PRELIMINARY DESIGN REPORT
EXECUTIVE SUMMARY

SUBLETT CREEK RESERVOIR MAU/ COVEY CANAL
REHABILITATION LEVEL II PROJECT
LINCOLN COUNTY, WYOMING

Submitted to
Wyoming Water Development Commission
6920 Yellowtail Road
Cheyenne, Wyoming 82002

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Wyoming State Archeologists

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Project 09114
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SUBLETTE CREEK EXECUTIVE SUMMARY

The purposes of this report are to present data collected from our investigations; results of our evaluations; and our preliminary designs and opinions of probable costs for a dam, reservoir, and associated facilities on Sublette Creek. The proposed reservoir sites are located about 3 miles south of Cokeville, Wyoming on Sublette Creek.

The general scope of work preformed and described in this report includes:

- Prepared a STATEMOD model to evaluate the quantity of water available to be diverted from the Smiths Fork and released from the reservoir.
- Identified existing easements along the canal and potential reservoir sites.
- Evaluated the ability of the Covey Canal to deliver water to the reservoir.
- Consulted with appropriate permitting agencies to identify possible environmental and wildlife issues.
- Evaluated cultural resources that could be impacted by each dam and reservoir.
- Performed a geotechnical investigation at two potential dam sites, which included field investigations and laboratory testing of soil and bedrock materials.
- Prepared preliminary designs and cost estimates for two potential dam and reservoir sites.
- Performed a financial analysis to estimate the ability of the local irrigators to fund construction of a new dam and reservoir.

Conclusions

The largest feasible reservoir size based on the available quantity of water is about 5,190 acre-feet. Based on the STATEMOD model, on average, sufficient water is available in the Smiths Fork to divert the remaining water right of 4,100 acre-feet (ac-ft), and based on historic data, additional water would have been available in 10 out of 40 years. However, because of seepage losses in the Covey Canal and evaporation losses in the reservoir, only about 2,000 ac-ft of the 4,100 ac-ft could be effectively used for late season irrigation and the reservoir would be lowered to one third of the total storage capacity, which corresponds to the permanent pool for fisheries requested by the Wyoming Game and Fish Department.
Increasing the capacity of the Covey Canal would provide minimal benefit to delivering additional water to the reservoir because in most years the Covey Canal and diversion structure have sufficient capacity to deliver both irrigation water and storage water, when storage water is available in the Smiths Fork. However, about 35 to 40 percent of the water is lost during conveyance from the diversion structure to the reservoir. If the efficiency (ratio of water diverted to water delivered) of the Covey Canal was improved and seepage losses reduced it may be possible to increase the permanent pool volume. If water rights could be transferred from the Smiths Fork to Sublette Creek the total volume of water that would enter the reservoir would increase. This may also increase the volume of the permanent pool and irrigation releases.

Because the Covey Canal and Mau Ditch have been at their present locations for more than 10 years, the state of Wyoming identifies these locations as existing easements that cannot be removed without consent of all afflicted parties. If the canal and ditch were to be enlarged or realigned, new easements would need to be obtained. Modifications to the canal and ditch that do not increase the footprint would not require new easements.

Several State and Federal agencies would have input with regard to permitting a dam and reservoir on Sublette Creek. Based on preliminary discussions with the U.S. Army Corps of Engineers, Fish & Wildlife Service, and Wyoming Game and Fish Department, the project is likely permittable, but an Environmental Impact Statement (EIS) will likely be required and the USACE would likely be the lead agency.

Three cultural resources that would be impacted by the dam and reservoir have been previously identified (Covey Canal, Mau Ditch, and Sublette Cutoff Trail). Additional cultural resources will likely be identified during a Class III (field reconnaissance) cultural resource survey, which will be required during future stages of project development.

Site 1 is the preferred site for a dam and reservoir (Figure 10.2) and further evaluation of Site 1A is not recommended. Site 1 is preferred because nearly vertically coarse grained rocks at Site 1A and downstream of Site 1 have the potential for significant and unacceptable seepage losses. Also, Site 1A would require construction of a new siphon and the spillway would discharge onto Highway 89 and Site 1A is about $4.3 million more expensive than Site 1.

The designs for Site 1 and Site 1A include the following features, which are also shown on Figures 10.1 through 10.10:
Earthen embankment with 2.5 horizontal to 1 vertical (H:V) slopes and crest elevations of 6,280 and 6,278 feet, respectively.

