EXECUTIVE SUMMARY

INTRODUCTION AND PROPOSED ACTION

The Wichita Water & Sewer Department (Department) proposes to develop and enhance multiple, local sources of water by construction of a surface water intake structure, new diversion and recharge/recovery wells, pre-sedimentation plant, and transmission pipelines in Sedgwick and Harvey counties, Kansas. This course of action is required to supply additional drinking water to the Department's customers primarily in the metropolitan area of Wichita, Kansas, through the year 2050. Because installation of the surface water intake structure could necessitate disturbing the channel of the Little Arkansas River, the Department may apply to the U.S. Army Corps of Engineers (Corps) for a permit, pursuant to Section 404 of the Clean Water Act to discharge dredged or fill materials into the waters of the United States. The consideration of this permit application by the Corps constitutes a federal action that requires the preparation of an environmental impact disclosure document pursuant to the National Environmental Policy Act of 1969 (NEPA).

The proposed ILWSP – 100 MGD with the aquifer storage and recovery (ASR) 75/25 option will include changes in withdrawal rates from Cheney Reservoir that would provide for greater use of water from the reservoir during normal and wet weather periods. Surface water would be diverted from the Little Arkansas River during periods of "above base flow," treated, and recharged or stored in the Equus Beds aquifer in the vicinity of the City's wells for use during dry periods. The capacity of the Local Well Field would be expanded by placing additional wells in the vicinity of Oak Park and the Wichita-Valley Center Floodway. The old Bentley Reserve Well Field would be reactivated. High chloride content water from this well field would be blended with low chloride water from the other sources to produce water of acceptable quality.

This EIS was prepared in accordance with Council of Environmental Quality regulations 40 CFR Parts 1500 through 1508 implementing NEPA and provides a complete and objective analysis of environmental impacts of the proposed project.

PURPOSE AND NEED

The purpose of the proposed project is 1) to provide a reliable supply of potable water to the customers of the Department through the year 2050, which requires delivering water to a growing service area, and 2) protect the Equus Beds aquifer's water quality. The project is intended to provide a firm water supply to meet the maximum daily, or peak, demand within the projected service area. The Equus Beds aquifer, a principal groundwater supply source for the City of Wichita, is currently threatened by saltwater intrusion, a result from the natural brine seepage from the Arkansas River and as a by-product of past oil field activities. Recharging the aquifer would help prevent further water quality degradation and provide a large volume of stored groundwater for future use during dry periods.

The Department's existing water supply includes two well fields and a reservoir. These facilities are the Equus Beds Well Field, Local Well Field, and Cheney

Reservoir. **With all systems combined, the Department currently has a maximum daily supply capacity of 178 MGD.** In 2000, the Equus Beds Well Field supplied 32 percent; the Local Well Field, 7 percent; and Cheney Reservoir, 61 percent of the water. Prior to implementation of the ILWSP, the City received 60 percent of its water from the Equus Beds, 37 percent from Cheney Reservoir, and 3 percent form the Local Well Field.

Water use varies by year and throughout the year, with peaks typically occurring in summer. Long-term climatic cycles are the major determinant of annual water usage, while short-term fluctuations affect the peak demand in a given year. The maximum amount of water used in one day is a key factor in determining water production requirements and sizing of water treatment and transmission facilities. Average daily usage between 1960 and 1996 has ranged from a low of 24.9 MGD in 1960 to 64.2 MGD in 1990. The peak year for water use was 1991 when the maximum daily delivery by the Department was 125.7 MGD. In 1989, the total pumping and average daily use were the third highest on record. The maximum daily use in 1988 was the second highest at 112.3 MGD. Average daily and maximum daily demands both show increasing trends over the 36-year period.

The peak demand in 1991 would have been higher if not for the City implementing watering restrictions. This was due to a limited available supply caused by deteriorating physical conditions of the Equus Beds wells. Physical repairs and replacements to the Equus Beds wells were completed between 1992 and 1998.

Estimates of future water demands, based on number of anticipated users, consumption pattern, and water conservation, revealed a deficit would occur about the year 2016 for average day usage and the year 2026 for the maximum day usage. **The projected water demand by the year 2050 will be approximately 112 MGD for the average day and 223 MGD for the maximum day.** In 2050, the net water needs, which are the total water demand projections less the firm yield of potential water supply sources, will be 22 MGD for the average day and 28 MGD for the maximum day.

