installer's statement to include the licensee name, license number, signature, and date.

R655-4-4.8 Incomplete or Incorrectly Completed Report

4.8 Incomplete or Incorrectly Completed Reports

An incomplete log or a log that has not been completed correctly will be returned to the licensed well driller to be completed or corrected. The well log will not be considered filed with

the state engineer until it is complete and correct.

4.8 Extensions of Time

The well driller may request an extension of time for filing the well log if there are circumstances which prevent the driller from obtaining the necessary information before the expiration of the 30 days. The extension request must be submitted in writing before the end of the 30-day period.

R655-4-4.9 Late Well Logs – Lapsed License

4.9 Late Well Logs – Lapsed License

All outstanding well logs or abandonment logs shall be properly submitted to the state engineer prior to the lapsing of a license. A person with a lapsed license who has failed to submit all well/abandonment logs within 90 days of lapsing will be subject to the state engineer's enforcement powers under Section 73-2-25 of the Utah Code (Related rules: Section R655-14 UAC)

R655-4-10 General Requirements

10.1 Standards

10.1.1 In some locations, the compliance with the following minimum standards will not result in a well being free from pollution or from being a source of subsurface leakage, waste, or contamination of the groundwater resource. Since it is impractical to attempt to prepare standards for every conceivable situation, the well driller or pump installer shall judge when to construct or otherwise perform work on wells under more stringent standards when such precautions are necessary to protect the groundwater supply and those using the well in question. Other state and local regulations pertaining to well drilling and construction, groundwater protection, isolation distances (setbacks) from potential contamination sources and/or other structures/boundaries, and water quality/testing regulations may exist that are either more stringent than these rules or that specifically apply to a given situation. It is the licensee's responsibility to understand and apply other federal, state, and local regulations as applicable.

R655-4-10.2 Well Site Locations

10.2 Well Site Locations.

10.2.1 Well site locations are described by course and distance from outside section corners or quarter corners (based on a Section/Township/Range Cadastral System) and by the Universal Transverse Mercator (UTM) coordinate system (NAD83 Map Datum) on all state engineer authorizations to drill (Start Cards). However, the licensee should also be familiar with local zoning ordinances, or county boards of health requirements which may limit or restrict the actual well location and construction in relationship to property/structure boundaries and existing or proposed concentrated sources of pollution or contamination such as septic tanks, drain fields, sewer lines, stock corrals, feed lots, etc. The licensee should also be familiar with the Utah Underground Facilities Act (Title 54, Chapter 8a of the Utah Code Annotated 1953 as amended) which requires subsurface excavators (including well drilling) to notify operators of underground utilities prior to any subsurface excavation. Information on this requirement can be found by calling Blue Stakes Utility Notification Center at (800)662-4111.

10.2.2 Regulated wells shall be drilled at the approved location as defined on the valid start card. The driller shall check the drilling location to see if it matches the state-approved location listed on the Driller's Start Card.

R655-4-10.3 Unusual Conditions

10.3.1 If unusual conditions occur at a well site and compliance with these rules and standards will not result in a satisfactory well or protection to the groundwater supply, a licensed water well driller or pump installer shall request that special standards be prescribed for a particular well (variance request). The request for special standards shall be in writing and shall set forth the location of the well, the name of the owner, the unusual conditions existing at the well site, the reasons and justification that compliance with the rules and minimum standards will not result in a satisfactory well, and the proposed standards that the licensee believes will be more adequate for this particular well. If the state engineer finds that the proposed changes are in the best interest of the public, the state engineer will approve the proposed changes by assigning special standards for the particular well under consideration. At the Division's discretion, the licensee applying for the variance may be required to provide additional technical information justifying the variance. The variance request will be evaluated, and a response will be given within fourteen days. In a public health emergency or other exceptional circumstance, verbal notification for a variance may be given. An emergency usually consists of a well failure resulting in a dry well or an unusable well. Driller convenience does not constitute an emergency.

R655-4-11 Well Drilling and Construction Requirements

11.0 General

11.0.1 Figures 1 through 5 are used to illustrate typical well construction standards, and can be viewed in the State of Utah Water Well Handbook available at the Division of Water Rights, 1594 West North Temple, Salt Lake City, Utah. Figure 1 illustrates the typical construction of a drilled well with driven casing such as a well drilled using the cable tool method or air rotary with a drill-through casing driver. Figure 2 illustrates the typical construction of a well drilled with an oversized borehole and/or gravel packed without the use of surface casing. Figure 3 illustrates the typical construction of a well drilled with an oversized borehole and/or gravel packed with the use of surface casing. Figure 4 illustrates the typical construction of a well drilled with an oversized borehole and/or gravel packed completed in stratified formations in which poor formation material or poor quality water is encountered. Figure 5 illustrates the typical construction of a well completed with PVC or nonmetallic casing.

R655-4-11.1 Approved Products, Materials, and Procedures

11.1.1 Any product, material or procedure designed for use in the drilling, construction, cleaning, renovation, development pump installation/repair, or abandonment of water production or non-production wells, which has received certification and approval for its intended use by the National Sanitation Foundation (NSF) under ANSI/NSF Standard 60 or 61, the American Society for Testing Materials (ASTM), the American Water Works Association (AWWA) or the American National Standards Institute (ANSI) may be utilized. Other products, materials or procedures may also be utilized for their intended purpose upon manufacturers certification that they meet or exceed the standards or certifications referred to in this section and upon state engineer approval.

R655-4-11.2 Well Casing - General

11.2 Well Casing - General

11.2.1 Drillers Responsibility. It shall be the sole responsibility of the well driller to determine the suitability of any type of well casing for the particular well being constructed, in accordance with these minimum requirements.

11.2.2 Casing Stick-up. The well casing shall extend a minimum of 18 inches above finished ground (land) level and the natural ground surface should slope away from the casing. A secure sanitary, weatherproof mechanically secured cap/seal or a completely welded cap shall be placed on the top of the well casing to prevent contamination of the well. If a vent is placed in the cap, it shall be properly screened to prevent access to the well by debris, insects, or other animals.

11.2.3 Steel Casing. All steel casing installed in Utah shall be in new or like-new condition, being free from pits or breaks, clean with all potentially dangerous chemicals or coatings removed, and shall meet the minimum specifications listed in Table 6 of these rules. In order to utilize steel well casing that does not fall within the categories specified in Table 6, the driller shall receive written approval from the state engineer. All steel casing installed in Utah shall meet or exceed the minimum ASTM, ANSI, or AWWA standards for steel pipe as described in Subsection 11.1 unless otherwise approved by the state engineer. Applicable standards (most recent revisions) may include:

ANSI/AWWA A100-AWWA Standard for Water Wells.

ANSI/ASTM A53-Standard Specifications for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

ANSI/ASTM A139-Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and over).

ANSI/AWWA C200-Standard for Steel Water Pipe-6 in. and Larger.

ASTM A589-89-Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe.

API Spec.5L and 5LS-Specification for Liner Pipe.

ASTM A106-Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service

ASTM A778-Standard Specifications for Welded, Unannealed Austenitic Stainless Steel Tubular Products.

ASTM A252-Standard Specification for Welded and Seamless Steel Pipe Piles.

ASTM A312-Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

ASTM A409- Standard Specification for Welded Large Diameter Austenitic Steel Pipe for Corrosive or High-Temperature Service

TABLE 6
MINIMUM WALL THICKNESS FOR STEEL WELL CASING

Depth								
Nominal Casing Diameter (in)	0 to 200 (ft)	200 to 300 (ft)	300 to 400 (ft)	400 to 500 (ft)	600 to 800 (ft)	800 to 1000 (ft)	1000 to 1500 (ft)	1500 to 2000 (ft)
2	.154	.154	.154	.154	.154	.154	...	...
3	.216	.216	.216	.216	.216	.216	...	...
4	.237	.237	.237	.237	.237	.237	.237	.237
5	.250	.250	.250	.250	.250	.250	.250	.250
6	.250	.250	.250	.250	.250	.250	.250	.250
8	.250	.250	.250	.250	.250	.250	.250	.250
10	.250	.250	.250	.250	.250	.250	.313	.313

12	.250	.250	.250	.250	.250	.250	.313	.313
14	.250	.250	.250	.250	.313	.313	.313	.313
16	.250	.250	.313	.313	.313	.313	.375	.375
18	.250	.313	.313	.313	.375	.375	.375	.438
20	.250	.313	.313	.313	.375	.375	.375	.438
22	.313	.313	.313	.375	.375	.375	.375	.438
24	.313	.313	.375	.375	.375	.438	...	...
30	.313	.375	.375	.438	.438	.500	...	...

