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Funding for WRDS and the creation of this electronic document was provided by the Wyoming Water Development Commission (http://wwdc.state.wy.us)
GUERNSEY HYDRAULIC STUDY
LEVEL II

EXECUTIVE SUMMARY

Prepared for
Wyoming Water Development Commission

November 1, 2003

Submitted by:
TST INC. OF DENVER

In cooperation with:
GUERNSEY HYDRAULIC STUDY
LEVEL II

EXECUTIVE SUMMARY

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Submitted by:
TST INC. OF DENVER

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PURPOSE

A Level II - Hydraulic Study for the Town of Guernsey has been completed in accordance with the Contract between the Wyoming Water Development Commission (WWDC) and TST Inc. of Denver, dated May 30, 2003.

The Town of Guernsey (2000 census population of 1,155) is located in the northeastern portion of Platte County, Wyoming, on the north bank of the North Platte River. Platte County is situated in the southeastern quarter of the State, within Wyoming's Great Plains region. Guernsey is bordered on the eastern town limits by Camp Guernsey, a state military reservation used as a National Guard training camp. Guernsey's closest neighboring community is Hartville (2000 census population of 76), which is located approximately 6 miles north by way of Highway 270. The Town of Wheatland (1990 census population of 3,271) is located about 30 miles to the south and west of Guernsey.

The work within this Level II Hydraulic Study was organized to address the following project priorities:

♦ Develop a plan to provide all required maintenance and rehabilitation for the water storage tank. Include a plan for the provision of emergency/fire flows for the period that the storage tank is off-line due to the suggested maintenance. Incorporate a review of new regulations regarding security at municipal water storage facilities and recommend improvements.

♦ Re-evaluate the condition of the existing distribution system now that some improvements recommended in the 1995 Level I Master Plan have been constructed.

♦ Evaluate the improvements necessary to provide water service to several areas of new development that may occur within or adjacent to the Town's existing service area in the near future.

♦ Evaluate the pending groundwater disinfection rules of the SWDA, and the ability of the existing system to meet any rule changes that may be promulgated in the near future. Recommend improvements necessary to address upcoming regulatory changes.

♦ Develop a funding and potential financing plan that can support the recommended improvements without a severe economic burden upon the consumers.
FINDINGS

Storage Tank & Emergency Water Supply

The existing water storage tank is an above ground steel structure with a diameter of 64 feet and a height of 32 feet. The storage capacity is approximately 750,000 gallons and there is a single inlet/outlet pipe and one overflow pipe. A video inspection of the interior portion of the tank was performed in August of 2002. The inspection revealed that the tank roof, walls, floor and center support have areas of coating de-lamination, corrosion, rust, and blistering of the paint coating.

The existing exterior roof access ladder does not meet modern safety requirements. The existing telemetry system between the wells, the tank and the municipal building is in poor repair, and has failed in the past, resulting in the storage tank becoming empty.

The recommended maintenance on the tank will require it to be drained and out of service for 8-12 weeks. The work should be performed in early spring or late fall to avoid the high water usage of the summer months. To adequately meet fire protection requirements, an alternative emergency water source is required.

The U.S. Army National Guard has preliminarily agreed to allow the Town to construct a connection between the two water systems. The connection will be used only for an emergency basis, should either the Town or the Guard Camp require an emergency source of water. The Guard Camp system has excellent capacity and the ability to supply adequate emergency or fire flows to the Town when the Town tank is off-line.

Distribution System & Water System Improvements

Several areas of deficient fire coverage due to small diameter pipe were discovered. Replacement of the existing 4" diameter pipe with new 6" diameter pipe would increase the fire flows to acceptable levels. Approximately 1,800 lineal feet of pipe would need to be upgraded.

The Town requested that the Level II Study include the conceptual design and cost estimates for water system improvements to extend service to two areas of proposed residential development: a 7-acre tract located on the south side of Town, and a 53-acre site located just west of the North Platte River and north of Highway 26. The 7-acre site is planned for a higher density of multifamily dwelling units, and would require approximately 2500 lineal feet of 6" diameter water line. The 53-acre site is planned for a lower density of 1-2 dwellings per acre. Extending water service to this area would include crossing the North Platte River and would consist of approximately 300 lineal feet of 10" diameter water line, installed on the Highway 26/North Platte River bridge.

The Town has decided not to pursue the construction of these two projects in the near future, but wait until the residential developments proceed further through the planning stages.
The Town would like to extend both potable and irrigation water transmission lines from an existing municipal facility to a proposed municipal facility. The potable water system for the existing facility is seasonal, and consists of one 30 gpm groundwater well and small diameter (2") delivery line. This seasonal water system is not connected to the Town's Public Water System. It currently provides water service to the Municipal Golf Course and an adjacent RV camping area. The Town is proposing development of a recreational facility known as “Hub City” located to the west of the Golf Course. Hub City will include picnic facilities and up to 26 new RV parking sites. The RV parking sites will offer water and sewer hookups. It will be used on a seasonal basis only.