ALTERNATIVES

Twenty-seven water supply sources, both conventional and non-conventional, were identified for potential consideration. Of the 27 sources, 11 were considered viable; 3 water supply plans were developed from these sources. The three plans were: Milford Reservoir Plan, the ILWSP with 250 MGD Diversion Option, and the ILWSP with 150 MGD Diversion Option. These plans were required to meet two goals, 1) the demand for additional water and 2) provide protection to the Equus Beds aquifer's water quality. The Milford Reservoir Plan was eliminated from further consideration because it could not meet the established need to protect the Equus Beds aquifer.

Both of the ILWSP options include a component for recharging the Equus Beds aquifer, but further engineering studies were required to determine the best method. Therefore, the Department designed and implemented an aquifer storage and recovery (ASR) or recharge demonstration project. Results proved the capability of the ILWSP options to meet the goal of

protecting the aquifer. Refinement of these two plans, based on information learned from the demonstration project and engineering studies, resulted in renaming the plans to ILWSP 150 MGD Diversion and ILWSP 100 MGD Diversion. Three alternatives—ILWSP 150 MGD, ILSWP 100 MGD, and No-action—were examined in detail for environmental impacts.

Both of the ILWSP alternatives contain the same components; however, the Equus Beds recharge and the Local Well Field (LWF) components include several options. The ILWSPs components are:

- Water Conservation
- Bentley Reserve Well Field
- Local Well Field Expansion
- Cheney Reservoir
- Equus Beds Aquifer

Conservation. The Department's current water conservation plan includes an inverted water rate for water use, a public education program, and an emergency operating plan with three action thresholds. It is clear that conservation by itself cannot meet the Department's future needs because, even with the inclusion of a 16 percent water demand reduction attributable to conservation, projection of future demand still indicated shortfalls of 28 MGD by the year 2050. **Because conservation was included in the projections upon which the 223 MGD need was established, conservation will be a necessary and integral part of any action taken to meet the Department's future water supply needs.** Additional activities proposed involve periodic review and modification of the inverted water rate structure; maintenance of watering restrictions; encouragement to use flow-restricting plumbing fixtures; restriction of lawn watering or car washing activities; and continuation of education program, leak detection surveys, meter repair and replacement, and cooperative efforts with industries.

***Bentley Reserve Well Field*.** This well field, located adjacent to the Arkansas River and south of the town of Bentley, was developed in the 1956 and abandoned at a later date due to poor water quality. Redevelopment could supply up to 10 MGD of relatively high chloride water to blend with low chloride water from the Equus Beds well field and meet demands. The wells would be constructed adjacent to the Arkansas River and the City of Wichita's existing water transmission line. Design and construction could start in 2003 and end in 2004. Estimated costs for redevelopment, and annual operation and maintenance are respectively $1,250,000 and $26,000.

Local Well Field. Expansion of the LWF would use above base flow water from the Little Arkansas River and any leakage water from the Equus Beds aquifer. Water from both sources would be transferred directly to the City's Central Water Treatment Plant. New components include horizontal collector wells, vertical wells, support facilities, and collection pipelines. Wells would be located in northwest Wichita, along and above the confluence of the Arkansas and Little Arkansas rivers and along the Wichita-Valley Center Floodway. Collection piping for the lower section of the LWF has two options. Option 1 conveys diverted water from the wells south to Vertical Well 5 in the Central

Riverside Park area, where it is then routed through City property to the Central Water Plant. Option 2 conveys water to Vertical Well 3 near the northern boundary of Oak Park then to an existing 48-inch waterline for conveyance to the Central Water Plant.

Construction and design would start in 2004 and end in 2008. Estimated costs for the expansion, and annual operation and maintenance is $13,537,000 and $63,000, respectively.

Cheney Reservoir. Use of this existing surface water reservoir will continue with only administrative or procedural changes or modifications of facility capacities. With the new conjunctive use water right permit and larger capacity water withdrawal facilities at the dam in place, the City would be able to withdraw up to 80 MGD from the reservoir when there is water stored in the flood control pool (between elevations 1,421.6 and 1,429.0 feet). This will allow the City to capture more of the water that would otherwise be released downstream by the Corps, thereby reducing withdrawals from the Equus Beds aquifer. At surface water pool elevations below 1,421.6 feet, the maximum withdrawal rate from the reservoir will revert to its current flow rate of 47 MGD.

Equus Beds Aquifer Recharge and Recovery Component (ASR). Two alternatives were considered for the Equus Beds ASR component. Both alternatives have three options for capturing, pre-treating, and recharging ground and surface water with an additional option to capture, pre-treat, and transfer 60 MGD of surface water directly to the City's water treatment facilities. The primary difference between these alternatives is the amount of water that is diverted for storage. The following table shows the breakdown of the alternatives with options. The first number in the option title represents the amount of induced infiltration water for recharge and the second number represents the amount of surface water for treatment and recharge. For example, the 60/90 ASR captures 60 MGD of induced infiltration water for recharge and 90 MGD of surface water for treatment and recharge.

