GRANGER REHABILITATION PROJECT - LEVEL II

EXECUTIVE SUMMARY

DECEMBER, 2002

Submitted to the:

WYOMING WATER DEVELOPMENT COMMISSION

FORSGREEN ASSOCIATES / INC.
GRANGER REHABILITATION PROJECT

LEVEL II STUDY

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Prepared by:
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FIGURE 1.1
GRANGER WATER SUPPLY PIPELINES
SECTION 1.0
EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW & HISTORY

The Town of Granger presently has a population of approximately 125 people, who are served by a community water system that delivers water to 86 non-metered connections. The Green River, which is located approximately 16 miles to the northeast of Granger, is presently the town's sole source of raw water. In the late 1970's, the town constructed a pipeline from the Town of Granger east to the FMC trona plant. This pipeline is an 8-inch diameter PVC pipeline extending east from Granger to FMC, a distance of approximately 10.2 miles. At FMC, this pipeline ties into the FMC raw water pipeline that extends an additional 7.5 miles to the Green River. It should be noted that the water supply agreement executed between the Town and FMC contains a "30-day notice" cancellation clause that places the town's water supply at risk.

In 2000 WWDC hired Forsgren Associates, Inc. to conduct a Water Supply Master Plan - Level I study. That study recommended FMC Agreement revisions, transmission pipeline improvements, treatment and storage improvements, distribution system leak testing, individual user meters, and agreement with Little America for water usage.

The Town continues to have serious concerns relative to the security of their long-term supply and water quality regulatory compliance. They are particularly concerned about the proposed Enhanced Surface Water Treatment Requirements soon to take effect. The age of Granger's treatment plant combined with the lack of control over their source of water prompted the town to request assistance from the WWDC, the result of which is this Level II study.

1.2 STUDY AREA

The project study area primarily includes the incorporated Town of Granger in Sweetwater County, Wyoming. It should be noted that there is a Little America facility located approximately 12 miles southeast of Granger. Little America is a large travel center complex that includes a 140-room motel, swimming pool, restaurant, gift shop, gas station, repair shop, convenience store, and employee housing. Some consideration has been given to Little America as part of this study to the extent that both entities could benefit from using shared resources.

1.3 DESCRIPTION OF EXISTING SYSTEM

1.3.1 EXISTING GRANGER SYSTEM

1.3.1.1 Water Supply Source

Granger presently obtains its municipal water from the Green River. This is accomplished through a pipeline system from the Green River to the FMC trona mine operations and then on to the town of Granger. This pipeline system is approximately 17.7 miles in combined length and includes a 20-inch diameter steel pipeline to the FMC plant and an 8-inch diameter PVC pipeline to the town of Granger. Figure 1.1 shows the Granger water supply pipelines.

In the summer of 1977, the Town was experiencing serious water shortages and decided to construct a pipeline from Granger to the FMC trona plant. FMC had agreed to allow Granger to tie into their pipeline from the Green River and to allow the transport of water through their...
existing system to the FMC plant, at which point the Town would construct a pipeline to Granger.

**FMC Water Supply Agreement:** A written agreement was signed in August 1978. This agreement is subject to certain conditions, one of which is a cancellation clause which allows FMC to stop delivering water with just 30 days notice. In addition, another clause allows for the interruption of the water delivery at any time, for any duration, and for whatever reason.

**FMC Transmission Line:** Discussions with FMC personnel this summer indicate a possible need to temporarily take that pipeline out of service for maintenance work. If that were the case, other means of obtaining water supply for Granger would need to be implemented. The FMC plant does have other water supply lines to meet their water needs. However, Granger’s supply is wholly reliant upon that single pipeline.

**Granger Transmission Pipeline:** This pipeline was constructed and put into service in 1978. The pipeline is an 8-inch diameter PVC pipeline extending approximately 10.2 miles from the FMC plant to the Town of Granger.

Because Granger’s water supply is dependent on FMC and their pumping operations at the Green River, the Town of Granger has little control of the flow and the pressure of the water in this transmission line. At times, the flow and pressure reaching the treatment plant is not adequate for proper operation of the treatment plant. Most of the time, they have both adequate flow and pressure reaching the treatment plant.

### 1.3.1.2 Water Treatment Plant

**Facilities Characterization:** The Town operates a manufactured package water treatment plant. The package treatment unit is housed in a metal building with dimensions of 23'-0" wide x 26'-0" long x 12'-0" high (interior dimensions).

Originally, this plant was designed and operated as a completely automatic unit. It has been many years since this type of automation and control has been useful to the operators of this plant. This plant has been manually operated for quite a few years with most of the automation having been removed or non-operable.

