SUBMIT OPTION SUBMITTAL FORM BY:
1. EMAIL TO: COLORADORIVERBASINSTUDY@USBR.GOV
2. U.S. MAIL TO: BUREAU OF RECLAMATION, ATTENTION MS. PAM ADAMS, LC-2721, P.O. BOX 61470, BOULDER CITY, NV 89006-1470
3. FACSIMILE TO: 702-293-8418

Option Submittal Form

Contact Information (optional): ☐ **Keep my contact information private.**

Contact Name:	Title:
Affiliation:	
Address:	
Telephone:	E-mail Address:

Date Option Submitted: 02/06/2012

Option Name:

Missouri River Reuse Project

Description of Option:

The Missouri River Reuse option is a diversion of up to 600,000 AFY of water from the Missouri River for reuse within the Missouri River Basin of Kansas and Colorado. Water would be diverted from the Missouri River only when flows to support navigation and municipal water diversions along the river from Leavenworth, Kansas to Saint Louis, Missouri, are not impaired.

1. Within Kansas, the water would be used to fill surface reservoirs and recharge depleted aquifers in the upper and lower Republican River Basins, Solomon River Basin, and Smoky-Hill/Saline River Basin as determined from assessment of need and feasibility by the Kansas State Water Office in cooperation with the Kansas Division of Water Resources, Army Corps of Engineers, and the States of Colorado and Nebraska. In particular, the water would be used for irrigation and municipal, commercial, and industrial use and to recharge the Ogallala aquifer in western Kansas. Each of these basins (including the Ogallala aquifer in northwest Kansas) is tributary to the Missouri River. The Ogallala aquifer discharges into the Republican River in northeast Colorado and northwest Kansas. Kansas may choose to construct new reservoirs or enlarge existing reservoirs for the project.
2. Along the Front Range of Colorado, the water (totaling 500 cfs or more as Colorado determines) would be used for municipal, commercial, and industrial use with return flows allocated for agricultural irrigation use within the South Platte River Basin (a tributary of the Missouri River). Some water could be used to recharge the bedrock aquifers of the Denver Basin. In eastern Colorado, some water could be used for irrigation and municipal use and to recharge the Ogallala aquifer. Water would likely be stored in Front Range reservoir such as Rueter-Hess, Carter, Barr, and Chatfield and in designated alluvial storage along the South Platte River. Colorado may choose to construct new reservoirs or enlarge existing reservoirs for the project.

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3. Some water may be available for use outside the Missouri River Basin, particularly that portion of the water in the Missouri River which is non-native (originating as transmountain diversions from the Colorado and Arkansas Rivers in Colorado and nontributary Denver Basin ground-water withdrawals). Some of this water could be directed to the Arkansas River in western and central Kansas and in eastern Colorado beginning near Colorado Springs. Some water could also be directed to the headwaters of the Colorado River Basin through pipelines and tunnels when there is great need to relieve drought in the basin provided the navigation and municipal supply flows in the Missouri River are plentiful and other water needs of western Kansas and eastern Colorado are being reasonably satisfied.

Location: Describe location(s) where option could be implemented and other areas that the option would affect, if applicable. Attach a map, if applicable.

The location of the Missouri River diversion point is in Leavenworth County, Kansas near the City of Leavenworth. The water would be treated and disinfected at a large treatment plant to be designed and constructed, as necessary, for subsequent conveyance and use. End-user treatment, such as water softening for municipal, commercial, and industrial use, is anticipated.

Conveyance of water across Kansas and eastern Colorado would be through single or parallel large-diameter pipelines located more or less adjacent to I-70. Infrastructure would include a series of high-capacity pumping stations (to be located, sized, and designed). The water conveyance infrastructure (pipeline and pumping stations) would be owned and operated by the Kansas Water Office in cooperation with the Corps of Engineers, Bureau of Reclamation, Kansas Division of Water Resources, Colorado Division of Water Resources, Colorado Water Conservation Board, and various public and private stakeholders. The diversion rights would owned by a Kansas entity.

Quantity and Timing: Roughly quantify the range of the potential amount of water that the option could provide over the next 50 years and in what timeframe that amount could be available. If option could be implemented in phases, include quantity estimates associated with each phase. If known, specify any important seasonal (e.g., more water could be available in winter) and/or frequency (e.g., more water could likely be available during above-average hydrologic years) considerations. If known, describe any key assumptions made in order to quantify the potential amount.

The project can be constructed and operated in affordable phases with 500 cfs being delivered to the Front Range by 2030 to meet forecasted water demands.