Note: Minimum wall thickness in inches.

For nominal casing diameters less than five (5) inches, the minimum wall thickness must be equivalent to ASTM Schedule 40.

For any other casing diameter not addressed herein, prior approval by the state engineer is require.

0.250 = 1/4, 0.312 = 5/16, 0.375 = 3/8, 0.438 = 7/16.

R655-4-11.2.4 Plastic and Other Non-metallic Casing

11.2.4 Plastic and Other Non-metallic Casing.

11.2.4.1 Materials. PVC well casing and screen may be installed in Utah upon obtaining permission of the well owner. Other types of non-metallic casing or screen must be approved by the state engineer prior to installation. Plastic well casing and screen shall be manufactured and installed to conform with The American National Standards Institute (ANSI) or the American Society for Testing and Materials (ASTM) Standard F 480 (most recent version), which are incorporated by reference to these rules. Casing and screen meeting this standard is normally marked "WELL CASING" and with the ANSI/ASTM designation "F 480-, SDR-17 (or 13.5, 21, etc.)". All plastic casing and screen for use in potable water supplies shall be manufactured to be acceptable to the American National Standards Institute/National Sanitation Foundation (NSF) standard 61. Other types of plastic casings and screens may be installed upon manufacturers certification that such casing meets or exceeds the above described ASTM/SDR specification or ANSI/NSF approval and upon state engineer approval.

11.2.4.2 Minimum Wall Thickness and Depth Requirements. PVC well casing and screen with a nominal diameter equal to or less than four (4) inches and for non-production well purposes shall meet the minimum wall thickness required under ASTM Standard F480-95 SDR 21 or a Schedule 40 designation. PVC well casing and screen use for water production well purposes with a nominal diameter equal to or less than four (4) inches shall meet the minimum wall thickness required under ASTM Standard F480-95 SDR 17 or a Schedule 80 designation. PVC well casing and screen with a nominal diameter greater than four (4) inches shall meet the minimum wall thickness required under ASTM Standard F480 (most recent version) SDR 17 or a Schedule 80 designation. Additionally, caution should be used whenever other than factory slots or perforations are added to PVC well casing. The installation of hand cut slots or perforations significantly reduces the collapse strength tolerances of unaltered casings. The depth at which plastic casing and screen is placed in a well shall conform to the minimum requirements and restrictions as outlined in ASTM Standard F-480 (most recent version) and to PVC casing manufacturer recommendations. Liner pipe does not need to meet these wall thickness requirements if it is placed inside of a casing that does meet these wall thickness requirements.

11.2.4.3 Fiberglass Casing. Fiberglass reinforced plastic well casings and screens may be installed in wells upon obtaining permission of the well owner. All fiberglass casing or screens

installed in wells for use in potable water supplies shall be manufactured to be acceptable by ANSI/NSF Standard 61 and upon state engineer approval.

11.2.4.4 Driving Non-metallic Casing. Non-metallic casing shall not be driven, jacked, or dropped and may only be installed in an oversized borehole.

11.2.4.5 Protective Casing. If plastic or other non-metallic casing is utilized, the driller shall install a protective steel casing which complies with the provisions of Subsection 11.2.3 or an equivalent protective covering approved by the state engineer over and around the well casing at ground surface to a depth of at least two and one half (2.5) feet. If a pitless adapter is installed on the well, the bottom of the protective cover shall be placed above the pitless adapter/well connection. If the pitless adapter is placed in the protective casing, the protective casing shall extend below the pitless entrance in the well casing and be sealed both on the outside of the protective casing and between the protective casing and well casing. The protective cover shall be sealed in the borehole in accordance with the requirements of Subsection 11.4. The annular space between the protective cover and non-metallic casing shall also be sealed with acceptable materials in accordance with Subsection 11.4. A sanitary, weather-tight seal or a completely welded cap shall be placed on top of the protective cover, thus enclosing the well itself. If the sanitary seal is vented, screens shall be placed in the vent to prevent debris insects, and other animals from entering the well. This protective casing requirement does not apply to monitor wells. Figure 5 depicts this requirement.

R655-4-11.3 Casing Joints

11.3 Casing Joints.

11.3.1 General. All well casing joints shall be made water tight. In instances in which a reduction in casing diameter is made, there shall be enough overlap of the casings to prevent misalignment and to insure the making of an adequate seal in the annular space between casings to prevent the movement of unstable sediment or formation material into the well, in addition to preventing the degradation of the water supply by the migration of inferior quality water through the annular space between the two casings.

11.3.2 Steel Casing. All steel casing shall be screw-coupled or welded. If the joints are welded, the weld shall meet American Welding Society standards and be at least as thick as the wall thickness of the casing and shall consist of at least two beads for the full circumference of the joint and be fully penetrating. Spot welding of joints is prohibited.

11.3.3 Plastic Casing. All plastic well casing shall be mechanically screw coupled, chemically welded, cam-locked or lug coupled to provide water tight joints as per ANSI/ASTM F480-95. Metal screws driven into casing joints shall not be long enough to penetrate the inside surface of the casing. Metal screws should be used only when surrounding air temperatures are below 50 degrees Fahrenheit (F) which retards the normal setting of the cement. Solvent-welded joints shall not impart taste, odors, toxic substances, or bacterial contamination to the water in the well.

R655-4-11.4 Surface Seals and Interval Seals

Well Surface Seals and Interval Seals

11.4 Surface Seals and Interval Seals – General

11.4.1 General. Before the drill rig is removed from the drill site of a well, a surface seal shall be installed. Well casings shall be sealed to prevent the possible downward movement of contaminated surface waters in the annular space around the well casing. The seal shall also prevent the upward movement of artesian waters within the annular space around the well casing. Depending upon hydrogeologic conditions around the well, interval seals may need to be installed to prevent the movement of groundwater either upward or downward around the

well from zones that have been cased out of the well due to poor water quality or other reasons. The following surface and interval seal requirements apply equally to rotary drilled, cable tool drilled, bored, jetted, augered, and driven wells unless otherwise specified.

11.4.2 Seal Material.

11.4.2.1 General. The seal material shall consist of neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout as defined in Section R655-4-2. Use of sealing materials other than those listed above must be approved by the state engineer. Bentonite drilling fluid (drilling mud), dry drilling bentonite, or drill cuttings are not an acceptable sealing material. In no case shall drilling fluid (mud), drill cuttings, drill chips, or puddling clay be used, or allowed to fill, partially fill, or fall into the required sealing interval of a well during construction of the well. The annular space to be grouted must be protected from collapse and the introduction of materials other than grout. All hydrated sealing materials (neat cement grout, sand cement grout, bentonite grout) shall be placed by tremie pipe, pumping, or pressure from the bottom of the seal interval upwards in one continuous operation when placed below a depth of 30 feet or when placed below static groundwater level. Neat cement and sand cement grouts must be allowed to cure a minimum of 24 hours before well drilling, construction, or testing may be resumed. Allowable setting times may be reduced or lengthened by use of accelerators or retardants specifically designed to modify setting time, at the approval of the state engineer. The volume of annular space in the seal interval shall be calculated by the driller to determine the estimated volume of seal material required to seal the annular space. The driller shall place at least the volume of material equal to the volume of annular space, thus ensuring that a continuous seal is placed. The driller shall maintain the well casing centered in the borehole during seal placement using centralizers or other means to ensure that the seal is placed radially and vertically continuous. Neat cement and sand cement grout shall not be used for surface or interval seals with PVC and other approved non-metallic casing unless specific state engineer approval is obtained.