**Facilities Condition:** The overall condition of the process unit is good. The problems being experienced by the water operators are more related to the peripheral controls that have been significantly modified over the years as original control strategies have failed.

The steel building which houses the treatment equipment is inadequately sized for proper and safe operation and maintenance of the facility. When working on the process unit, for example, operators are required to climb up a wood step ladder tied to the side of the unit and stand on that ladder when performing surface wash down of any of the process bays. When access is needed to the basins, operators are required to crawl along wooden planks laid across the tank tops with nothing to hold onto and only 4'-4" of clearance between the tops of the tanks and the building roof.

The building also has inadequate ventilation. It is heated by a gas furnace that is outdated and in disrepair. The building’s electrical system appears to be questionable with regards to code compliance and general safety.
Finished Water Quality: In recent history, the treatment plant has consistently been producing finished water with quality within water quality standards. There have been isolated events when finished water turbidity has been out of compliance for a short period of time. Such events have been the result of either breaks in their raw water transmissions line or a rain event in the Green River basin that has quickly altered the characteristics of the raw water influent, and operators have been unable to manually adjust the chemistry quick enough to account for the change in influent water quality.

1.3.1.3 Finished Water Storage

Granger's storage tank is a 500,000 gallon steel tank. Wyoming DEQ Water Quality Rules and Regulations sets water storage requirements based on both an average daily demand and a peak daily demand. Granger's storage tank meets both of those storage capacity requirements.

In 1999, the Town had the interior of the storage tank cleaned and inspected. Upon completion of that dive inspection and cleaning, it was recommended to the Town that the interior coating of the tank be stripped and re-coated. Large sections of interior wall were identified as having no coating. Some pitting and corrosion of the interior walls were noted. That work has not been done to date, likely due to the Town's budgeting constraints.

1.3.1.4 Distribution System

Granger's water distribution system was replaced with PVC piping in the late 1970's and early 1980's. In about 1985, a new pipeline and booster pump station was constructed that served the Wyoming Department of Transportation Maintenance Shop located about (one) 1 mile north of Town. In addition to serving the WyDOT Maintenance, there are presently five residential connections and one commercial connection to this pipeline. Figure 1.2 shows the overall distribution system as it exists today.

1.3.2 LITTLE AMERICA WATER SYSTEM

Little America has both a separate water source and a separate treatment plant from Granger's. Little America uses the Ham's Fork as their primary source for raw water. Historically, they have experienced significant shortages in their source supply and have had to look to the Town of Granger for assistance. In 1992 Little America and Granger agreed to make a raw water interconnection whereby the Little America treatment plant could receive emergency supplemental raw water from Granger through their pipeline to FMC.

Little America's treatment facility is located on the bank of the Ham's Fork River, immediately west of the Town of Granger.

1.4 WATER SUPPLY CONSIDERATIONS

1.4.1 IDENTIFICATION OF NEEDS

1.4.1.1 Projected Service Area Population

If one were to conservatively assume a slight population increase of 1% annual growth over the next 30 years, the population projection for the year 2030 would be 170. This population nearly matches the population of Granger back in the early 1980's. The 1% annual growth rate has been conservatively adopted for the purposes of this study.
1.4.1.2 Recorded Water Use

The Town of Granger does not have metered services. However, they have maintained good master meter records on treated water production. They have also kept good records on bulk water sales for industrial use.

**Bulk Sales:** The Town sells treated water in bulk to local industrial users that haul water in tanker trucks that are filled up at the treatment plant.

**Per Capita Water Use:** Since the Town of Granger does not have metered services, the per capita water use was estimated by taking the average daily production of the treatment plant and trying to account for the use of that production volume.

With a current population estimate of 125, Granger’s peak day water usage is calculated to be 713 gallons per capita-day. Average summer use is calculated to be 424 gallons per capita-day.

1.4.1.3 Projected Water Use Design Criteria

The statewide average per capita water use for systems relying upon treatment plants is 230 gallons per person per day as presented in the “State of Wyoming, 2000, Water System Survey Report”, published by the Wyoming Water Development Commission. It is felt that this water usage is more reflective of Granger’s actual water need assuming that the Town is able to correct their problems with “lost” water in the system.

1.4.2 WATER RIGHTS CONSIDERATIONS

The Town has three direct flow water rights. The more senior right is on the Ham’s Fork. This right is for 0.57 cfs. The other two rights are to the Green River and to one of its tributaries. The Green River right is for 0.56 cfs. The other right is a seasonal right to 1.5 cfs between the dates of June 1 through August 31 from Cottonwood Creek.