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Additional Information

Technical Feasibility: Describe the maturity and feasibility of the concept/technology being proposed, and what research and/or technological development might first be needed.

The Missouri River Reuse Project is technically feasible as evidenced by other large diversion projects in the western United States including, but not limited to: (a) the numerous transmountain diversion projects in Colorado that bring tens of thousands of acre-feet of Colorado River and Arkansas River water to the Front Range through numerous tunnels; (b) the Colorado River Aqueduct that brings water from the Colorado River at Parker Dam to Southern California; (c) the Los Angeles Aqueduct that brings water from Owens Valley to Los Angeles; (d) the Central Arizona (canal) Project that brings Colorado River water to Phoenix and Tucson, and (e) the State Water Project of California that provides irrigation water to farms in the San Joaquin Valley, and is a major source of supply for cities in Los Angeles, Riverside, San Bernardino, and San Diego Counties and other parts of southern California. Many of these projects involve the Bureau of Reclamation, Corps of Engineers, and numerous state water resources agencies.

A similar serious project has been proposed that would divert surface water from the Mississippi River and pump it west into the Colorado River Basin. Another large project has been proposed that would divert about 300,000 of acre-feet of surface water from the Green River at Flaming Gorge Reservoir in southwest Wyoming, pump the water across southern Wyoming along I-80 to Cheyenne and then south into the Denver Basin. Moreover, private energy and pipeline companies have constructed thousands of miles of interstate pipelines that pump vast quantities of natural gas and petroleum products across the United States.

Costs: Provide cost and funding information, if available, including capital, operations, maintenance, repair, replacement, and any other costs and sources of funds (e.g., public, private, or both public and private). Identify what is and is not included in the provided cost numbers and provide references used for cost justification. Methodologies for calculating unit costs (e.g., $/acre-foot or $/million gallons) vary widely; therefore, do not provide unit costs without also providing the assumed capital and annual costs for the option, and the methodology used to calculate unit costs.

Legal, engineering and construction costs need to be determined for numerous possible options. Construction costs will likely be in the billions of dollars and would be borne by the various end users – water providers and irrigators in Kansas and Colorado with some participation by the Corps of Engineers and Bureau of Reclamation. Operating costs must be affordable for irrigators and municipal users for the project to be feasible. In exporting water out-of-state to Colorado, Kansas could charge and collect a reasonable severance tax, as well as the State Water Plan fee.

The historic 2007 multi-state agreement among the seven Colorado River Basin States governing the

future management of the Colorado River provides for the introduction and recovery of non-Colorado River system water and non-Colorado River system water exchanges. The Front Range of Colorado uses about 345,000 acre-feet of Colorado River water each year and releases that water into the South Platte River Basin, which is tributary to the Missouri River. According to the 2004 Colorado Statewide Water Supply Initiative (SWSI) report, the South Platte River Basin will need an additional 409,700 acre-feet of water by 2030 due largely to forecasted population increase. Bringing Missouri River reuse water to the Front Range provides an opportunity for Colorado to exchange all or a portion of this water for other water in the Colorado River Basin originating in the State of Colorado (such as from the Yampa, White, and Green Rivers) to the Lower Basin states. This exchange of water would engage the States of California, Arizona, Nevada, and New Mexico in helping to pay for the project. The federal government would also have a financial interest in the project because of the Colorado River treaty with Mexico.

Permitting: List the permits and/or approvals required and status of any permits and/or approvals received.

The Missouri River Reuse Project could have major interstate impacts on regional and local water supply. Congressional and state legislative approvals will likely be needed with an accompanying environmental impact statement under NEPA. A 404 permit will be needed from the Corps of Engineers including numerous state approvals. Water rights for the diversion will have to be obtained from the Kansas Department of Water Resources and will be held by a Kansas entity.

Legal / Public Policy Considerations: Describe legal/public policy considerations associated with the option. Describe any agreements necessary for implementation and any potential water rights issues, if known.

Even though the water will be used in Kansas and Colorado, the reuse project will likely have profound and unprecedented positive impacts on the Colorado, Republican, and South Platte River compacts affecting Kansas, Colorado, Nebraska, Wyoming, Utah, Nevada, Arizona, New Mexico, California, and the Colorado River treaty with Mexico. The reuse project could also positively impact the North Platte and Arkansas River compacts involving Kansas, Colorado, Nebraska, and Wyoming. The State of Missouri will need solid assurance that the flows in the Missouri River will always be sufficient to support navigation and municipal water diversions in the state. A benefit to the states of Missouri and Kansas and Kansas City area water providers is the possible reduced risk of damage from flooding and river degradation.