11.4.2.2 Bentonite Grout. Bentonite used to prepare grout for sealing shall have the ability to gel; not separate into water and solid materials after it gels; have a hydraulic conductivity or permeability value of $10E-7$ centimeters per second or less; contain at least 20 percent solids by weight of bentonite, and have a fluid weight of 9.5 pounds per gallon or greater and be specifically designed for the purpose of sealing. In addition, if a bentonite grout is to be placed in the vadose zone (unsaturated interval), then clean rounded fine sand shall be added to the bentonite grout in order to increase the overall solids content and stabilize the grout from dehydrating and cracking in that interval. For 20% solids bentonite grout, at least 100 pounds of clean rounded fine sand shall be added. For 30% solids bentonite grout, at least 50 pounds of clean fine sand shall be added. Bentonite grout shall not be used for sealing intervals of fractured rock or sealing intervals of highly unstable material that could collapse or displace the sealing material, unless otherwise approved by the state engineer. Bentonite grout shall not be used as a sealing material where rapidly flowing groundwater might erode it. Bentonite or polymer drilling fluid (mud) does not meet the definition of a grout with respect to density, gel strength, and solids content and shall not be used for sealing purposes. At no time shall bentonite grout contain materials that are toxic, polluting, develop odor or color changes, or serve as a micro-bacterial nutrient. All bentonite grout shall be prepared and installed according to the manufacturer's instructions and these rules. All additives must be certified by a recognized certification authority such as NSF and approved by the state engineer. All bentonite used in any well shall be certified by NSF/ANSI approved standards for use in potable water supply wells, or equivalent standards as approved by the state engineer.

11.4.2.3 Unhydrated Bentonite. Unhydrated bentonite (e.g., granular, tabular, pelletized, or

chip bentonite) may be used in the construction of well seals above a depth of 50 feet.

Unhydrated bentonite can be placed below a depth of 50 feet when placed inside the annulus of two casings, when placed using a tremie pipe, or by using a placement method approved by the state engineer. The bentonite material shall be specifically designed for well sealing and be within industry tolerances. All unhydrated bentonite used for sealing must be free of organic polymers and other contamination. Placement of bentonite shall conform to the manufacturer's specifications and instructions and result in a seal free of voids or bridges.

Granular or powdered bentonite shall not be placed under water by gravity feeding from the surface. When placing unhydrated bentonite, a sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate, verify a continuous seal placement, and to break up possible bridges or cake formation.

11.4.3 Seal and Unperforated Casing Placement.

11.4.3.1 General Seal Requirements. Figure 1 illustrates the construction of a surface seal for a typical well. The surface seal must be placed in an annular space that has a minimum diameter of four (4) inches larger than the nominal size of the permanent well casing (This amounts to a 2-inch annulus). The surface seal must extend from land surface to a minimum depth of 30 feet. The completed surface seal must fully surround the permanent well casing, must be evenly distributed, free of voids, and extend to undisturbed or recompact soil. In unconsolidated formations such as gravels, sands, or other unstable conditions when the use of drilling fluid or other means of keeping the borehole open are not employed, either a temporary surface casing with a minimum depth of 30 feet and a minimum nominal diameter of four (4) inches greater than the outermost permanent casing shall be utilized to ensure proper seal placement or the well driller shall notify the state engineer's office that the seal will be placed in a potentially unstable open borehole without a temporary surface casing by telephone or FAX in conjunction with the start card submittal in order to provide an opportunity for the state engineer's office to inspect the placement of the seal. If a temporary surface casing is utilized, the surface casing shall be removed in conjunction with the placement of the seal. Alternatively, conductor casing may be sealed permanently in place to a depth of 30 feet with a minimum 2-inch annular seal between the surface casing and borehole wall. If the temporary surface casing is to be removed, the surface casing shall be withdrawn as sealing material is placed between the outer-most permanent well casing and borehole wall. The sealing material shall be kept at a sufficient height above the bottom of the temporary surface casing as it is withdrawn to prevent caving of the borehole wall. If the temporary conductor casing is driven in place without a 2-inch annular seal between the surface casing and borehole wall, the surface casing shall be removed. Specific state engineer approval must be obtained on a case-by-case basis for any variation of these requirements. Surface seals and unperforated casing shall be installed in wells located in unconsolidated formation such as sand and gravel with minor clay or confining units; unconsolidated formation consisting of stratified layers of materials such as sand, gravel, and clay or other confining units; and consolidated formations according to the following procedures.

11.4.3.2 Unconsolidated Formation without Significant Confining Units. This includes wells that penetrate an aquifer overlain by unconsolidated formations such as sand and gravel without significant clay beds (at least six feet thick) or other confining formations. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet. Permanent unperforated casing shall extend at least to a depth of 30 feet and also extend below the lowest anticipated pumping level. Additional casing placed in the open borehole below the required depths noted above shall meet the casing requirements of Subsection 9.2 unless the casing is installed as a liner inside a larger diameter approved casing.

11.4.3.3 Unconsolidated Formation with Significant Confining Units. This includes wells that penetrate an aquifer overlain by clay or other confining formations that are at least six (6) feet

thick. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet and at least five (5) feet into the confining unit above the water bearing formation.

Unperforated casing shall extend from ground surface to at least 30 feet and to the bottom of the confining unit overlying the water bearing formation. If necessary to complete the well, a smaller diameter casing, liner, or well screen may be installed below the unperforated casing. The annular space between the two casings shall be sealed with grout, bentonite, or a mechanical packer. Additional casing placed in the open borehole below the required depths noted above shall meet the casing requirements of Subsection 11.2 unless the casing is installed as a liner inside a larger diameter approved casing.

11.4.3.4 Consolidated Formation. This includes drilled wells that penetrate an aquifer, either within or overlain by a consolidated formation. The surface seal must be placed in a 2-inch annular space to a minimum depth of 30 feet and at least five (5) feet into competent consolidated formation. Unperforated permanent casing shall be installed to extend to a depth of at least 30 feet and the lower part of the casing shall be driven and sealed at least five (5) feet into the consolidated formation. If necessary to complete the well, a smaller diameter casing, liner, or well screen may be installed below the unperforated casing. The annular space between the two casings shall be sealed with grout, bentonite, or a mechanical packer. Additional casing placed in the open borehole below the required depths noted above shall meet the casing requirements of Subsection 11.2 unless the casing is installed as a liner inside a larger diameter approved casing.

11.4.3.5 Sealing Artesian Wells. Unperforated well casing shall extend into the confining stratum overlying the artesian zone, and shall be adequately sealed into the confining stratum to prevent both surface and subsurface leakage from the artesian zone. If leaks occur around the well casing or adjacent to the well, the well shall be completed with the seals, packers, or casing necessary to eliminate the leakage. The driller shall not move the drilling rig from the well site until leakage is completely stopped, unless authority for temporary removal of the drilling rig is granted by the state engineer, or when loss of life or property is imminent. If the well flows naturally at land surface due to artesian pressure, the well shall be equipped with a control valve so that the flow can be completely stopped. The control valve must be available for inspection by the state engineer at all times. All flowing artesian water supply wells shall be tested for artesian shut-in pressure in pounds per square inch and rate of flow in cubic feet per second, or gallons per minute, under free discharge conditions. This data shall be reported on the well log.

11.4.3.6 Exceptions: With state engineer approval, exceptions to minimum seal depths can be made for shallow wells where the water to be produced is at a depth less than 30 feet. In no case shall a surface seal extend to a total depth less than 10 feet below land surface.

