



GILLETTE MADISON PIPELINE PROJECT (GMPP) TECHNICAL MEMORANDUM #15

TO: Mike Cole, P.E., City of Gillette

FROM: Casey Hanson, P.E., MMI

DATE: May 1, 2011

JOB NO.: MMI #4776.001, BMcD # 54432

RE: 10% Design for Distribution Line from End of Disinfection Zone to Madison Pump Station

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ATTACHMENTS: FIGURE 1
10% Drawing Sheets WA-1 Through WA-10

Urgent For Review Please Comment Please Reply For Your Use

Background

The work contained in the Tech Memo was added to the GMPP Professional Services contract between the City of Gillette and Burns & McDonnell Engineering Co. by Amendment #1, which was approved and effectively executed on April 4, 2011.

The GMPP design effort identified using the first 7,600 feet of both the 30-inch existing and 42-inch proposed transmission lines leaving the Pine Ridge storage complex and heading toward the Donkey Creek pump station as the best disinfection contact time configuration. The GMPP preliminary design report (PDR) and 10% design document for the sodium hypochlorite system cover the proposed disinfection system in detail. The proposed disinfection arrangement allows the Pine Ridge tanks to be used primarily for hydraulic storage and as a hydraulic buffer between the transmission main from the existing Madison pump station, the proposed wellfield

collection line from the proposed Madison wellfield, and the transmission main to the Donkey Creek pump station.

When the proposed disinfection changes are implemented, two issues arise that this pipeline addresses: 1) Existing services off the existing pipeline that turnout before the end of the disinfection zone and 2) the Madison pump station, including the bulk water loadout facility, will not have disinfected water when the City of Gillette chooses to decommission the existing chlorine gas disinfection at the Madison pump station.

Proposed Design

The proposed design for this work is relatively straightforward. The proposed line is 8-inch to comply with Wyoming Department of Environmental Quality water distribution system minimum sizing.

Pressure calculations:

Pipeline Elevation at Exiting Madison Station = ~4,228 Feet
Maximum HGL in Pipeline (Static from Pine Ridge Complex) = 4,530 Feet
 $\Delta = \sim 300$ Feet = 130 PSI

Due to the proposed size (8-inch) and maximum operating pressure for this line, for 10% design, it is assumed that the pipeline will be AWWA C900 PVC. The maximum flows in this line are anticipated to be generated by the bulk loadout station at the Madison pump station. In an 8" line, a bulk loadout station can not produce enough flow to generate significant velocities and consequent significant surges. AWWA provides recommended factors of safety for determining C900 dimension ratios (DR's) of 2.5 for distribution lines, and 2.0 for transmission mains. The more conservative 2.5 factor will be used to design this pipeline and will cover any minor surges that may be produced in this line. Using the AWWA formulae, this pipeline will likely be DR21. This DR covers both the anticipated internal pressures and with proper bedding provides sufficient side support for up to 20 feet of overburden.

Schematic Layout

Figure 1 shows a schematic layout of the proposed 8 inch distribution system.

Plan View

Attached plan sheets WA-1 through WA-10 show the existing utilities and topography laid over an orthographic aerial photo of the area and the proposed pipeline routing.

FIGURE 1



