

Cornerstone and Backup Alternatives Matrix - Workshop No. 5

No.	Raw Water Source	Description	Evaluation Criteria						
			Reliable Capacity	Raw Water Quality	Cost	Implementability	Flexibility	Environmental Benefits	Recreation
Cornerstone Alternatives									
5	Raise Normandy Reservoir Winter/Spring Pool Level without Raising Dam	Raise Normandy Reservoir Winter/Spring pool level from 864 ft to 869 ft to preserve water storage from Winter/Spring pool for human and environmental needs during drier Summer/Fall months. Increase releases from Normandy Reservoir to meet needs at Shelbyville and Columbia. Cost includes acquisition of roughly xxx acres of flood prone land. Delineation of the extent of increased flooding required.	<ul style="list-style-type: none"> - Satisfies entire river deficit of 32 mgd in 2060 - Increases storage by approximately 5 BG, exceeding the minimum 1.4 BG needed to meet Columbia constraint in 2060. Reduces flood storage volume by roughly 5 BG. - Continued reliance on Normandy Reservoir (208 sq mi drainage area) as sole source of water during severe droughts to satisfy many needs. 	No change.	\$?? million (project cost)	<ul style="list-style-type: none"> - EIS involving detailed environmental studies of flow alteration will be required, but ability to obtain necessary permits is likely. - May require extended time to acquire land in flood prone areas downstream of dam. 	<ul style="list-style-type: none"> - Winter pool can be raised in stages, as needed over time. 	<ul style="list-style-type: none"> - Acquisition of flood prone land along stream buffer area may be viewed as environmental benefit. - Potential negative impacts due to higher frequency of flooding. 	<ul style="list-style-type: none"> - Preserves pool storage and extends recreation in Normandy Reservoir during drought.
9	Raise Normandy Dam (Increase Winter/Spring Pool Level, and Retain Summer/Fall Pool Level)	Increase the height of Normandy Dam and Winter/Spring pool level by 5 ft (i.e., increase flood pool from 880 ft to 885 ft, retain Summer/Fall pool at 875 ft, and increase Winter/Spring pool from 864 ft to 869 ft). Increase releases from Normandy Reservoir to meet needs at Shelbyville and Columbia.	<ul style="list-style-type: none"> - Satisfies entire river deficit of 32 mgd in 2060. - Increases storage by approximately 5 BG, exceeding the minimum 1.4 BG needed to meet Columbia constraint in 2060. - No impact on flood storage volume. - Continued reliance on Normandy Reservoir (208 sq mi drainage area) as sole source of water during severe droughts to satisfy many needs. 	No change.	\$15 million to \$30 million (project cost), depending on need to raise roads and bridges, etc.	<ul style="list-style-type: none"> - EIS involving detailed environmental studies of flow alteration will be required, but ability to obtain necessary permits is likely. - Need to document number of stream miles inundated. - Short Springs (State Designated Natural Area) along Bobo Creek could experience prolonged periods of occasional inundation. Retaining summer pool level avoids need to inundate 2 to 3 acres of flora and hiking trails at Short Springs. - Loss of shoreline vegetation. 	<ul style="list-style-type: none"> - No flexibility to phase implementation for construction, but could raise winter pool in stages, as needed over time. 	<ul style="list-style-type: none"> - No apparent environmental benefits associated with hydrologic regime, physical habitat, water quality and biota. 	<ul style="list-style-type: none"> - Preserves pool storage and extends recreation in Normandy Reservoir during drought. - Potential impacts to campgrounds and boat ramps.
15	Monsanto Lake (Existing Offstream Storage Reservoir)	Purchase Monsanto Lake which is a 5 BG offstream storage reservoir along Duck River approximately 8 miles northwest of Columbia. Utilize existing Columbia intake, upgrade existing Columbia pumping station, and construct a *pipeline (10 miles) from reservoir to Columbia WTP to convey water from reservoir to WTP, and to refill reservoir from the Duck River. *Note: One 42-inch pipeline, or two 30-inch pipelines provides at least 32 MGD capacity. One 30 inch pipeline included in costs, to provide initial capacity of approximately 20 MGD.	<ul style="list-style-type: none"> - 5 BG of new storage satisfies minimum 1.4 BG river deficit in 2060. - Direct ownership maximizes control of supply. - Direct connection between reservoir and Columbia WTP assures delivery of required supply (eliminates potential for unanticipated loss of raw water from Duck River between Normandy Reservoir and Columbia). - Reduces reliance on Normandy Reservoir (208 sq mi drainage area) as sole source of water during severe droughts to satisfy many needs. 	Construct a multi-port intake in the reservoir to obtain highest quality water. Need to collect additional data on quality of raw water and sediments.	\$34 million (project cost) excluding land costs and wetland replacement	<ul style="list-style-type: none"> - Jurisdictional wetlands identified, but ability to obtain necessary permits is likely. 	<ul style="list-style-type: none"> - Alternative can be implemented in multiple phases. - Provides option to serve Spring Hill from Monsanto Lake, instead of Spring Hill's existing Duck River intake. - Alternative flexible for providing either raw water or finished water to Columbia and Spring Hill. 	<ul style="list-style-type: none"> - Discontinuing use of existing Spring Hill intake (at least during droughts) would increase flow in sensitive reach of Duck River just above Columbia. 	<ul style="list-style-type: none"> - Potential for fishing and other recreational opportunities associated with offstream storage reservoir.
24	Construct Water Intake near Williamsport and Pump Back to Columbia/Maury County	Construct a 32 mgd water intake (or utilize existing intake) and pumping station on Duck River near Williamsport and a *pipeline (approx. 17 miles) to convey water to the Columbia water treatment plant, or to a new WTP in Maury County. *Note: One 42-inch pipeline, or two 30-inch pipelines provides at least 32 MGD capacity. One 30 inch pipeline included in costs, to provide initial capacity of approximately 20 MGD.	<ul style="list-style-type: none"> - Satisfies entire river deficit of 32 mgd in 2060. - Drought proof and highly reliable. - Minor reduction in downstream flows due to consumptive uses in the Maury and South Williamson County water systems. - Reduces reliance on Normandy Reservoir (208 sq mi drainage area) as sole source of water during severe droughts to satisfy many needs. 	- No change.	\$38 million (project cost)	<ul style="list-style-type: none"> - EIS involving detailed environmental studies of flow alteration will be required, but ability to obtain necessary permits is likely. - Lower downstream flows not likely to cause adverse impacts on aquatic life. 	<ul style="list-style-type: none"> - Alternative can be implemented in multiple phases. - Provides option to serve Spring Hill from Williamsport intake, instead of Spring Hill's existing Duck River intake. - Alternative flexible for providing either raw water or finished water to Columbia and Spring Hill. 	<ul style="list-style-type: none"> - Discontinuing use of existing Spring Hill intake (at least during droughts) would increase flow in sensitive reach of Duck River just above Columbia. 	<ul style="list-style-type: none"> - No recreational benefits or impacts.