11.4.4 Interval Seals. Formations containing undesirable materials (e.g., fine sand and silt that can damage pumping equipment and result in turbid water), contaminated groundwater, or poor quality groundwater must be sealed off so that the unfavorable formation cannot contribute to the performance and quality of the well. These zones, as well as zones with significantly differing pressures, must also be sealed to eliminate the potential of cross contamination or commingling between two aquifers of differing quality and pressure. Figure 4 illustrates this situation. Unless approved by the state engineer, construction of wells that cause the commingling or cross connection of otherwise separate aquifers is not allowed.

11.4.5 Other Sealing Methods. In wells where the above-described methods of well sealing do not apply, special sealing procedures can be approved by the state engineer upon written request by the licensed well driller.

R655-4-11.5 Special Requirements for Oversized and Gravel Packed Wells

Gravel Pack or Filter Material

11.5 This section applies to wells in which casing is installed in an open borehole without driving or drilling in the casing and an annular space is left between the borehole wall and well casing (e.g., mud rotary wells, flooded reverse circulation wells, air rotary wells in open bedrock).

11.5.1 Oversized Borehole. The diameter of the borehole shall be at least four (4) inches larger than the outside diameter of the well casing to be installed to allow for proper placement of the gravel pack and/or formation stabilizer and adequate clearance for grouting and surface seal installations. In order to accept a smaller diameter casing in any oversized borehole penetrating unconsolidated or stratified formations, the annular space must be sealed in accordance with Subsection 11.4. In order to minimize the risk of: 1) borehole caving or collapse; 2) casing failure or collapse; or 3) axial distortion of the casing, it is required that the entire annular space in an oversized borehole between the casing and borehole wall be filled with formation stabilizer such as approved seal material, gravel pack, filter material or other state engineer-approved materials. Well casing placed in an oversized borehole should be suspended at the ground surface until all formation stabilizer material is placed in order to reduce axial distortion of the casing if it is allowed to rest on the bottom of an open oversized borehole. In order to accept a smaller diameter casing, the annular space in an oversized borehole penetrating unconsolidated formations (with no confining layer) must be sealed in accordance with Subsection 11.4 to a depth of at least 30 feet or from static water level to ground surface, whichever is deeper. The annular space in an oversized borehole penetrating stratified or consolidated formations must be sealed in accordance with Subsection 11.4 to a depth of at least 30 feet or five (5) feet into an impervious strata (e.g., clay) or competent consolidated formation overlying the water producing zones back to ground surface, whichever is deeper. Especially in the case of an oversized borehole, the requirements of Subsection 11.4.4 regarding interval sealing must be followed.

11.5.2 Gravel Pack or Filter Material. The gravel pack or filter material shall consist of clean, well-rounded, chemically stable grains that are smooth and uniform. The filter material should not contain more than 2% by weight of thin, flat, or elongated pieces and should not contain organic impurities or contaminants of any kind. In order to assure that no contamination is introduced into the well via the gravel pack, the gravel pack must be washed with a minimum 100 ppm solution of chlorinated water or dry hypochlorite mixed with the gravel pack at the surface before it is introduced into the well (see Table 7 of these rules for required amount of chlorine material).

11.5.3 Placement of Filter Material. All filter material shall be placed using a method that through common usage has been shown to minimize a) bridging of the material between the borehole and the casing, and b) excessive segregation of the material after it has been introduced into the annulus and before it settles into place. It is not acceptable to place filter material by pouring from the ground surface unless proper sounding devices are utilized to measure dynamic filter depth, evaluate pour rate, and minimize bridging and formation of voids.

11.5.4 No Surface Casing Used. If no permanent conductor casing is installed, neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite seal shall be installed in accordance with Subsection 11.4. Figure 2 of these rules illustrates the construction of a typical well of this type.

11.5.5 Permanent Conductor Casing Used. If permanent conductor casing is installed, it shall be unperforated and installed and sealed in accordance with Subsection 11.4 as depicted in Figure 3 of these rules. After the gravel pack has been installed between the conductor casing and the well casing, the annular space between the two casings shall be sealed by either

welding a water-tight steel cap between the two casings at land surface or filling the annular space between the two casings with neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite from at least 50 feet to the surface and in accordance with Subsection 11.4. If a hole will be created in the permanent conductor casing in order to install a pitless adapter into the well casing, the annular space between the conductor casing and well casing shall be sealed to at least a depth of thirty (30) feet with neat cement grout, sand cement grout, bentonite grout, or unhydrated bentonite. A waterproof cap or weld ring sealing the two casings at the surface by itself without the annular seal between the two casings is unacceptable when a pitless adapter is installed in this fashion. Moreover in this case, the annular space between the surface casing and well casing must be at least 2 inches in order to facilitate seal placement.

11.5.6 Gravel Feed Pipe. If a gravel feed pipe, used to add gravel to the gravel pack after well completion, is installed, the diameter of the borehole in the sealing interval must be at least four (4) inches in diameter greater than the permanent casing plus the diameter of the gravel feed pipe. The gravel feed pipe must have at least 2-inches of seal between it and the borehole wall. The gravel feed pipe must extend at least 18 inches above ground and must be sealed at the top with a watertight cap or plug (see Figure 2).

11.5.7 Other Gravel Feed Options. If a permanent surface casing or conductor casing is installed in the construction of a filter pack well, a watertight, completely welded, steel plate (weld ring) at least 3/16 of an inch in thickness shall be installed between the inner production casing and the outer surface/conductor casing at the wellhead. A watertight fill port with threaded cap may be installed for the purpose of placing additional filter pack material in the well.

R655-4-11.6 Protection of the Aquifer

11.6 Protection of the Aquifer

11.6.1 Drilling Fluids and LCMs. The well driller shall take due care to protect the producing aquifer from clogging or contamination. Organic substances or phosphate-based substances shall not be introduced into the well or borehole during drilling or construction. Every effort shall be made to remove all substances and materials introduced into the aquifer or aquifers during well construction. "Substances and materials" shall mean all bentonite- and polymer-based drilling fluids, filter cake, and any other inorganic substances added to the drilling fluid that may seal or clog the aquifer. All polymers and additives used in any well shall be certified by NSF/ANSI approval standards for use in potable water supply wells, or equivalent standards as approved by the state engineer. The introduction of lost circulation materials (LCM's) during the drilling process shall be limited to those products which will not present a potential medium for bacterial growth or contamination. Only LCM's which are non-organic, which can be safely broken down and removed from the borehole, may be utilized. This includes, but is not limited to, paper/wood products, brans, hulls, grains, starches, hays/straws, and proteins. This is especially important in the construction of wells designed to be used as a public water system supply. All polymers and additives used in any well shall be certified by NSF/ANSI approval standards for use in potable water supply wells, or equivalent standards as approved by the Division. The product shall be clearly labeled as meeting these standards. Polymers and additives must be designed and manufactured to meet industry standards to be nondegrading and must not act as a medium which will promote growth of microorganisms.

11.6.2 Containment of Drilling Fluid. Drilling or circulating fluid introduced into the drilling process shall be contained in a manner to prevent surface or subsurface contamination and to prevent degradation of natural or man-made water courses or impoundments. Rules

regarding the discharges to waters of the state are promulgated under R317-8-2 of the Utah Administrative Code and regulated by the Utah Division of Water Quality (Tel. 801-536-6146). Pollution of waters of the state is a violation of the Utah Water Quality Act, Utah Code Annotated Title 19, Chapter 5.

11.6.3 Mineralized, Contaminated or Polluted Water. Whenever a water bearing stratum that contains nonpotable mineralized, contaminated or polluted water is encountered, the stratum shall be adequately sealed off so that contamination or co-mingling of the overlying or underlying groundwater zones will not occur (see Figure 4) Water bearing zones with differing pressures must also be isolated and sealed off in the well to avoid aquifer depletion, wasting of water, and reduction of aquifer pressures.

11.6.4 Down-hole Equipment. All tools, drilling equipment, and materials used to drill, repair, renovate, clean, or install a pump in a well shall be free of contaminants prior to beginning well construction or other in-well activity. Contaminants include lubricants, fuel, bacteria, etc. that will reduce the well efficiency, and any other item(s) that will be harmful to public health and/or the resource or reduce the life of the water well. It is recommended that excess lubricants placed on drilling equipment be wiped clean prior to insertion into the borehole.

