ArkDSS Memorandum
Final

To: Bill Tyner and Kelley Thompson, Colorado Division of Water Resources

From: Wilson Water Group

Subject: Task 2.1 – Aurora Water Operating Memorandum

Date: April 2019

INTRODUCTION

One of the Task 2.1 objectives is to:

> *Develop and document an understanding of the operations of key water use facilities in the basin in order to accurately represent the use and operations in the water rights allocation modeling. This understanding will be developed through interviews with DWR personnel, operators of large canal and reservoir systems, and representatives of federal facilities.*

Key water use facilities include diversion structures, transmountain diversions, and reservoirs.

- Diversion structures include structures that divert Aurora Water (Aurora) native water rights and/or carry Aurora transbasin diversions and changed ditch shares.
- Transmountain diversions include those structures that transport non-native from another basin into the Arkansas River basin for ultimate use by Aurora.
- Key reservoirs include reservoirs owned by Aurora and reservoirs that store Aurora native water, transbasin water, or changed ditch shares.

A number of Aurora operational components have been identified as key structures for the Arkansas River Decision Support System (ArkDSS) surface water modeling efforts. The purpose of this memorandum is to document physical, legal, and operational aspects of those key structures.

The information provided in this memorandum was developed from publicly accessible sources, information provided by Aurora, and discussions with representatives of Aurora. Information in this memorandum is believed to be accurate. However, this information should not be relied upon in any legal proceeding.

Table of Contents — **Page**

Introduction	1
System Overview	2
Physical Information	5
Water Rights	11
Operational Information	13
References	16

SYSTEM OVERVIEW

Aurora delivers water to approximately 370,000 people in the City of Aurora. The utility operates a complex system of storage and delivery pipelines that draw water from South Platte River, Arkansas River and tributaries of the Upper Colorado River basin. Aurora has a water history that dates back over 100 years as highlighted in the following time line:

- 1891 – Town of Fletcher (aka Aurora) is incorporated and purchases the East Denver Water Company.
- 1892 – Aurora Lake is built to provide irrigation water.
- 1907 – Fletcher changes name to Aurora.
- 1949 – City of Aurora creates its own Water Department to operate within city limits, however water is provided by Denver Water Board.
- 1957 – Aurora purchases Last Chance Ditch water rights.
- 1958 – Aurora enters into agreement with city of Colorado Springs to construct Homestake Project.
- 1959 – Well Field is developed in Cherry Creek to provide water to 1,700 new homes in Aurora.
- 1963 – Construction begins on Homestake Project.
- 1967 – Homestake Project Phase I is completed and Aurora can now serve all service area without assistance from Denver Water Board.
- 1968 – Griswold Water Treatment Plan is completed.
- 1973 – Quincy Reservoir is added to Aurora's water system.
- 1981 – Rampart Pipeline is completed, increasing water transmission capacity from 31 million gallons per day (MGD) to 72 MGD.
- 1983 – Quincy Water Treatment Plant is completed.
- 1989 – Aurora Reservoir is completed.
- 2010 – Prairie Waters Project is completed.

Aurora supplies a clean and continuous supply of drinking water to the third largest city in the state. The location of Aurora's key structures and water delivery/storage systems in the Arkansas River basin are shown in Figure 1. Approximately 50 percent of Aurora's physical water supplies divert from, or flow through the Arkansas River basin. The raw water supply in the Arkansas network is complex and is primarily comprised of the following systems:

1. Homestake Project
2. Turquoise Reservoir
3. Twin Lakes Project
4. Busk-Ivanhoe Project
5. Columbine Ditch
6. Upper Arkansas Water Rights

7. Rocky Ford Ditch
8. Colorado Canal System

All Aurora water supplies from the Arkansas River and Colorado River are diverted from the Arkansas River basin into Spinney Mountain Reservoir in the upper South Platte basin via the Otero Pump Station and Homestake Pipeline. This water is subsequently delivered to the City of Aurora via the South Platte River.