Emergency spillway to store flood events with less than a 100-year return interval and to pass flood events up to the probable maximum flood. The principle spillway would be included within the emergency spillway and would be used to control the reservoir pool and to slowly release flood events with less than a 100-year return interval.

Realignment of the existing stock drive.

New access roads from Highway 89.

New water services to existing homes.

Earthen levees to protect existing power transmission poles from reservoir water.

New boat ramp for the reservoir.

The estimated cost for the facilities at Site 1 is about $19,063,000 and at Site 1A is about $23,316,000. These costs include contingencies for items that could be identified in later phases of design, final design, owner administration, construction management, and permitting and wetland mitigation.

Based on a finical analysis, the local irrigators would be able to pay for about 7 percent of the total cost over 50 years. The current Wyoming Water Development Commission (WWDC) rules allow for a 67 percent grant and a 33 percent loan for projects. For a dam and reservoir to be constructed on Sublette Creek, additional grant money would need to be secured from the WWDC or additional funding sources identified.

Recommendations

Based on our investigations and evaluations we have identified the following items that should be addressed in the next phase of study for Site 1:

- Perform further evaluation of the geological and geotechnical conditions for Site 1 including: obtaining site-specific topography, advancing subsurface investigations along the Site 1 dam alignment and spillway location, performing additional laboratory testing of borrow materials from the valley bottom and spillway excavation, and evaluating the appropriate lining of the principal spillway to reduce erosion during operation of the principal spillway.
• Perform additional evaluations for environmental permitting issues and cultural resources including: continue coordination with USACE to discuss the type of permit that would be required and the amount and kind of wetland mitigation that would be required. Continue coordination with the WGFD about project impacts to terrestrial and aquatic species. Continue coordination with FWS regarding threatened plant species and begin conducting surveys for plants, identify the minimum required pool size, and perform a Class III cultural resource survey to identify cultural resources that could be impacted by the dam and reservoir.

• Identify improvements to deliver water to the reservoir including: identify locations of significant seepage in the Covey Canal and prepare remediation designs, identify if water rights could be transferred between Sublette Creek and the Smiths Fork to be able to partially fill the reservoir with water from Sublette Creek, select preferred reservoir size based on efficiency improvements and water rights transfers, and evaluate the condition and serviceability of the Bill Hill section and the siphon of the Covey Canal.
SECTION 3
SITE 1 10.2

EXPLANATION

FINE GRAINED ALLUVIUM

COARSE GRAINED ALLUVIUM

PETTerson LIMESTONE

EPHRAM CONGLOMERATE - CONGLOMERATE, SANDSTONE, CLAYSTONE, AND MUDSTONE

STUMP FORMATION AND PREUSS RED BEDS - INTERBEDDED SANDSTONE, SHALE AND MUDSTONE

ROCK TYPES (NOTE 1)

MUDSTONE

INTERBEDDED SANDSTONE AND CLAYSTONE

CONGLOMERATE

SCALE IN FEET

0 30 60 120

TYPICAL SECTION
STEEL PIPE ENCASED IN CONCRETE 10.3

NOTE:

1. ROCK TYPES ONLY SHOWN WHEN IDENTIFIED FROM OUTCROPS AND SUBSURFACE INVESTIGATIONS.
SPILLWAY PLAN

SPILLWAY PROFILE
ALONG TRAINING WALL

TYPICAL CHANNEL CROSS-SECTION

DISCHARGE TABLE

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CHECKED: JMM

DRAWN: JMM

JMM

JUNE 2010

1:6 SCALE

WARNING
IF THIS DRAWING DOES NOT MEASURE 3/4" THEN DRAWING IS NOT TO SCALE

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WYOMING WATER DEVELOPMENT COMMISSION
SUBLETTE CREEK RESERVOIR
ALTERNATE PRINCIPAL SPILLWAY DETAILS

FIGURE 10.4
Existing Livestock Driveway

Existing Dike or Berm Transmission Towers and Guy Lines

Existing Transmission Lines

Proposed Livestock Driveway (5.5 Miles)

Existing Transmission Line Towers

BLM Road 4211

Proposed 8" Water Supply From Cokaville

Reconstructed Siphon

Proposed Dam Access Road

Existing Residences

Proposed Livestock Driveway (2.3 Miles)

Water Supply To Be Abandoned

8" Water Supply

From Cokaville

SiPhO:

Road

Legend

Land Ownership

US

State of Wyoming

BLM

Private

Wyoming Water Development Commission

Sublette Creek Site Plan

Site 1 Plan

Sunrise Engineering