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19	Convey Arnold Cooling Water to Normandy Reservoir or DRUC WTP	Construct a 24-inch pipeline (7 miles) to convey cooling water from the cooling lake at Arnold AFB to a pipeline which would discharge directly to Normandy Reservoir. Alternatively, could construct 9 miles of 24-inch pipeline and discharge directly to the DRUC WTP. Cooling lake obtains water pumped from Woods Reservoir (approximately 25 BG total storage) which was constructed exclusively for water supply (1 mgd) and cooling water for Arnold AFB and its operation is controlled by Arnold AFB. Water in the cooling lake is treated and supplied to the AFB for drinking and other potable water needs.	<ul style="list-style-type: none"> - <u>Adequate storage in Woods Reservoir to satisfy minimum 2-3 BG of storage needed at Normandy Reservoir to meet 1.4 BG river deficit in 2060.</u> - <u>Alternatively, if Arnold cooling water is conveyed to DRUC WTP, adequate to meet full potable supply needs of DRUC for 90-180 days (approximately 1-2BG).</u> - <u>Arnold AFB would need to identify any restrictions on use to assess reliability.</u> 	- Need to define source and location of water contamination.	\$8 million (project cost) to reservoir, \$10 million to DRUC WTP.	- Minimal permit requirements.	- No flexibility to phase implementation.	- Could allow more complete utilization of Normandy Reservoir storage, by accessing this alternate supply when reservoir pool level drops too low for DRUC access, or when Normandy Reservoir reaches level where water quality is unacceptable for water supply.	- No recreational benefits or impacts.