11.6.5 Well Disinfection and Chlorination of Water. No contaminated or untreated water shall be placed in a well during construction. Water should be obtained from a chlorinated municipal system. Where this is not possible, the water must be treated to give at least 100 parts per million free chlorine residual. Upon completion of a well or work on a well, the driller or pump installer shall disinfect the well using accepted disinfection procedures to give at least 100 parts per million free chlorine residual equally distributed in the well water from static level to the bottom of the well. A chlorine solution designated for potable water use prepared with either calcium hypochlorite (powdered, granular, or tablet form) or sodium hypochlorite in liquid form shall be used for water well disinfection. Off-the-shelf chlorine compounds intended for home laundry use, pool or fountain use should not be used if they contain additives such as antifungal agents, silica ("Ultra" brands), scents, etc. Table 7 provides the amount of chlorine compound required per 100 gallons of water or 100 feet linear casing volume of water to mix a 100 parts per million solution. Disinfection situations not depicted in Table 7 must be approved by the state engineer. Additional recommendations and guidelines for water well system disinfection are available from the state engineer upon request.

TABLE 6
AMOUNT OF CHLORINE COMPOUND FOR EACH 100 FEET OF WATER
STANDING IN WELL (100 ppm solution)

Well Diameter (inches)	Ca-HyCLT* (25% HOCL) (ounces)	Ca-HyCLT (65% HOCL) (ounces)	Na-HyCLT** (12- trade %) (fluid ounces)	Liquid CL*** (100% C12) (lbs)
2	1.00	0.50	3.5	0.03
4	3.50	1.50	7.0	0.06
6	8.00	3.00	16.0	0.12
8	14.50	5.50	28.0	0.22
10	22.50	8.50	45.0	0.34
12	32.50	12.00	64.0	0.50
14	44.50	16.50	88.0	0.70
16	58.00	26.00	112	0.88
20	90.50	33.00	179	1.36

For Every 100 gal. of water add:	5.50	2.00	11.5	0.09
----------------------------------	------	------	------	------

* Calcium Hypochlorite (solid)

** Sodium Hypochlorite (liquid)

*** Liquid Chloride

R655-4-11.7 Special Requirements

11.7.1 Explosives. Explosives used in well construction shall not be detonated within the section of casing designed or expected to serve as the surface seal of the completed well, whether or not the surface seal has been placed. If explosives are used in the construction of a well, their use shall be reported on the official well log. In no case shall explosives, other than explosive shot perforators specifically designed to perforate steel casing, be detonated inside the well casing or liner pipe.

11.7.2 Access Port. Every well shall be equipped with a usable access port so that the position of the water level, or pressure head, in the well can be measured at all times.

11.7.3 Completion or Abandonment. A licensed driller shall not remove his drill rig from a well site unless the well is completed or abandoned. Completion of a well shall include all surface seals, gravel packs or curbs required. Dry boreholes, or otherwise unsuccessful attempts at completing a well, shall be properly abandoned in accordance with Section R655-4-14. Upon completion, all wells shall be equipped with a watertight, tamper-resistant casing cap or sanitary seal.

11.7.4 Surface Security. If it becomes necessary for the driller to temporarily discontinue the drilling operation before completion of the well or otherwise leave the well or borehole unattended, the well and/or borehole must be covered securely to prevent contaminants from entering the casing or borehole and rendered secure against entry by children, vandals, domestic animals, and wildlife.

11.7.5 Pitless Adapters/Units. Pitless adapters or units are acceptable to use with steel well casing as long as they are installed in accordance with manufacturers recommendations and specifications as well as meet the Water Systems Council Pitless Adapter Standard (PAS-97) which are incorporated herein by reference and are available from Water Systems Council, 13 Bentley Dr., Sterling, VA 20165, phone 703-430-6045, fax 703-430-6185 (watersystemscouncil.org). The pitless adaptor, including the cap or cover, casing extension, and other attachments, must be so designed and constructed to be secure, water tight, and to prevent contamination of the potable water supply from external sources. Pitless wellhead configurations shall have suitable access to the interior of the well in order to measure water level and for well disinfection purposes. Pitless configurations shall be of watertight construction throughout and be constructed of materials at least equivalent to and having wall thickness and strength compatible to the casing. Pitless adapters or units are not recommended to be mounted on PVC well casing. If a pitless adapter is to be used with PVC casing, it should be designed for use with PVC casing, and the driller should ensure that the weight of the pump and column do not exceed the strength of the PVC well casing. If it is known that a pitless adapter/unit will be installed on a well, a cement grout seal shall not be allowed within the pitless unit or pitless adaptor sealing interval as the well is being constructed. The pitless adapter or unit sealing interval shall be sealed with unhydrated bentonite as the well is constructed and before pitless installation. Upon pitless adapter/unit installation, the surface seal below the pitless connection shall be protected and maintained. After the pitless adapter/unit has been installed, the associated excavation around the well from the pitless connection to ground surface shall be backfilled and compacted with low permeability fill that

includes clay. The pitless adapter or unit, including the cap or cover, pitless case and other attachments, shall be designed and constructed to be watertight to prevent the entrance of contaminants into the well from surface or near-surface sources.

11.7.6 Hydraulic Fracturing. The hydraulic fracturing pressure shall be transmitted through a drill string and shall not be transmitted to the well casing. Hydraulic fracturing intervals shall be at least 20 feet below the bottom of the permanent casing of a well. All hydraulic fracturing equipment shall be thoroughly disinfected with a 100 part per million chlorine solution prior to insertion into the well. The driller shall include the appropriate hydraulic fracturing information on the well log including methods, materials, maximum pressures, location of packers, and initial/final yields. In no case shall hydrofracturing allow commingling of waters within the well bore. Clean sand or other material (propping agents) approved by the Division may be injected into the well to hold the fractures open when pressure is removed.

11.7.7 Static Water Level, Well Development, and Well Yield. To fulfill the requirements of Subsection R655-4-4.5.2, new wells designed to produce water shall be developed to remove drill cuttings, drilling mud, or other materials introduced into the well during construction and to restore the natural groundwater flow to the well to the extent possible. After a water production well is developed, a test should be performed to determine the rate at which groundwater can be reliably produced from the well. Following development and testing, the static water level in the well should also be measured. Static water level, well development information, and well yield information shall be noted on the official submittal of the Well Log by the well driller.

11.7.8 Packers. Packers shall be of a material that will not impart taste, odor, toxic substances or bacterial contamination to the water in the well.

11.7.9 Screens. Screens must be constructed of corrosion-resistant material and sufficiently strong to withstand stresses encountered during and after installation. Screen slot openings, screen length, and screen diameter should be sized and designed to provide sufficient open area consistent with strength requirements to transmit sand-free water from the well. Screens should be installed so that exposure above pumping level will not occur.

11.7.10 Openings in the Casing. There shall be no opening in the casing wall between the top of the casing and the bottom of the required casing seal except for pitless adapters, measurement access ports, and other approved openings installed in conformance with these standards. In no case shall holes be cut in the casing wall for the purpose of lifting or lowering casing into the well bore unless such holes are properly welded closed and watertight prior to placement into the well bore.

11.7.11 Casing vents. If a well requires venting, it must terminate in a down-turned position at least 18-inches above ground (land) level, at or above the top of the casing or pitless unit and be covered with a 24 mesh corrosion-resistant screen.

R655-4-12.1.2 Public Water Supply Wells

12.1.2 Public Water Supply Wells. Public water supply wells are subject to the minimum construction standards outlined in Section R655-4-11 in addition to the requirements established by the Department of Environmental Quality, Division of Drinking Water under Rules R309-515 and R309-600. Rules and requirements in R309-515 and R309-600 are regulated by the Division of Drinking Water and not by the Division of Water Rights and may include a preliminary evaluation report related to drinking water source protection, well plan and specification review and approval, and mandatory grout seal inspection (The Division of Drinking Water should be contacted to determine specific and current rules and requirements).