Implementation Risk / Uncertainty: Describe any aspects of the option that involves risk or uncertainty related to implementing the option.

The project has numerous options that can be considered in terms of design, construction, operations, and costs. Each of these options needs to be fully explored, which will take time and money. The possible source(s) of funding need to be determined and evaluated. The project is large and will need to engage the cooperation (buy-in) and participation by numerous states and their respective water resources agencies and water providers, the Corps of Engineers, the Bureau of Reclamation, and various Missouri

River stakeholders. Other federal agency cooperation will be needed from the Environmental Protection Agency, Fish and Wildlife Service, Natural Resource Conservation Service, US Department of Commerce, US Energy Department, US Forest Service, and the Bureau of Land Management. Considerable risk and uncertainty exists when seeking approval and consensus from such a cadre of stakeholders.

Reliability: Describe the anticipated reliability of the option and any known risks to supply or demand, such as: drought risk, water contamination risk, risk of infrastructure failure, etc.

Historic flows in the Missouri River demonstrate that the river it a reliable source of supply for navigation, irrigation, and municipal supply. Flows vary annually and seasonally. The main stem of the Missouri River is managed by the Corps of Engineers pursuant to an annual operating plan that is focused on flood control, navigation, municipal water supply, recreation, and habitat for fish and wildlife. The historic Missouri River flood of 2011 caused significant river-bottom degradation from Atchison, Kansas to Kansas City, Missouri, breached numerous federal and private levees, and considerable damage to public and private property. A large diversion from the Missouri River would provide another means for the Corps of Engineers to control flooding of the Missouri River in the Kansas City reach. During periods of low flow, projected river diversions would be reduced or suspended. Subsequent water stored in reservoirs west of the diversion point could be released as needed to ensure adequate supplies of water for municipal use, such as along the Kansas River.

Water Quality: Identify key water quality implications (salinity and other constituents) associated with the option in all of the locations the option may affect.

The water quality will be suitable for irrigation and typical municipal, commercial, and industrial uses.

Energy Needs: Describe, and quantify if known, the energy needs associated with the option. Include any energy required to obtain, treat, and deliver the water to the defined location at the defined quality.

Energy Required	Source(s) of Energy
The amount of electrical energy required for operations would be substantial and needs to be determined based on consideration of reasonable design alternatives.	Power supply to the pumping stations would be provided by a combination of existing and expanded coal-fired power plants and wind energy as determined most appropriate and feasible by objective engineering and economic analyses.

Hydroelectric Energy Generation: Describe, and quantify if known, any anticipated increases or decreases in hydroelectric energy generation as a result of the option.

Location of Generation	Impact to Generation
Hydroelectric power generation may be possible	The feasibility of generating electricity from

where the local topography allows along the pipeline route.	in-pipe flows should be investigated.

Recreation: Describe any anticipated positive or negative effects on recreation.

Location(s)	Anticipate Benefits or Impacts
	Additional water for Kansas and Colorado reservoirs will positively support reservoir recreation activities.

Environment: Describe any anticipated positive or negative effects on ecosystems within or outside of the Colorado River Basin.

Location(s)	Anticipated Benefits or Impacts
	The reuse project would likely have a positive affect on the riparian habitat of the lower South Platte River basin, particularly for whooping cranes and other waterfowl in northeast Colorado and southwest Nebraska. Potential impacts on endangered and protected fish and waterfowl along the Missouri River would need to be determined.

Socioeconomics: Describe anticipated positive or negative socioeconomic (social and economic factors) effects.

Project alternative studies, engineering, design, construction, legal support, and operations would be a significant economic benefit to the States of Kansas and Colorado in terms of employment and population growth. A large diversion works, treatment plant, and pumping station would likely employ hundreds of skilled workers and engineers in Leavenworth County, Kansas. Pipeline and booster pumping stations would likewise employ hundreds of skilled workers across Kansas and eastern Colorado. Severance tax revenue for state of Kansas from the export of water to Colorado would also be significant. The economic benefit could be similar to the Keystone Pipeline from Canada to the United States or nearly any of the aqueduct projects in California. The project could also yield substantial volumes of new water to the Lower Colorado River Basin states under the Colorado River Compact.

Other Information: Provide other information as appropriate, including potential secondary benefits or considerations. Attach supporting documentation or references, if applicable.