THE NEED FOR REAL-TIME DATA
SPURS DISTRICT TO INVEST IN RADIO TELEMETRY

The City of Cheyenne Wyoming has recently experienced rapid growth, resulting in the Water Department being heavily dependent on remote well fields. Monitoring of the well fields via radio telemetry became an important priority.

During the early 1990's the City of Cheyenne experienced record-breaking growth. Cheyenne's status as the State's Capital, along with its location adjacent to two major interstates, has made the city part of the rapidly expanding Rocky Mountain Front Range. Concurrent with the growth, the City's water needs grew rapidly. The Board of Public Utilities, (BOPU), utilized both ground and surface water, which was blended together. The surface water's headworks consisted of far-flung reservoirs. The main source of ground water was a series of distant wells. Many of the wells utilized aging equipment, and raw water production drop-offs were common due to power spikes and pump failures. Each time a pump went off-line, someone from the water department staff had to make a 30 mile road trip to track down which well had failed. This labor intensive process resulted in frequent overtime hours as well as wear and tear on the Utility's trucks. Additionally, the inconsistent well flows made it difficult to maintain precise water quality.

One of the major challenges to implementing this project was the topographical diversity of the two main well fields. One well field is south of the Round Top WTP, with fairly easy radio path profiles. The other field, located north and west approximately 20 miles, is known as the Merritt well field. It is located on the back side of a high mesa known as Table Mountain. The Merritt well field requires a repeater on Table Mountain to transmit information to the Round Top plant. Additionally, several future well sites will be so remote as to require store-and-forward technology as a feature of the RTU's. The final design utilized 2 pairs of 900MHz frequencies as well as a Simplex UHF frequency for the store-and-forward sites.

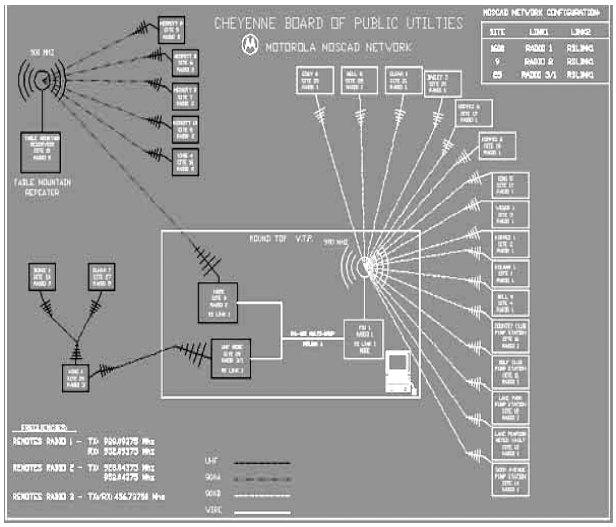
In the Autumn of 1997, the BOPU and their consulting engineer requested bids for installing radio telemetry at 8 well field sites and supplying a computerized central control station.

At the onset of the SCADA project, the Table Mountain repeater site was totally undeveloped. The district subcontracted the excavation of a steep road to the top of the mesa and the excavation for an 80' tower with equipment shelter.

Primary power at the repeater is supplied by a roof mounted photovoltaic system, with a wind generator and a propane powered generator as back-up. Reliability was a major concern for this site. Cary Chapman of the BOPU's Water Department says, "Our most difficult site to reach is the Table Mountain Repeater site during the winter. The Moscad RTU and the related power system has functioned without any failures since it was installed." All the sites were outfitted with radio based telemetry that includes battery back-up.

Table Mountain Repeater Site

With the RTU infrastructure in place, Cheyenne's computerized central quickly began showing real-time data. The control screens currently include data on well levels, well flows, pump status, low temperature alarms and intrusion alarms. The SCADA system provides real-time data and allows for remote start/stop control of the pumps. Chapman says, "The Moscad telemetry has helped to reduce our troubleshooting time by directing employees to the exact site of a troublesome well." Jim Van Dorn, who maintains the well field for the utility, stated, "Our Federal Well field is very remote and gravity feeds to the plant. When a pump shut off out there it would take two hours before we knew there was a problem. We then had to dispatch a maintenance person out to the wells, and adjust our blending ratios of well and surface water to maintain our water quality. The whole process often took five hours. Now, with the MOSCAD RTU system, we know about a problem immediately and can react quickly."



Control Screen

The BOPU is in the process of adding telemetry to an additional 15 sites consisting of wells, pump stations and a metering station. Cheyenne has future plans to expand their telemetry system to include their local reservoirs as well as their distant mountain reservoirs approximately 90 miles away. Ultimately, the system may utilize satellite technology to relay this distant information. By carefully selecting state-of-the-art technology, Cheyenne has set the stage for a 20+ year life span on their investment!