R655-4-13 Deepening, Rehabilitation, and Renovation of Wells

This provision is not applicable to the project.

13.1 Sealing of Casing.

13.1.1 If in the repair of a drilled well, the old casing is withdrawn, the well shall be recased and resealed in accordance with the rules provided in Subsection R655-4-11(11.4).

13.2 Inner Casing.

13.2.1 If an inner casing is installed to prevent leakage of undesirable water into a well, the space between the two well casings shall be completely sealed using packers, casing swedging, pressure grouting, etc., to prevent the movement of water between the casings.

13.3 Outer Casing.

13.3.1 If the "over-drive" method is used to eliminate leakage around an existing well, the casing driven over the well shall meet the minimum specifications listed in Subsection R655-4-11(11.4).

13.4 Artesian Wells.

13.4.1 If upon deepening an existing well, an artesian zone is encountered, the well shall be cased and completed as provided in Subsection R655-4-11(11.4).

13.5 Drilling in a Dug Well.

13.5.1 A drilled well may be constructed through an existing dug well provided that:

13.5.1.1 Unperforated Casing Requirements. An unperforated section of well casing extends from a depth of at least ten (10) feet below the bottom of the dug well and at least 20 feet below land surface to above the maximum static water level in the dug well.

13.5.1.2 Seal Required. A two foot thick seal of neat cement grout, sand cement grout, or bentonite grout is placed in the bottom of the dug well so as to prevent the direct movement of water from the dug well into the drilled well.

13.5.1.3 Test of Seal. The drilled well shall be pumped or bailed to determine whether the seal described in Subsection R655-4-13(13.5.1.2) is adequate to prevent movement of water from the dug well into the drilled well. If the seal leaks, additional sealing and testing shall be performed until a water tight seal is obtained.

13.6 Well Rehabilitation and Cleaning.

13.6.1 Tools used to rehabilitate or clean a well shall be cleaned, disinfected, and free of contamination prior to placement in a well.

13.6.2 The driller shall use rehabilitation and cleaning tools properly so as not to permanently damage the well or aquifer. If the surface seal is damaged or destroyed in the process of rehabilitation or cleaning, the driller shall repair the surface seal to the standards set forth in Subsection R655-4-11(11.4).

13.6.3 Debris, sediment, and other materials displaced inside the well and surrounding aquifer as a result of rehabilitation or cleaning shall be completely removed by pumping, bailing, well development, or other approved methods.

13.6.4 Detergents, chlorine, acids, or other chemicals placed in wells for the purpose of increasing or restoring yield, shall be specifically designed for that purpose and used according to the manufacturer's recommendations.

13.6.5 Any renovation, rehabilitation, cleaning, or other work on a well that requires alteration of the well itself shall be conducted by a licensed well driller.

13.6.6 Following completion of deepening, renovation, rehabilitation, cleaning, or other work on a well, the well shall be properly disinfected in accordance with Subsection R655-4-11(11.6.5).

R655-4-14 Abandonment of Wells

14.1 Temporary Abandonment.

14.1.1 When any well is temporarily removed from service, the top of the well shall be sealed with a tamper resistant, water-tight cap or seal. If a well is in the process of being drilled and is temporarily abandoned, the well shall be sealed with a tamper resistant, water-tight cap or seal and a surface seal installed in accordance with Subsection R655-4-11(11.4). The well may be temporarily abandoned during construction for a maximum of 90 days. After the 90 day period, the temporarily abandoned well shall be completed as a well that meets the standards of Section 11 or permanently abandoned in accordance with the following requirements, and an official well abandonment report (abandonment log) must be submitted in compliance with Section R655-4-4.

14.2 Permanent Abandonment.

14.2.1 The rules of this section apply to the abandonment of the type of wells listed in Subsection R655-4-1(1.2) including private water wells, public supply wells, monitor wells, cathodic protection wells, and heating or cooling exchange wells. A licensed driller shall notify the state engineer prior to commencing abandonment work of an existing well and submit a complete and accurate abandonment log following abandonment work in accordance with Section R655-4-4 of these rules. Prior to commencing abandonment work, the driller shall obtain a copy of the well log of the well proposed to be abandoned from the well owner or the state engineer, if available, in order to determine the proper abandonment procedure. Any well that is to be permanently abandoned shall be completely filled from bottom to top in a manner to prevent vertical movement of water within the borehole as well as preventing the annular space surrounding the well casing from becoming a conduit for possible contamination of the groundwater supply. A well driller who wishes to abandon a well in a manner that does not comply with the provisions set forth in this section must request approval from the state engineer.

14.3 License Required.

14.3.1 Well abandonment shall be accomplished under the direct supervision of a currently licensed water well driller who shall be responsible for verification of the procedures and materials used.

14.4 Acceptable Materials.

14.4.1 Neat cement grout, sand cement grout, unhydrated bentonite, or bentonite grout in accordance with Section R655-4-11.4 shall be used to abandon wells and boreholes. Other sealing materials or additives, such as fly ash, may be used in the preparation of grout upon approval of the state engineer. Drilling mud or drill cuttings shall not be used as any part of a sealing materials for well abandonment. The liquid phase of the abandonment fluid shall be water from a potable municipal system or disinfected in accordance with Subsection R655-4-11(11.6.5).

14.5 Placement of Materials.

14.5.1 Neat cement and sand cement grout shall be introduced at the bottom of the well or required sealing interval and placed progressively upward to the top of the well. The sealing material shall be placed by the use of a grout pipe, tremie line, dump bailer or equivalent in order to avoid freefall, bridging, or dilution of the sealing materials or separation of aggregates from sealants. Sealing material shall not be installed by freefall (gravity) unless the interval to be sealed is dry and no deeper than 30 feet below ground surface. If the well to be abandoned is a flowing artesian well, the well may be pressure grouted from the surface. The well should be capped immediately after placement of seal materials to allow the seal material to set up and not flow out of the well.

14.5.2 Bentonite-based abandonment products shall be mixed and placed according to manufacturer's recommended procedures and result in a seal free of voids or bridges.

Granular or powered bentonite shall not be placed under water. When placing unhydrated bentonite, a sounding or tamping tool shall be run in the sealing interval during pouring to measure fill-up rate, verify a continuous seal placement, and to break up possible bridges or cake formation.

14.5.3 If seal material settlement occurs during placement and set up, the top of the abandoned well casing or borehole shall be topped off with approved sealing material until the seal top remains at the natural ground surface.

14.5.4 Abandonment materials placed opposite any non-water bearing intervals or zones shall be at least as impervious as the formation or strata prior to penetration during the drilling process.

14.5.5 Prior to well or borehole abandonment, all pump equipment, piping, and other debris shall be removed to the extent possible. The well shall also be sounded immediately before it is plugged to make sure that no obstructions exist that will interfere with the filling and sealing. If the well contains lubricating oil that has leaked from a turbine shaft pump, it shall be removed from the well prior to abandonment and disposed of in accordance with applicable state and federal regulations.

14.5.6 Verification shall be made that the volume of sealing and fill material placed in a well during abandonment operations equals or exceeds the volume of the well or borehole to be filled and sealed.

14.6 Termination of Casing.

14.6.1 The casings of wells to be abandoned shall be severed to the natural ground surface or deeper if necessitated by development of the area. If the casing is severed below ground surface, compacted native material shall be placed above the abandoned well upon completion.

14.7 Abandonment of Artesian Wells.

14.7.1 A neat cement grout, sand-cement grout, or concrete plug shall be placed in the confining stratum overlying the artesian zone so as to prevent subsurface leakage from the artesian zone. The remainder of the well shall be filled with sand-cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. The uppermost ten (10) feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.8 Abandonment of Drilled and Jetted Wells.

14.8.1 A neat cement grout or sand cement grout plug shall be placed opposite all perforations, screens or openings in the well casing. The remainder of the well shall be filled with cement grout, neat cement, bentonite abandonment products, concrete, or bentonite slurry. The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.9 Abandonment of Gravel Packed Wells.