ILWSP 150 MGD Alternative	ILWSP 100 MGD Alternative
60/90 ASR Option	60/40 ASR Option
75/75 ASR Option	75/25 ASR Option
100/50 ASR Option	100/0 ASR Option

Both alternatives include a surface water intake, induced infiltration wells, and facilities to transfer and recharge the captured water to the Equus Beds aquifer, and to recover the stored water. A pre-sedimentation plant is proposed to treat surface water before recharging into the aquifer or piping to the City's water treatment plants. The surface water intake structure would divert water from the Little Arkansas River to the pre-sedimentation plant for treatment. The pre-sedimentation plant will be located south of Sedgwick, Kansas, on the Little Arkansas River. The total area needed for the pre-sedimentation plant is estimated to be 29 acres. Treated water would then be conveyed to the well field or to the City's Water Treatment Plant, depending on the option chosen. Of the 37 to 41 total new recharge wells, 35 to 39 would be in Harvey County and 2 would be located in Sedgwick County. A 1.9-mile long, 48-inch diameter raw water pipeline would deliver water from

the surface intake structure to the pre-sedimentation plant. The wells would be connected to a collector pipeline system consisting of an approximately 44-mile network of pipes ranging in diameter from 12 to 60 inches.

Approximately 53 to 42 induced infiltration wells will be installed along the Little Arkansas River, such that approximately half of the total diversion capacity is located above Halstead and the remaining one-half located between Valley Center and Halstead. The diversion system would only divert water when the flow in the Little Arkansas River at Halstead and Valley Center is above 40 cubic feet per second (cfs). Approximately four new horizontal collector wells and five new vertical wells will be located just upstream of the mouth of the Little Arkansas River, within the city limits of Wichita. Operation of these wells will be restricted to flows greater than 20 cfs.

The alternatives are scheduled for implementation over several years to facilitate planning and administrative needs, project funding, engineering, permitting, land acquisition, and construction. The implementation for each of the three options is very similar. Each option's implementation has four phases with the exception of the 100/50, which has five phases. Phases 1-3 are basically the same for each option. They differ only in the number of recharge wells and basins, in the amount of piping, and in the capacity and number of induced infiltration wells required. Phase 4 of the 100/0 ASR and 100/50 ASR option contains several additional tasks similar to Phase 3. Phase 5 of the 100/50 option contains the same tasks as Phase 4 for the 60/90 and 75/75 options.

The estimated construction costs for the ILWSP 150 MGD alternative range from $334 to $312 million (2000 dollars) depending on which option is used and whether 60 MGD is diverted to the City's Water Treatment Plant. Annual operation, maintenance, and energy (OMR&E) costs are estimated to range from $6.82 to $5.24 million (2000 dollars) depending on which option is used and whether 60 MGD is diverted to the City's Water Treatment Plant (2000 dollars).

The construction costs for the ILWSP 100 MGD alternative is estimated to range from $307.0 to $283.5 million depending on which option is used and whether 60 MGD is diverted to the City's Water Treatment Plant. Annual OMR&E costs are estimated to range from $5.82 to $3.50 million depending on which sub-option is used and whether 60 MGD is diverted to the City's Water Treatment Plant.

Under the **No-action** alternative, no permits would be issued; therefore, no new facilities to provide additional drinking water could be constructed. If No-action were taken, the existing water supply sources would be unable to meet the maximum daily needs for the expected future growth of metropolitan Wichita. Without additional capacity, the Department would be required to limit new customers as much as possible by not providing water to customers outside its present service area boundaries. This action would limit, but not completely stop, growth in demand because the Department is required by statute to serve new customers within its service area boundaries. Eventually, the Department would not be able to maintain system pressure during maximum use periods.

ENVIRONMENTAL CONSEQUENCES
The **ILWSP –150 MGD Alternative** would not affect land resources such as the general setting and geology. A total of 91 acres of prime farmland would be removed from potential agricultural production for the life of the project. However, this impact is not considered significant given approximately 770,000 acres of Harvey and Sedgwick counties, where most of the prime farmland would be affected, are classified as prime farmland. A total of 360 acres of land would be taken out of agricultural production for the life of the project. This impact would not be significant because approximately 880,000 acres of land in Harvey and Sedgwick counties are used for agriculture.

Slight, temporary increases in already turbid rivers and streams could occur from installation of the surface intake structure at the Little Arkansas River, installation of transmission pipelines crossing other smaller streams, and from stormwater runoff during construction of the other project facilities.