Key structures are identified below for each of the water systems owned and operated by Aurora within the Arkansas River basin. Note that Aurora owned facilities located on the western slope are discussed and detailed in the Upper Colorado River Water Resource Planning Model documentation. Similarly, facilities owned by Aurora in the upper South Platte basin are described in the South Platte River Water Resource Planning Model documentation.

Figure 1: Aurora – Water Supply Systems

PHYSICAL INFORMATION

The City of Aurora is located in the South Platte River basin; however about 25 percent of Aurora's water is from Arkansas River Basin supplies and 25 percent of Aurora's water is from transbasin diversions. A physical description of these supplies and associated water rights are detailed below as they involve operations in the Arkansas River.

1. Physical Information – Homestake Project

The Homestake Project is a transbasin water project owned and operated as a joint venture between Aurora and Colorado Springs Utilities. The Homestake Project diverts water from the headwaters of the Eagle River in the Colorado River basin (Water District 37), Figure 2. Water is delivered to the upper Arkansas River (Water District 11) via the Homestake Tunnel. In the Arkansas River basin, water delivered from the Homestake Tunnel is stored in the Homestake Project account in Turquoise Reservoir. Water is moved to Twin Lakes Reservoir by river exchange or Reclamation book-over exchange. By agreement with Reclamation, power is generated using Homestake water. Homestake water is conveyed via the Mt. Elbert Conduit from Turquoise Reservoir to Twin Lakes Reservoir. From Twin Lakes Reservoir Homestake Project water is sent through the Otero Pipeline by gravity to the Otero Pump Station near Buena Vista. At the Otero Pump Station, water is lifted over the divide between the Arkansas River basin and conveyed east through the Homestake Pipeline into South Park. Aurora's portion of Homestake water is split from Colorado Springs Utilities' portion at a location south of Spinney Mountain Reservoir and Aurora's portion flows into Spinney Mountain Reservoir. Aurora receives 50 percent of the annual yield from the Homestake Project; on average, the yield is 13,000 acre-feet per year. However, Aurora is obligated to provide the first 2,500 acre-feet of yield to Pueblo Board of Water Works; resulting in an average annual yield from the Homestake Project of about 10,500 acre-feet.

All Aurora owned Homestake Project water is exported from the Arkansas River basin into the South Platte basin via the Otero Pump Station.

The history, operations, and current specifications of Homestake Project infrastructure are summarized below. Further discussion of Homestake Project operations is included in the Operational Information section.

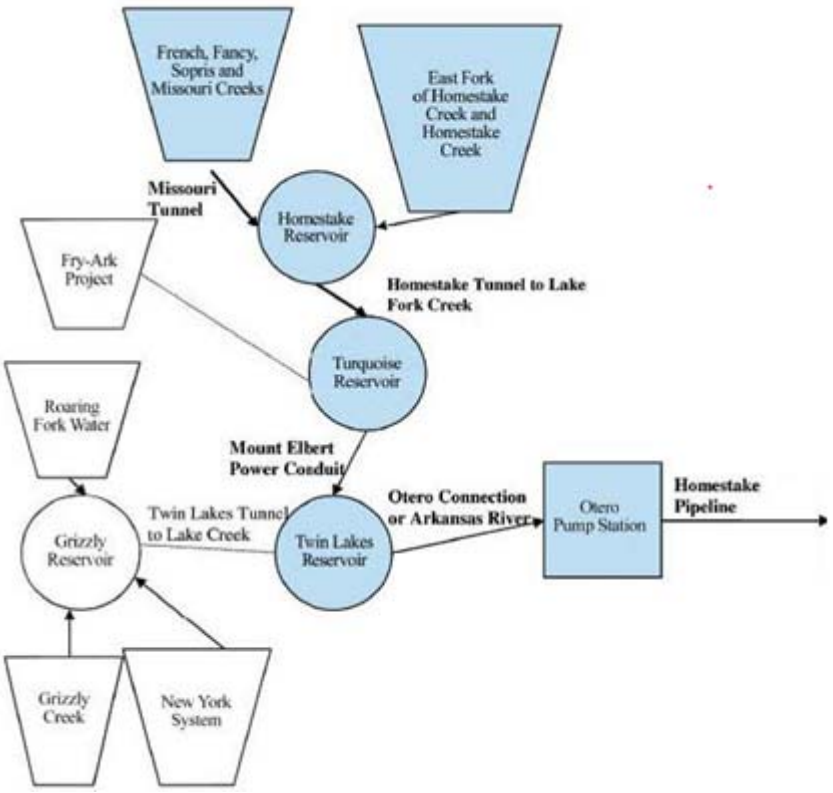

Figure 2: Aurora – Homestake Project and Twin Lakes Water Systems
(Schematic used with permission from Colorado Springs Utilities)