14.9.1 All gravel packed wells shall be pressure grouted throughout the perforated or screened section of the well. The remainder of the well shall be filled with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. If gravel pack extends above or below the perforated/screened interval in the annular space between the casing and borehole wall, additional perforations in that blank interval of casing shall be required. The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.10 Removal of Casing.

14.10.1 Where possible, it is recommended that the well casing be removed during well abandonment, and when doing so, the abandonment materials shall be placed from the bottom of the well or borehole progressively upward as the casing is removed. The well shall be sealed with sand cement grout, neat cement grout, bentonite abandonment products, or bentonite grout. In the case of gravel packed wells, the entire gravel section shall be pressure grouted.

The uppermost ten feet of the well shall be abandoned as required in Subsection R655-4-14(14.5.3).

14.11 Replacement Wells.

14.11.1 Wells which are to be removed from operation and replaced by the drilling of a new well under an approved replacement application, shall be abandoned in a manner consistent with the provisions of Section R655-4-14 before the rig is removed from the site of the newly constructed replacement well, unless written authorization to remove the rig without abandonment is provided by the state engineer. Also refer to the requirements provided in Subsection R655-4-4(4.4).

14.12 Abandonment of Cathodic Protection Wells.

14.12.1 The general requirements for permanent well abandonment in accordance with Section R655-4-14 shall be followed for the abandonment of cathodic protection wells.

14.12.2 A cathodic protection well shall be investigated before it is destroyed to determine its condition, details of its construction and whether conditions exist that will interfere with filling and sealing.

14.12.3 Casing, cables, anodes, granular backfill, conductive backfill, and sealing material shall be removed as needed, by re-drilling, if necessary, to the point needed to allow proper placement of abandonment material. Casing that cannot be removed shall be adequately perforated or punctured at specific intervals to allow pressure injection of sealing materials into granular backfill and all other voids that require sealing.

R655-4-4 Well Driller Requirements

Well Videotaping

Well videotaping is required for the project.

R655-4-15 Monitor Well Construction Standards

This provision is not applicable to the project.

15.2 Installation and Construction.

15.2.1 Materials and Equipment Contaminant-Free. All material used in the installation of monitor wells shall be contaminant-free when placed in the ground. Drilling equipment shall be clean and contaminant free in accordance with Subsection R655-4-11(11.6.4). During construction contaminated water should not be allowed to enter contaminant-free geologic formations or water bearing zones.

15.2.2 Borehole Integrity. Some minor cross-contamination may occur during the drilling process, but the integrity of the borehole and individual formations must then be safeguarded from permanent cross connection.

15.2.3 Casing and Screen. The well casing should be perforated or screened and filter packed with sand or gravel where necessary to provide adequate sample collection at depths where appropriate aquifer flow zones exist. The casing and screen selected shall not affect or interfere with the chemical, physical, radiological, or biological constituents of interest. Screens in the same well shall not be placed across separate water bearing zones in order to minimize interconnection, aquifer commingling, and cross contamination. Screens in a nested well can be placed in separate water bearing zones as long as the intervals between the water bearing zones are appropriately sealed and aquifer cross connection and commingling does not occur. Monitor well casing and screen shall conform to ASTM standards, or consist of at least 304 or 316 stainless steel, PTFE (Teflon), or Schedule 40 PVC casing.

15.2.4 Gravel/Filter Pack. If installed, the gravel or filter pack should generally extend two (2) feet to ten (10) feet above screened or perforated areas to prevent the migration of the sealing material from entering the zones being sampled. Gravel or filter pack material shall meet the

requirements of Subsection R655-4-11(11.5.2). Gravel/filter pack for monitoring wells does not require disinfection. Drill cutting should not be placed into the open borehole annulus. The well driller shall ensure that a bridge or voids do not occur in the annular space during the placement of the gravel pack by means of a sounding device or other mechanism.

15.2.5 Annular Seal. All monitor wells constructed shall have a continuous surface seal, which seals the annular space between the borehole and the permanent casing, in accordance with the provisions in Section R655-4-11. The surface seal depth requirements of Section R655-4-11 do not apply to monitor wells. The surface seal may be more or less than 50 feet depending on the screen/perforation and/or gravel pack interval. Seals shall also be constructed to prevent interconnection and commingling of separate aquifers penetrated by the well, prevent migration of surface water and contaminations into the well and aquifers, and shall provide casing stability. The seal shall have a minimum diameter of four inches larger than the nominal size of the permanent casing, and shall extend from land surface to the top of the filter pack. After the permanent casing and filter pack (optional) has been set in final position, a layer of bentonite or fine sand (e.g., mortar sand) shall be placed on top of the filter pack to maintain separation between the seal material and the screened interval in order to insure that the seal placement will not interfere with the filter pack. The remaining annular space shall be filled to land surface in a continuous operation with unhydrated bentonite, neat cement grout, sand-cement grout, or bentonite grout. Only potable water should be used to hydrate any grout or slurry mixture. The completed annular space shall fully surround the permanent casing, be evenly distributed, free of voids, and extend from the permanent casing to undisturbed or recompacted soil. All sealing materials and placement methods shall conform to the standards in Section R655-4-2 and Subsection R655-4-11(11.4). The well driller shall ensure that a bridge or voids do not occur in the annular space during the placement of the seal.

15.2.6 Cuttings, Decon Water, Development Water, and Other IDW. Drill cuttings, decontamination (Decon) water, monitor well development water, and other investigation derived waste (IDW) shall be managed and disposed of in accordance with applicable state and federal environmental regulations. It is the responsibility of the driller to know and understand such requirements.

15.3 Minimum Surface Protection Requirements.

15.3.1 If a well is cased with metal and completed above ground surface, a locking water resistant cap shall be installed on the top of the well.

15.3.2 If the well is not cased with metal and completed above ground surface, a protective metal casing shall be installed over and around the well. The protective casing shall be cemented at least two feet into the ground around the nonmetallic casing. A water tight cap shall be installed in the top of the well casing. A locking cap shall be installed on the top of the protective casing.

15.3.3 Monitor wells completed above ground and potentially accessible to vehicular damage shall be protected in the following manner. At least three metal posts, at least three inches in diameter, shall be cemented in place around the casing. Each post shall extend at least three feet above and two feet below ground surface. A concrete pad may be installed to add protection to the surface completion. If installed, the concrete pad shall be at least four (4) inches thick and shall slope to drain away from the well casing. The base shall extend at least two (2) feet laterally in all directions from the outside of the well boring. When a concrete pad is used, the well seal may be part of the concrete pad.

15.3.4 If the well is completed below land surface, a water tight cap with a lock shall be attached to the top of the well casing. A metal monument or equivalent shall be installed over and around the well. The monument shall serve as a protective cover and be installed level with the land

surface and be equipped with a waterproof seal to prevent inflow of any water or

contaminants. Drains will be provided, when feasible, to keep water out of the well and below the well cap. The monument and cover must be designed to withstand the maximum expected load.

15.4 Abandonment.

15.4.1 Abandonment of monitor wells shall be completed in compliance with the provisions of Section R655-4-14. The provisions of Section R655-4-14 are not required for the permanent abandonment of monitor wells completed at a depth of 30 feet below natural ground surface.

R655-4-16. Pump Installation and Repair.

16.1 Pump installation practices. All pump installations shall be completed in such a manner as to prevent waste and contamination of groundwater by pollution material entering the well from pumping equipment, casing connectors, fittings, piping, sanitary seals or caps.

16.2 Surface Seal. If in the process of pump installation or repair, the well's surface seal is disturbed or damaged, it shall be repaired and resealed in accordance with the standards provided in Subsection R655-4-11(11.4).

