City of Calistoga

Staff Report

TO: Honorable Mayor and City Council

FROM: Derek Rayner, Senior Civil Engineer

DATE: February 19, 2013

SUBJECT: Feige Tank Evaluation Presentation and Discussion

APPROVAL FOR FORWARDING:

Richard D. Spitler, City Manager

ISSUE:

Feige Tank Evaluation Presentation and Discussion

RECOMMENDATION:

Accept presentation.

BACKGROUND/DISCUSSION:

The City of Calistoga water system receives water from two sources: the Kimball Reservoir via the Kimball Water Treatment Plant and the State Water Project via the City of Napa. Drinking water supplies for the City's main pressure zone are stored in a single existing distribution reservoir, 1.0-MG Feige Tank, and in the near future a new 1.5-MG Mt. Washington buried pre-stressed concrete tank, anticipated to be in service by the summer of 2013.

Concerns were raised by the California Department of Public Health (CDPH) about the structural integrity of the City of Calistoga's one-million gallon drinking water storage tank at Feige Canyon back in 1995. CDPH realized that the fact that the City had only one distribution system storage tank for the main pressure zone, taking the tank out of service for repair would have too significant of impact on the

operation of the city water system. In addition, CDPH also knew the City had inadequate/deficient water storage capacity based on demand figures from 1991. Knowing that Feige tank could not be repaired until the City had another tank on-line, CDPH focused their attention towards City compliance on building another tank which is now almost constructed and called the 1.5MG Mt Washington storage tank.

Summit Engineering Inc. completed a Feige tank conditional study about 16-years ago (March 1997) which included steel thickness testing (ultrasonic thickness testing) and video inspections by divers to document failure of internal protective coatings. The thickness testing completed showed that for the most part the steel plates had adequate thickness but the video documented significant protective coating system failures with significant cracks and rust nodules. Rusting was observed on the roof plates, framing, floor plates, and column.

Feige tank has had virtually no maintenance for the last 47-years because the City's water system cannot operate without this storage tank. Now that a second storage tank is coming on-line in the near future, the City will need to address whether to repair or replace Feige tank.

The 1997 Feige tank conditional study did not include a structural assessment or seismic evaluation of the tank. City staff felt it important to have this analyzed to meet CDPH's original concerns raised back in the mid-1990s.

REPORT SUMMARY (Seismic/Structural Condition Assessment January 2013):

Kennedy/Jenks Consultants was contracted to perform the evaluation of the Feige tank for a total cost of $9,250 which was budgeted in FY 12/13 Water Distribution Capital Projects. The study is attached.

The purpose of the study was to determine the structural and seismic condition of the Feige tank to withstand strong ground shaking. Current seismic codes require Public Safety facilities are designed to withstand a maximum credible earthquake relevant to local active faults and require a 1.5 importance factor applied to those forces. Generally, in the Napa area seismic designs use ground accelerations which are about equivalent to Richter magnitude scales between 6.5 to 7.0.

The Kennedy/Jenks report determined that the existing welded steel tank has significant structural/seismic deficiencies. The existing tank does not have a footing and is not mechanically anchored to the ground. The only thing holding the tank down is the weight of the tank itself supported by a 4-inch thick asphalt curb around the circumference of the tank. The study determined that the existing unanchored tank inadequately resists the overturning movement during an earthquake. The report recommends if the tank is rehabilitated that a new concrete ring wall footing (30"x40") be constructed to support the walls around the entire circumference of the tank. Chairs or large L-shaped pieces of steel would have to be welded to the tank walls and anchored to the new footing on about 6-feet centers.

The study concluded the tank is not tall enough to allow for required freeboard due to sloshing of water during a seismic event. The roof supports are inadequate around access locations. The report also raised concerns on steel plate welds not having a complete connection between the fist and second wall plates near the base of the tank and documents that 4 out of 5 of the shell plates were 1/16-of-an-inch too thin to satisfy the minimum hoop tensile stress requirements.

The report provides 3 alternatives for preservation/repair/replacement. However, to structurally make the tank sound only alternatives 2 & 3 are relevant (i.e. repair or replace the tank, respectively). Costs are provided for the alternatives and anticipated lifespan assuming proper maintenance every 15 years. In summary, the rehab lifespan is 40-years while replacement, which is only a little over $300K more expensive will last closer to 100-years, two-and-a-half times longer. The report seems to suggest replacement is the best long term solution for the City

GENERAL PLAN CONFORMANCE, ENVIRONMENTAL REVIEW:

The City's general plan recognizes the need to repair or replace the Feige Canyon Water Tank. Objective I-1.2 – Maintain water storage, conveyance and treatment infrastructures in good condition.

Environmental review of this project will be completed once an alternative is chosen and approved by City Council.

FISCAL IMPACT:

The summary of the report seems to suggest replacement is the best long term solution for the City and we should budget appropriately for this alternative. Initial budgets for the replacement alternative including design, construction services, and testing are $1.5 million.

A recommended fiscal budget is as follows:

- FY 13/14 - $250,000 for design services
- FY 14/15 - $1,100,000 for construction
- FY 14/15 - $150,000 for inspection and testing

Grant and or loan funding opportunities should be pursued to determine funding options for the Feige tank improvements.

ATTACHMENTS:

1. Seismic Evaluation, City of Calistoga 1.0 MG Feige Canyon Tank by Kennedy/Jenks Consultants