Homestake Tunnel (3704614)

The Homestake Tunnel is a transmountain diversion tunnel that carries water from the upper Eagle watershed to the upper Arkansas watershed. The tunnel is a 66-inch steel pipeline, and the Homestake partners try to keep conveyance of water from Homestake Reservoir to Turquoise Reservoir at a rate of 300 cfs. Half of the water delivered through the tunnel is associated with Aurora's interest in the Homestake Project. Diversions through the tunnel are measured on the eastern portal and maintained by DWR via the HOMTUNCO gage.

DWR maintains a streamflow gage to measure records through the Homestake Tunnel (09063700). Records are relatively complete from 1967 to present.

Turquoise Reservoir (1103500)

Turquoise Reservoir is part of the Fry-Ark Project and is managed by Reclamation. Aurora has ownership of a 15,000 acre-feet account in the reservoir for Homestake Project water, and leases an additional 5,000 acre-feet of storage from Reclamation. The additional storage capacity is used to store Aurora's Arkansas River water and additional Colorado River water supplies.

Only a few years of Turquoise Reservoir storage data are currently in HydroBase, but a complete dataset of reservoir content was obtained from Reclamation and provided to DWR for inclusion.

Twin Lakes Reservoir (1103503)

Twin Lakes Reservoir is part of the Fry-Ark Project and is managed by the U.S. Bureau of Reclamation. Before the Fry-Ark Project was developed and expanded the reservoir to its current size, the reservoir was owned and operated by the Twin Lakes Reservoir and Canal Company. Aurora has ownership of 2,739 acre-feet of the reservoir capacity that is associated with a 5 percent ownership in the Twin Lakes Project described below. Water stored in Twin Lakes Reservoir is taken for delivery to Aurora through the Otero Pipeline and Otero Pump Station.

Only a few years of Twin Lakes Reservoir storage data are currently in HydroBase, but a complete dataset of reservoir content was obtained from Reclamation and provided to DWR for inclusion.

Otero Pipeline and Pump Station (110529)

Otero Pump Station is located near Buena Vista Colorado and is used to deliver water stored in Twin Lakes Reservoir to both Colorado Springs Utilities and Aurora. The Otero Pump station lifts water from the Arkansas River basin into the South Platte basin via the Homestake Pipeline.

HydroBase only has a few years of diversion records through the Otero Pipeline; they have historically been kept in the Division 2 office. They will be reviewed and provided to DWR for inclusion in HydroBase.

Homestake Pipeline

The Homestake Pipeline conveys water supplies from the Otero Pump Station to Spinney Reservoir for use by Aurora. The pipeline can deliver water supplies for Aurora at a rate of up to 50.5 MGD.

HydroBase has essentially no diversion records for the Homestake Pipeline.

2. Physical Information – Twin Lakes Water Systems

Aurora owns 5 percent of the Twin Lakes Reservoir and Canal Company (TLRCC). As shown in Figure 2, TLRCC owns and maintains a transbasin network of diversion structures on the upper Roaring Fork River in the Colorado River basin (WD 38). Water is diverted through the Twin Lakes Tunnel (TWITUNCO) under the continental divide to a location upstream from Twin Lakes

Reservoir (WD 11). Once in Twin Lakes Reservoir, TLRCC water is delivered to Aurora using the Otero Pump Station as described in the Homestake Project section described above.

The project yields about 2,490 acre-feet per year to Aurora. The history, operations, and current specifications of the Twin Lakes System infrastructure are summarized below. Further discussion of the operations of these units is included in the Operational Information section.