16.3 Tools, Equipment, and Materials. Down-hole tools and equipment used in performance of pump installation and repair shall be cleaned, disinfected, and free of contamination prior to placement in a well. All tools, drilling equipment, and materials used to drill a well shall be free of contaminants prior to beginning pump-related work. Contaminants include lubricants, fuel, bacteria, etc. that will reduce the well efficiency, and any other item(s) that will be harmful to public health and/or the resource or reduce the life of the water well. It is recommended that excess lubricants placed on equipment be wiped clean prior to insertion into the well. Thread Compounds, Sealants, and Lubricants must not exceed the maximum contaminant levels for chemicals, taste, and odor. The licensee shall use pump-related tools and equipment properly so as not to permanently damage the well or aquifer.

16.4 Disinfection. Following completion of pump installation and repair work on a well, the well, pump, and in-well discharge piping shall be properly disinfected in accordance with Subsection R655-4-11(11.6.5).

16.5. Product, material, and Process Standards. Any product, material or procedure designed for use related to pump installation and repair of water production or non-production wells, which has received certification and approval for its intended use by the National Sanitation Foundation (NSF) under ANSI/NSF Standard 60 or 61, the American Society for Testing Materials (ASTM), the American Water Works Association (AWWA) or the American National Standards Institute (ANSI) may be utilized. Other products, materials or procedures may also be utilized for their intended purpose upon manufacturers certification that they meet or exceed the standards or certifications referred to in this section and upon state engineer approval. Organic substances shall not be introduced into the well or borehole during pump installation and repair work.

16.6 Surface Completions. Pump installers shall leave the well surface completion upon completion of pump installation/repair work in accordance with the standards in Subsection R655-4-11 as it pertains to casing stick up, steel/PVC casing extensions, sanitary capping and venting, and protective casings. Upon completion, all wells shall be equipped with a watertight, tamper-resistant casing cap or sanitary seal.

16.7 Flowing Artesian Wells. In accordance with Subsection R655-4-11(11.4.3.5, artesian wells that flow naturally at the surface, the well shall be equipped with a control valve so that the flow can be completely stopped. The control valve must be available for inspection by the state engineer at all times.

16.8 Seals Between Casings. If the well is constructed of multiple casing strings at or near the ground surface and if a pitless adapter/unit is installed, the standards of Subsection R655-4-11(11.5.5) shall be employed to ensure proper sealing between casings is maintained.

16.9 Water Level and Flow Measurement. Following pump installation and repair work, the well shall be left in such a manner to allow for access to water level measurements in accordance with R655-4-11(11.7.2). After pump installation and repair work is completed on a well, the static water level should be measured after which a test should be performed to determine the rate at which groundwater can be reliably produced from the well. Pumping water level should be measured and recorded during this test. Static water level and well testing information shall be noted on the official submittal of the Pump Log by the pump installer or well driller.

16.10 Surface Security. If it becomes necessary for the pump installer to temporarily discontinue operation on a well before completion or otherwise leave the well unattended, the well must be covered securely to prevent contaminants from entering the casing and rendered secure against entry by children, vandals, domestic animals, and wildlife.

16.11 Above-grade connections. An above-grade connection into the top or side of a well casing shall be at least eighteen inches (18") above the land surface and shall be constructed so as to exclude dirt or other foreign matter by at least one of the following methods, as may be applicable:

- (A) Threaded connection;
- (B) Welded connection;
- (C) Expansion sealer;
- (D) Bolted flanges with rubber gaskets;
- (E) Overlapping well cap; or
- (F) If a water well pump is mounted or sealed on a concrete pedestal, the casing shall extend at least to the top of the pedestal and at least eighteen inches (18") above the land surface.

16.12 Pitless Connections. Pitless adapters and units shall be installed in accordance with the standards set forth in Subsection R655-4-11(11.7.5). Pitless adapters shall be installed below the frost line. A below-ground connection shall not be submerged in water at the time of installation. Holes cut in the casing through which the pitless adapters are installed must be sized and constructed so as to guarantee a watertight seal with the pitless adapter in place.

16.13 Backflow Protection. When a check valve or foot valve is not a part of the pump, a check valve or back-siphon prevention device shall be installed on the pump discharge line within the well or beyond the well to eliminate the opportunity for contaminated water to backflush into the well. Such device must be designed to direct or isolate the water flow to prevent water in the distribution line from running back down the well during removal or repair to the pump and pumping equipment. When a flow meter is installed on a well the meter must be located downstream from the backflow preventer and be placed in accordance with manufacturer spacing specifications.

16.14 Hand Pumps. Hand pumps shall be of the force type equipped with a packing gland around the pump rod, a delivery spout which is closed and downward directed, and a one-piece bell-type base which is part of the pump stand or is attached to the pump column in a watertight manner. The bell base of the pump shall be bolted with a gasket to a flange which is securely attached to the casing or pipe sleeve.

16.15 Pumping Water Level. In a screened or perforated well, the well pump setting and suction inlet shall be located so that the pumping level of the water cannot be drawn below the top of the screen.

16.16 Pump and Column/Drop Pipe Removal. During any repair or installation of a water well

pump, the licensed installer shall make a reasonable effort to maintain the integrity of ground

water and to prevent contamination by elevating the pump column and fittings, or by other means suitable under the circumstances.

KEY: water wells, pump installers, well drillers license

Date of Enactment or Last Substantive Amendment: April 9, 2018 Notice of

Continuation: August 1, 2014

Authorizing, and Implemented or Interpreted Law: 73-3

THIS PAGE INTENTIONALLY BLANK

Fact Sheet Regarding Water Discharges From Water Well Drilling and Operation Prepared by:

Utah Division of Water Quality

Updated July 2002

Background:

Utah Administrative Code (UAC) R317-8-2 requires a UPDES discharge permit for the discharge of pollutants from any point source into waters of the State. A point source is defined as "any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, from which pollutants are or may be discharged."

Through the use of various drilling methods and reasonable best management practices, water well drilling generally can be conducted such that no discharge occurs or that only de minimis (insignificant) amounts of pollutants would be released into waters of the State. As such, it has been the policy of the Division of Water Quality to not require water well drilling operations to obtain a discharge permit as long as they do not discharge or discharge de minimis amounts of pollutants.

There may be circumstances where a discharge permit is necessary or desired by the well driller or owner. However, because a discharge permit can take several months to issue, requires payment of a permit fee, and because the permit would contain specific enforceable effluent quality limits and frequent self-monitoring and reporting requirements, it is highly recommended that all options to avoid discharge or attain the de minimis discharge be explored before pursuing an individual discharge permit.

Best Management Practices (BMP's)

The goal of BMP implementation is to avoid discharge or, if this is not practicable, to obtain a de minimis pollutant discharge during any phase of well development. The primary pollutants of concern are total suspended solids and turbidity in the form of drill cuttings and muds. Occasionally chemicals such as surfactants are used during the drilling operation. It is the responsibility of the operator and/or owner to assure that BMP's are properly installed and operated in order to contain all fluids or to produce a de minimis pollutant discharge to waters of the State. Some BMP's are indicated below:

1. Drill pits or ponds of adequate size for total containment of all fluids containing drill cuttings, surfactants and associated chemicals.
2. Pits or ponds used for settling; followed by filter cloth and/or straw bales which can be used for filtration prior to fluids entering surface waters of the state.
3. Land application of produced waters during drilling, pump testing, and well development where no discharge would occur to waters of the State.
4. Land application where sufficient filtration through vegetation removes solids and turbidity before water is diffused and enters any surface waters.
5. Other sediment and turbidity reduction treatment such as frac tanks, cyclone separators, etc.

Pollution of waters of the state is a violation of the Water Quality Act, UCA 19-5, which provides for significant monetary penalties, and additional penalties for violations that are willful or caused by gross negligence.

If you have any concerns not covered in this fact sheet or any further questions, please contact:

Mike Herkimer
(801) 538-6058
Division of Water Quality
288 North 1460 West
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Jim Goddard
(801) 538-7314
Division of Water Rights
1594 West North Temple, Suite 220
Salt Lake City, Utah 84114-6300

THIS PAGE INTENTIONALLY BLANK