Message

From: John Bohan [/O=CBJ/OU=FIRST ADMINISTRATIVE GROUP/CN=RECIPIENTS/CN=JOHN_BOHAN]
Sent: 1/16/2014 8:59:54 AM
To: Rob Steedle [rob_steedle@ci.juneau.ak.us]
Subject: RE: new well field project
Attachments: LCB Water Source Improvements Report.pdf

Try this... the brief overview we pulled together for the Grant Application.

Costs... reality... we're going to make what money we get work and pare down the first phase as needed...

ideally –

first phase : $1.5 mil - $2 mil

future phases: WAG : $3 - $6+ million depending on how far we can take the updates and upgrades

Thanks
John Bohan, PE
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From: Rob Steedle
Sent: Wednesday, January 15, 2014 7:54 PM
To: John Bohan
Subject: FW: new well field project

John,

I think you are better qualified to answer this question. Please send me a description or give me a call tomorrow.

thx

From: Kim Kiefer
Sent: Wednesday, January 15, 2014 7:41 PM
To: Kirk Duncan
Cc: Rob Steedle
Subject: new well field project

Hi Kirk,

Nice job tonight providing the Public Works Department overview, a lot of information to condense into a short period of time.

Can you send me a short description of the Last Chance Basin Hydro-Geo Project? I have the info from the last two Assembly meetings but I need a little more. How much are you anticipating the total cost, will it be drilling two new wells and what are the benefits of that, etc.

I need the project description for the Marine Passenger Fee memo.

Thanks!

Kim

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July, 2013

Last Chance Basin Water Source Improvements Work Plan Report

The Last Chance Basin (LCB) well field is diminishing in production capacity. As a result, there have been times when the water available to bulk users has been reduced to a limited amount or no water at times to protect the wells in LCB from damage due to continuous running. This multi phase project will result in improved production capacity and more efficient operations. The main components of the project are:

- Installation of two new production wells to improve capacity
- Replacement of existing wells with new wells adjacent to the existing well houses to utilize existing infrastructure
- Installation of VFDs on all pumps to save electricity, improve operation characteristics
- Update of SCADA system and control software to add efficiency to operations
- Modification of piping configurations to allow redundancy in ability for each well to feed both the low elevation system and high elevation system (currently, there is only one well of five that is configured this way)

Background

The LCB water source consists of 5 wells located in the LCB, above Downtown Juneau. Wells 1, 2, and 3 have been in operation since the early 1960's and wells 4 and 5 were placed in operation in 1989. The 1989 project included plans for an additional well, well 6; however it was deleted from the project as a cost savings measure.

Currently, Wells 1, 4 and 5 pump directly into the Juneau water distribution system and are controlled so that water distribution system pressures do not exceed the CBJ water system design criteria for system pressures. Well 3 pumps to the Mill Tunnel Reservoir. Water from the Mill Tunnel Reservoir is used primarily to serve the higher elevations of Juneau such as the Starr Hill area and the Highlands area above Juneau Douglas High School. During the summer months, water in the Mill Tunnel is also used to meet peak demand conditions that occur when cruise ships use CBJ's water system to fill their onboard drinking water tanks.

Water production from wells has diminished with time as a result of fine material in the aquifer slowly moving towards the wells and impacting the open pore spaces in the aquifer around wells. This restricts the amount of water that can enter the well and be made available for the drinking water system. In 2009 CBJ conducted a rehabilitation project of the LCB wells to improve water production. A nitrogen gas hydro-pulsing technique was used to create pressure pulses in the aquifer to loosen the aquifer material around each well and surging, bailing and pumping the wells was done to remove the loosened fine material from the aquifer around the wells. After the

well rehabilitation project, measured production rates from the wells had increased on average about 78%. Recommendations from Kleinfelder, the well rehabilitation consultant for the 2009 rehabilitation project were to rotate the wells, alternating lead / lag, not run the wells continuously and to rest each well to allow the fines to settle down and not migrate as much (lead / lag / rest) .