Twin Lakes Tunnel (1104617)

The Twin Lakes Tunnel is a transmountain diversion that carries water from the upper Roaring Fork watershed to Lake Creek in the upper Arkansas watershed above Twin Lakes Reservoir. The tunnel has a rated capacity of 625 cfs; however, peak flows have exceeded 625 cfs on a number of occasions. Five percent of the flow measured through the tunnel is associated with Aurora's interest in the Twin Lakes System. Diversions through the tunnel are measured on the eastern portal and maintained by DWR via the TWITUNCO gage.

DWR maintains a streamflow gage to measure records through Twin Lakes Tunnel (09073000). Records are complete from 1935 to present.

Where to find more information:

- Additional information on the Homestake Project and Twin Lakes diversions is included in the CDSS Colorado River Basin Information Report.
- Additional information on Fry-Ark Project and operations of Turquoise Reservoir and Twin Lakes Reservoir is included in the ArkDSS Fryingpan-Arkansas Facilities and Related Operations memorandum.

3. Physical Information – Busk-Ivanhoe Project

Aurora owns 50 percent of the Busk-Ivanhoe Project, with the remainder 50 percent of the Project owned by Pueblo Board of Water Works. The Project consists of a diversion network in the upper Fryingpan River of the Colorado River basin (Water District 38). Water is diverted through the Ivanhoe Reservoir Tunnel under the continental divide to the Arkansas River basin (Water District 11) upstream of Turquoise Reservoir, where it is delivered into Aurora's Turquoise Reservoir space before being delivered to Aurora via the Twin Lakes and Otero Pump Station as described in the Homestake Project section described above.

The project yields about 2,416 acre-feet per year to Aurora. The history, operations, and current specifications of the Busk-Ivanhoe System infrastructure are summarized below. Further discussion of the operations of these units is included in the Operational Information section.

Busk-Ivanhoe Tunnel (3804613)

The Ivanhoe Reservoir Tunnel is a transmountain diversion tunnel that carries water diverted in the upper Fryingpan River watershed to the upper Arkansas watershed. The tunnel has a decreed water right of 35 cfs and delivers water to Busk Creek and into Lake Fork Creek very near the inflow point to Turquoise Reservoir. Approximately 50 percent of the flow measured through the tunnel is associated with Aurora's interest in the Project. Diversions through the tunnel are measured on the eastern portal and maintained by DWR via the BUSTUNCO gage.

DWR maintains a streamflow gage to measure records through the Busk-Ivanhoe Tunnel (090077500). Records are relatively complete from 1950 to present.

4. Physical Information – Columbine Ditch

In 2009, Aurora partnered with Climax Molybdenum Company to form the Fremont Pass Ditch Company and purchase the Columbine Ditch from Pueblo Board of Water Works. The transbasin Ditch consists of an open ditch that diverts water from the upper Eagle River basin (Water District 37). Water is diverted across the continental divide near Fremont Pass into Chalk Creek, which is tributary to the East Fork of the Arkansas River (Water District 11). Columbine Ditch water is typically exchanged into storage in Turquoise Reservoir and delivered to Aurora using Twin Lakes and the Otero Pump Station as described in the Homestake Project section described above.

The history, operations, and current specifications of the Columbine Ditch infrastructure are summarized below. Further discussion of the operations of these units is included in the Operational Information section.

Columbine Ditch (3701067, 3701066, 3704641)

The Columbine Ditch is a transmountain, open canal that diverts water from the upper portions of the East Fork of the Eagle River and carries water by gravity across the continental divide into the Chalk Creek tributary to the Arkansas River. The ditch has a total decreed water right of 60 cfs. Approximately 66.67 percent of the flow measured in the ditch is associated with Aurora's interest. Aurora's interest in the ditch yields about 892 acre-feet per year.

DWR maintains a streamflow gage to measure records through the Columbine Ditch (09061500 Columbine Ditch near Fremont Pass). Records are relatively complete from 1950 to present.