Recharge to the Equus Beds aquifer would increase aquifer water storage thereby raising the groundwater level. Wetlands currently affected by lower groundwater levels may experience renewal. An insignificant amount of crops, hayfield, and pastures, and upland forests, would be lost for the life of the project because of the installation of project facilities. These losses of vegetation are not expected to significantly impact wildlife.

Surface water flows of the Little Arkansas River would increase for both median and low flows, except during May and June when the recharge system is expected to operate more frequently and at higher diversion rates. During these two months, median flows would decrease by 20 to 44 cfs but would still be greater than the historic median flows in the other 10 months.

The ILWSP 150 MGD alternative would not affect current trends in human population or economic growth, significant cultural resources, or hazardous waste sites. The aesthetics of the pre-sedimentation plant site and the well field would be disrupted by project facilities.

Impacts from the **ILWSP 100 MGD Alternative** would be similar to the ILWSP 150 MGD alternative because the two alternatives would have the same pre-sedimentation plant, and much of the same transmission pipeline routes. A total of 65 acres of prime farmland would be removed from potential agricultural production for the life of the project; however, this impact is not considered significant given approximately 770,000 acres of Harvey and Sedgwick counties, where the prime farmland would be affected, are classified as prime farmland. A total of 310 acres of land would be taken out of agricultural production for the life of the project. This impact would not be significant given that approximately 880,000 acres of land in Harvey and Sedgwick counties are used for agriculture.

Similar to the 150 MGD alternative, the 100 MGD alternative would reduce median flows in the Little Arkansas River during May and June. These are the two months with the highest historic flows and the months when the recharge system is expected to operate more frequently. The magnitude of

these reductions would be 20 to 44 cfs. The other ten months of the year, implementation of this alternative would actually increase median and lower flows.

Because no construction activity would occur, the **No-action** alternative would not adversely impact natural resources. However, continued used of the Equus Beds aquifer at the current rate would diminish the quantity and quality of the water. As the water level in the aquifer declines, the threat of saltwater intrusion rises, therefore increasing the potential for contamination of the aquifer. The No-action alternative would require the Department to stop expanding its service area. This would tend to slow residential and business development in areas outside the Department's current service area. As a result, the current rate of the conversion of farmland and the filling of wetlands that result from suburban development also would be slowed. The population inside the Department's service area would continue to grow for some time. Eventually, peak-day water shortages would become more frequent and current trends of increasing population growth, economic expansion, and tax revenues would slow as a result of declining quality of life, discouraged in-migration, and encouraged out-migration.

MITIGATION

Impacts to surface water quality from erosion caused by construction site stormwater runoff would be minimized by the implementation of Stormwater Pollution Prevention plans as required by the Kansas Department of Health and Environmental under the National Pollution Discharge Elimination System program. These plans would detail the erosion control practices such as silt fences, sedimentation ponds, and rapid regrading and reseeding that would be used at each construction site**.**

MAJOR CONCLUSIONS

Major conclusions of the EIS are based on the impacts and/or benefits to the environment resulting from the proposed project. The goals of the proposed project are to meet the need for an additional 28 MGD of peak day production capacity to meet anticipated demands through the year 2050 and to provide protection to the Equus Beds aquifer from saltwater intrusion. The calculation of need included an assumption that 16 percent of future demand could be met by water conservation.

- The applicant's preferred alternative is the ILWSP – 100 MGD Alternative with the ASR 75/25 option.

- The induced infiltration wells, located along the Little Arkansas River, will be operated only when the discharge in the Little Arkansas River exceeds 40 cfs from April through September at Halstead and Valley Center and 20 cfs from October through March within the city limits of Wichita. The number of wells operating concurrently will vary depending on the flow in the river. The wells will be operated slightly less than half of the time and periods with all wells running would range from 11 to 15 percent of the time.

- Changes in the flow regime of the lowest reaches of the Little Arkansas River would be significant at low to intermediate flows. The collector wells associated with the Local Well Field expansion would be capable of

limiting the discharge at the mouth of the river to 20 cfs, 78 percent of the time. This low flow should be sufficient to sustain the current habitat and use of this section of the river.

- Surface diversion from the Little Arkansas River will occur only on an "as available" basis from above-base flows. Therefore, the optimum discharges and maximum available habitat for fish species will still be reached and the critical threshold for fish species habitat and recruitment in the river will not be threatened.

AREAS OF CONTROVERSY

There are no known areas of controversy at this time.

ISSUES TO BE RESOLVED

Develop a Hydrobiological Monitoring Plan in association with FWS and KDWP to accurately document specific impacts.