Due to the inability to rest the wells, water production in LCB wells continues to decrease, and is now at a point where the CBJ has to limit the amount of water provided to the cruise ships during peak times to prevent causing damage to the wells.

The CBJ currently has the hydro geological consulting firm Shannon and Wilson performing modeling and testing of the LCB well field to provide additional guidance regarding well field operations and future developments. Jim Bailey and Chris Allen from Shannon and Wilson are the same people who worked for Kleinfelder and performed the LCB Well rehabilitation in 2009.

The Last Chance Basin Well Field Capacity Improvements Project is a multiple phase project to improve the capacity of the LCB well field to meet current and future water demand and to provide redundancy in providing water to the Low Elevation and High Elevation Water systems.

Project Phasing

Phase I: Utilize 1989 Plan to install Well 6 at the location planned and developed during that project (access road and building pad were constructed in 1989), plus install a new well 7. While well drillers are mobilized to Juneau and in the LCB, have them install and develop replacement wells at wells 1 – 5. New pumps with VFD's will be installed during Phase II. Wells #6 and #7 will connect to existing system and provide the ability to rest all the wells while maintaining the required water demand. Well pumps 6 and 7 will be installed and controlled with VFD's.

Phase II: Install new pumps and VFD controls at existing well sites 1-5 into the new wells drilled during Phase I. A small addition will be built onto the existing well houses to accommodate the new wells. The existing infrastructure (piping, power, communication, well house) can still be used. Evaluate pump sizing to determine if all new pumps can efficiently reach up to the Mill Tunnel (Downtown/cruise ships and High Elevation System) and also through Jualpa Tunnel into the CBJ Low Elevation System. If pump efficiency becomes an issue, a small pressure tank style reservoir and inline booster pump may make the system operate more efficiently to keep the well pump size smaller and more efficient while utilizing the booster pump to fill the Mill Tunnel reservoir. The intent is to increase redundancy of the system by allowing each well to have the ability to provide water where needed. Work will also include updating the SCADA and control system to accommodate the new controls and technology.

Phase III: Reconfigure distribution piping to allow for redundancy in pumping options– install valving manifolds so multiple pumping configurations can be utilized to provide water to the Mill Tunnel and Low Elevation System through the Jualpa Tunnel. Install booster pump and surge tank if needed.

Operation and Maintenance

One of the goals of the project is to reduce operational costs. This is accomplished in two ways; reduced electrical power consumption and reduced operations and maintenance staff time. The additional wells do not automatically mean increased operations and maintenance costs. The wells will still only be operated on a demand / supply basis. This project will allow the CBJ to operate wells in a lead / lag / rest scenario, following the recommendations of Kleinfelder in 2009 and Shannon and Wilson during their current study. (The personnel from Kleinfelder moved to Shannon and Wilson, so the CBJ has kept continuity by utilizing the same consultant expertise to analyze the LCB.)

Electrical Power Consumption

Currently, the LCB pumps operate in either full power on or full power off, and flow is controlled accordingly by adjusting pressure valves and flow meters. This means that the LCB well pumps are drawing full electric loads when operating, regardless of if they provide 100% rated flow or only 25% rated flow. The installation of VFD's will allow the pump speed to match the flow requirement, and only draw the electricity necessary to provide the required amount of flow, therefore reducing electricity consumption and excessive wear and tear on the pump motors.

Operations Staff and Maintenance

At the completion of the full project, the CBJ Water Utility staff will spend less time, than they currently do, manipulating pressure valves and flow meters. The new SCADA and control system upgrades and the installation of VFDs will allow CBJ Water Utility staff to monitor and operate the system from one location, with better information so they can make better decisions and work more efficiently. The lead / lag / rest operation scenario for the well pumps will allow CBJ Water Utility staff to perform scheduled, preventative and more routine maintenance in the same amount of time they currently spend troubleshooting and operating the current LCB wells.

The end result will be that CBJ Water Utility staff will be performing more preventative maintenance and operating the LCB in a more efficient manner that maintains the existing operations budget or reduces the operations and maintenance costs.