1.4.2.1 Available Water versus Legal Supply

The water right on the Ham’s Fork has the highest priority of all Granger’s water rights. In addition, the Ham’s Fork passes adjacent to the Town and would be a logical source of water for the Town. The problem is that this body of water is unreliable as a water source from both a quantity and a quality perspective. During this past summer, for example, the Ham’s Fork dried up to no flow and only a few damp spots in the channel bottom.

1.5 ALTERNATIVES EVALUATION

1.5.1 WATER SUPPLY ALTERNATIVES

1.5.1.1 Do Nothing

It is believed that the “Do Nothing” alternative is not an option. There needs to be a modification of the agreement between FMC and Granger for current operations and practices to continue, or an alternate source of supply needs to be addressed.
1.5.1.2 Return to Ham’s Fork Supply

Due to the problems that the Town of Granger has experienced, it is not felt to be practical to rely on the Ham’s Fork as their primary supply. It is possible to try and utilize the Ham’s Fork as a secondary water source in the event that the Town was temporarily unable to get Green River water through their existing transmission system. The old diversion works are still on the Ham’s Fork, and it may also be practical to share Little America’s diversion works in the event of an emergency.

1.5.1.3 Groundwater

Groundwater in the Granger area has historically been characterized by poor quality and limited yields. Groundwater as a source for the municipal water demands for the Town is not believed to be feasible based on the conclusions of previous studies.

1.5.1.4 Continued Use of Green River Water

Continued use of the Green River as the primary water source for the Town of Granger is, in our opinion, the most practical alternative from a source reliability standpoint. The consistent availability of water and the water quality of the Green River make it the preferred source for Granger. For continued use of the Green River to occur, the Town will need to renegotiate a long-term agreement with FMC for the continued use of their pipeline. At present, FMC has agreed to continue pumping water to the Town of Granger. If an opportunity to participate in a redundant pipeline to secure the source of water is forthcoming, then FMC has indicated their willingness to renegotiate the current contract.

1.5.1.5 Joint Water Supply Agreement with Granger and Little America

With the interconnect between the Granger raw water transmission line and Little America’s treatment plant completed in 1992, the Town and Little America both have the ability to utilize Green River water. Little America already purchases raw water from Granger as a secondary source when the Ham’s Fork is too low in dry years. This arrangement was agreed to by FMC to help out when Little America is experiencing shortages.

Wyoming has been in a drought cycle during the course of this Level II study. Little America has been required to secure water from FMC through Granger. It has become apparent that Little America prefers to remain independent from Granger, and that Granger also prefers autonomy.

A joint water supply agreement between Little America and Granger would help with shared costs for operation and maintenance of the raw water transmission pipeline. It may also be required to make construction of a new pipeline feasible.
1.6 RECOMMENDATIONS AND CONCLUSIONS

1.6.1 RECOMMENDED SYSTEM IMPROVEMENTS & MODIFICATIONS

In the July 2003 town council meeting, the council was polled to determine priority of improvements and modifications. Although construction of a pipeline from the Green River intake to the FMC plant was ideologically preferred, an addition of $30.00 per month to water bills was not. The project priorities, from most pressing to least immediate were seen to be:

1. Storage Tank Repairs
2. Treatment Plant Relocation and PLC
3. Water Service Meters
4. Transmission pipeline from the Green River to FMC plant
5. Additional Fire Protection

1.6.1.1 Supply, Transmission, and Storage

FMC Agreement Revisions: It is recommended that the Town of Granger continue to renegotiate a long-term agreement with FMC for the continued use of their pipeline. This new agreement should, in our opinion, allow for Granger’s permanent use of the pipeline, while still allowing FMC to temporarily shut off the pipeline for maintenance. It should also allow FMC to permanently shut off the pipeline, if needed, and establish conditions by which the Town of Granger could acquire the pipeline in the event that it was abandoned.

Transmission Pipeline(s) Improvements: It is recommended that the numerous air release valves along this pipeline be routinely inspected and maintained. Damaged air release valves could lead to air locks in the pipeline and a significant reduction in available flow at the treatment plant. It is also recommended that the transmission line be flushed on a scheduled basis to help reduce sediment buildup.

Inconsistent raw water pressure and flow at the treatment plant has been an ongoing problem for the operators. Proper adjustment of the Cla-Val is critical to system capacity and operation of the water treatment plant.

1.6.1.2 Storage Needs

It is recommended that the storage tank be equipped with a transducer and communication line (radio or hard wire), thus allowing accurate tank level readings at the treatment plant.

It is recommended that the storage tank be re-lined to protect the inner tank walls from the observed corrosive pitting.

Following the September 11, 2001 terrorist attack on the World Trade Center in New York City, additional regulations regarding security of water storage and supply have been promulgated. To comply, a 6 foot chain link security fence is recommended around the storage tank.
1.6.1.3 Treatment Plant

The water treatment plant has been meeting EPA water quality standards. There is concern that the plant, as presently operated and configured, represents a serious threat to the health and safety of the operators and the public.

