City of Grand Island

Tuesday, January 18, 2011
Study Session

Item -2

Presentation by HDR Engineering - Uranium Removal Process at the Platte River Well Field

Staff Contact: Gary R. Mader

Council Agenda Memo

From: Gary R. Mader, Utilities Director

Meeting: January 18, 2011

Subject: Municipal Water System Uranium Removal

Item #'s: 2

Presenter(s): Gary R. Mader, Utilities Director

Background

In 2003, the new regulation placing a Maximum Containment Level (MCL) on uranium in drinking water became effective. Uranium is a naturally occurring element in the aquifers of Nebraska and other states across the nation. Implementation of the new MCL began with the sampling of the state's municipal water systems in accordance with the EPA specified testing protocol. Samples of the Grand Island water supply for regulatory compliance were first taken in 2004. The sampling protocol requires testing for four consecutive quarters, with the average of the year long sampling results being the level by which system compliance is established.

Sampling and testing of the Grand Island water system thus far show full compliance with the EPA regulation. Uranium is naturally occurring in the aquifer in central Nebraska. Uranium is not an acute concern but rather is a concern over a lifetime of exposure. According to the *Neb-Guide from the University of Nebraska, "....uranium in water supplies produces very little radioactivity, the health effects from exposure to uranium are primarily thought to be associated with the chemical properties of soluble uranium. Studies suggest that ingestion of high levels of uranium may be associated with an increased risk of kidney damage…Exposure to soluble uranium in drinking water has not been shown to increase the risk of developing cancer."*

The City's municipal water system is supplied primarily from its Platte River Well Field. This well field is comprised of 21 wells and a pumping station. Recent testing for State regulatory requirements has indicated composite uranium levels to be approaching the Maximum Containment Level (MCL) established by the EPA. Testing of individual wells for uranium has indicated most wells exceed this MCL. To allow use of these wells during high water system demand periods, additional piping was installed in the past year for blending with lower uranium concentration wells.

As a proactive measure, in case uranium levels cannot be controlled below the new MCL by well blending, the Department, with our consultant for this project, HDR Engineering of Lincoln, has undertaken a more detailed investigation to determine uranium removal methods and evaluate those best suited for the Grand Island system. Factors in the evaluation included; the review of available technologies; amount of uranium removal; capital costs; operational costs; and waste disposal.

HDR recently completed this evaluation of treatment options. The evaluation screened known water treatment methods and focused on coagulation/filtration, ion exchange, and adsorptive media as the most viable options for radionuclide removal. The recommendation of the evaluation was an adsorptive media system, and was presented at a meeting with Nebraska Health and Human Services, Nebraska Department of Environmental Quality, HDR, and City Utilities staff in attendance. The use of this type of technology has been shown to be very effective in radionuclide removal, but its use has not been used in an application as large as would be required to treat Grand Island's water demand. The consensus at the meeting was that it may be useful to perform a large scale pilot program on selected wells at the Platte River Well Field. It is anticipated that a full capacity treatment system would be comprised of several modules the size of a pilot plant, therefore, utilization of the pilot plant could be incorporated into the final design solution. Based on the multiple phase structure of the uranium engineering services RFP, HDR was requested to provide a proposal for preparing specifications to issue for bids for an adsorptive media pilot plant. These specifications are for the components and accessories of an integrated treatment system. The suppliers for these systems are very specialized and details for the systems are not standard, therefore, the bidders may be required as part of the bidding process to perform small pilot demonstrations of their system's effectiveness in radionuclide removal from Grand Island's water. It is anticipated that the next phase would be to design facilities and infrastructure modifications for installing the removal system and prepare specifications to issue for bids for installation contractors.

Discussion

A presentation of the background of this project and projected costs and rate impacts will be discussed at the Study Session. The presentation will include recommended implementation steps for the uranium removal system including future action items for consideration by the Council.