**Water Quality and Treatment**

The Town of Guernsey received an Administrative Order from the Region 8 EPA office, dated August 25, 2003. The Order cited Guernsey for violating two areas of monitoring requirements: the Total Coliform Rule (TCR), and initial monitoring of a new water source (Well #4) for radioactivity. A review of water quality testing done when Well #4 was developed in 2001 indicated high radon levels, which is not unusual for this area of Wyoming.

After a review of the Town’s water quality monitoring results, the EPA Administrative Order, and all applicable existing or proposed water quality regulations, it is our preliminary recommendation that the Town construct facilities for the removal of high levels of radon. These facilities should consist of a dedicated water line that would deliver water from all three of the water supply wells to the storage tank. Aeration equipment at the storage tank would provide air stripping of the radon, thereby allowing delivery of safe water to the Town’s entire distribution system.

Absolute regulatory requirements that require disinfection of groundwater have still not been promulgated, and may not be in the very near future. It is assumed that the previous TC violations, as identified in EPA’s Administrative Order of August 25, 2003, were isolated instances and they are not expected to be repeated. Therefore disinfection is not required at this time.

The Wellhead Protection Plan (WHP) prepared for Guernsey is 5 years old and the recommendations for addressing possible contamination that are presented in the Management Program of the WHP are dated.

**RECOMMENDATIONS & CONFIGURATIONS**

**Storage Tank & Emergency Water Supply**

It is recommended that the tank be drained, sandblasted, repaired where necessary, and then recovered with one primer coat and two finish coats of paint. Due to the age of the paint coatings, it is assumed that the paint contains lead. Therefore, the blasting method and disposal of the paint will have to meet current regulations for removal of hazardous material.
The exterior access ladder needs to be replaced with a new ladder that has a safety cage and a safety door on the bottom seven feet of the ladder. Additional rehabilitation work at the same time frame would include sandblasting and repainting the exterior surfaces and installing an interior galvanic cathodic protection system.

A connection between the Camp Guernsey and Town of Guernsey water systems should be constructed prior to the rehabilitation and maintenance of the Guernsey water storage tank to allow temporary provision of emergency and fire flows to the Town while the tank is off-line. Once the tank rehabilitation is complete, the connection would be partially dismantled. Reconnection would be available for future emergency situations. The location of the connection is shown in Figure 4.1.

**Distribution & Water System Improvements**

Replace approximately 1,800 lineal feet of existing 4” diameter pipe with new 6” diameter pipe to increase fire flows to acceptable levels. Figure 6.3 shows the area of the replaced pipe.

Extend potable water and irrigation transmission lines to the proposed Hub City municipal facility. The potable water improvements will include approximately 2400 lineal feet of 2 ½” water line with appurtenances. A 550-gallon hydropressure tank should be added at the existing potable well in order to guarantee adequate transmission and distribution line pressures. Approximately 600 lineal feet of 3” transmission line will extend the existing irrigation line into the area. Figure 6.5.3 shows the proposed transmission line extensions, both potable and irrigation.

**Water Quality and Treatment**

Proposed improvements for water treatment include a dedicated 10” diameter transmission line that will transport water directly from all three municipal wells to the location of the existing storage tank, where mixing equipment will be provided for the mitigation of high radon levels. The proposed location of the transmission line is shown in Figure 6.2.

The chlorination equipment at Well #3 should be removed, as it is inoperable. The chlorination equipment at Well #4 can remain in case it is needed in the future. If future testing indicates that disinfection is required, then a decision could be made, at that time, if chlorination is to be added at Wells #2 and #3, or if another form of disinfection and/or treatment would be more advantageous.

The following actions should be taken to update the Wellhead Protection Plan: review the Management Program and report the progress made to date on implementation of the recommendations; determine if any new sources should be added to the list; develop a list of action items and a schedule for addressing outstanding issues; and prepare a SWA.
COST ESTIMATES

Project costs and proposed project financing are summarized in the table below. Costs and financing plans for components associated with 1) developing the 7 acres south of Wells #3 and #4, 2) constructing a 10” water main across the North Platte River to service a 53 acre tract, and 3) water system improvements for Hub City are not included in the table. These projects do not qualify for state or federal funding and will have to be financed solely by the Town of Guernsey.

The total estimated project cost is $1,242,364.85. Proposed project funding is shown in the table below.

PROJECT FUNDING

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<th>IMPROVEMENT</th>
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* SLIB is 20-year repayment  ** RUS is 30-year repayment