There is also concern about the process controls and the lack of automation. Over the years, the process controls have been modified and/or deteriorated to the point that there remains minimal automation to the plant. An operator must be there on very frequent intervals to monitor the plant and to make manual adjustments to process controls.

It is recommended that the existing manufactured package unit be retained to serve the Town's treatment needs. It is also recommended, however, that new process controls be added to the treatment plant.

As indicated above, there is also serious concern about worker safety at the treatment plant. The building is too small to hold the process unit, the clearwell, the transfer pump station, and the small table for laboratory work and record keeping. Of more concern are the electrical system and the heating/ventilation system within the building. It is felt that this building and its systems would not meet current building codes, electrical codes, fire codes, or OSHA regulations.

Due to the lack of process controls and automation, the facility places the general public at risk relative to water quality and treated water supply. In addition, the day-to-day operation of the treatment plant clearly places the workers at risk.

It is recommended that a new package unit be placed in a new, larger building to be built at the existing site. Improvements, such as addition of a bag filter unit are also recommended. This larger building would be of adequate size to house the package treatment unit and filters, the recommended process controls, the necessary laboratory, and provide storage of process chemicals. In addition, a new clearwell could be constructed that lies below the treatment unit to eliminate the need to pump finished water twice; once from the unit to the clearwell and then again from the clearwell to the storage tank.

1.6.1.4 Distribution System

It is recommended that a new water line be constructed that ties First Street to Second Street along Oak Street. There is no looping of water lines in these two streets beyond Pine Street to Oak Street. The WaterCADD model simulation indicates a lack of fire flow capacity in the pipeline down Second Street to Oak Street. With the school located on this block this water line loop becomes of even greater importance.

1.6.1.5 Metering

Individual meters are recommended to allow the Town to better track actual water consumption (and leakage) in the future. This can be a valuable management tool for system planning and operation. It should also be noted that individual meters are a valuable conservation tool. Meters are a requirement of many State and Federal funding agencies.
1.6.1.6 Joint Water Supply Agreement with Little America

It is recommended that the Town of Granger negotiate an agreement with Little America for the use of Little America’s intake facilities on the Ham’s Fork for use in an emergency. Such an emergency would be if FMC were to take down their pipeline for maintenance work. This agreement should, in our opinion, allow for the continued wholesale purchasing of Green River water by Little America for emergency supplementation. This agreement could also allow for sharing of water operators to help cut down operational costs at each of the two facilities.

1.6.2 ECONOMIC DATA

1.6.2.1 Cost Estimates

The estimated cost for the recommended system improvements (without pipeline construction) from table 1.1 is $501,800. A detailed cost breakdown is included in Appendix A.

**TABLE 1.1 Preliminary Project Budget**

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<th>Item</th>
<th>Description</th>
<th>Construction Cost</th>
<th>Other Cost</th>
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<tbody>
<tr>
<td>1</td>
<td>Treatment Plant Relocation &amp; Process Controls</td>
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<tr>
<td>2</td>
<td>Pipeline Construction</td>
<td>$0</td>
<td></td>
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<tr>
<td>3</td>
<td>Storage Tank Interior Stripping &amp; Coating</td>
<td>$75,000</td>
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<td>4</td>
<td>6-inch PVC water line loop at Oak Street</td>
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<tr>
<td>5</td>
<td>Water service meters (68 connections)</td>
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<td><strong>Subtotal</strong></td>
<td><strong>$501,800</strong></td>
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<td>Preparation of Plans &amp; Specs (10%)</td>
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<tr>
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<td>Permitting</td>
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<td></td>
<td>R.O.W Acquisition</td>
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<td>Construction Engineering (10%)</td>
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<td><strong>Const. Subtotal</strong></td>
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<td>Construction Contingency (15%)</td>
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<td><strong>TOTAL ESTIMATED COST</strong></td>
<td><strong>$685,457</strong></td>
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</table>
1.6.2.3 Projected User Rate Impacts

The estimated rate impact for the proposed water system improvements (without the pipeline) is $17.12 per connection per month as shown in Table 1.1. This rate impact is based on 68 current connections, using funding from CDBG and SCIB. This represents a 57% increase from the current $30.00/month user rate.

1.6.3 WHERE DO WE GO FROM HERE?

It is recommended that this project be advanced to a Level III Study. Primary Level III activities should include:

I.  Design and construction of water storage tank repairs
II. Design and construction of treatment plant relocation and PLC
III. Design and construction of water service meters
IV. Design and construction of 6" water line loop at Oak Street and if possible
V.  Design and construction of transmission pipeline