5. Physical Information – Colorado Canal Water System

Aurora owns about 27 percent of the Colorado Canal Company. Aurora also has ownership in Lake Meredith Company and Lake Henry Company. These companies were originally formed to provide irrigation water to lands east of Pueblo, Colorado; however, much of the original water

rights have since been changed from irrigation to municipal uses. Aurora is able to divert the fully consumable portion of the changed irrigation water rights and utilize the associated storage for their benefit. This water supply is typically exchanged to upstream locations and ultimately diverted through the Otero Pump Station for delivery to Aurora's water system. When upstream exchanges are not possible, Lake Henry and Lake Meredith store historical use credits. On average, Colorado Canal water rights yield about 6,540 acre-feet per year.

Where to find more information:

- Additional information on the Colorado Canal is included in the ArkDSS Colorado Canal Operating Memorandum.

6. Physical Information – Rocky Ford Ditch

Aurora owns 94.3 percent of the Rocky Ford Ditch water rights. This ditch has very senior water rights in the lower Arkansas River basin that originally provided irrigation water to lands near Rocky Ford Colorado. Aurora purchased and changed shared from irrigation to municipal uses. The water rights are categorized into two groups, Rocky Ford I and Rocky Ford II, corresponding to the two water court cases that changed the specific ditch shares from irrigation to municipal uses.

Aurora owned Rocky Ford I water rights are associated with 466.48 shares and are limited to diverting a maximum annual 8,250 acre-feet of fully consumable water. Aurora diverts the consumptive use of these water rights at Pueblo Reservoir from March 15 through October 1. Only ditch losses and immediate return flows are conveyed to the Rocky Ford Ditch headgate associated with these shares. The delayed return flows are diverted and stored in Pueblo Reservoir and delivered in time and place when due.

Aurora owned Rocky Ford II water rights are associated with 290 shares and are limited to diverting a maximum annual 5,761 acre-feet of fully consumable water. Aurora can divert Rocky Ford II water rights at Pueblo Reservoir from March 15 through October 31 of each year; however, both ditch losses and immediate return flows associated with these shares are delivered to the Rocky Ford Ditch headgate. These deliveries help to convey the remaining minority shareholder's diversions through the ditch system. The delayed return flows are diverted and stored in Pueblo Reservoir and delivered in time and place when due.

The historical consumptive use portion of these water rights is stored in Aurora's 10,000 acre-feet excess capacity account in Pueblo Reservoir. From Pueblo Reservoir, Rocky Ford Ditch water is exchanged upstream for delivery via the Otero Pump Station.

7. Physical Information – Upper Arkansas Water Rights

Aurora owns several changed irrigation water rights in the upper Arkansas River basin near Leadville. The consumptive use from these water rights is exchanged into Twin Lakes Reservoir or Turquoise Reservoir and positioned such that Aurora can take delivery via the Otero Pump Station as described above in the Homestake Project section.

WATER RIGHTS

Aurora owns numerous water rights in the Colorado River, South Platte River, and Arkansas River basins for direct flow, storage, ground water, and exchange uses. The following discussion and tabulation of water rights is meant to highlight those water rights within the Arkansas River basin. Note this is not a complete catalogue.

Direct Flow Water Rights

Table 1 lists the direct flow water rights owned by Aurora in the upper Arkansas River basin around Leadville. These water rights have been decreed as alternate points to each ditch, to Otero Pump Station, and for storage in Turquoise, Twin Lakes, and Clear Creek Reservoirs. Case No. 93CW0137A confirmed the change of use and alternate points of use, and Case No. 93CW0137B provided further volumetric limitations.

Table 1: Aurora's Upper Arkansas Direct Flow Water Rights

Water Source	Appropriation Date	Admin. No.	Case No.	Decreed Rate (cfs)	Comments
Upper Arkansas River and Tributaries	08/01/1878	22888.10440	98CW0137A,B	3.44	TF HENDERSON-ROCK CREEK D ID 754
	06/16/1887	13681.00000	98CW0137A,B	5.00	TF DELAPPE DITCH ID 527
	05/01/1887	13635.00000	98CW0137A,B	10.00	TF HENDERSON-DELAPPE DITCH ID 527
	05/01/1882	11809.00000	98CW0137A,B	4.00	TF FOR WELLS & STARR DITCH ID 526
	05/05/1880	11083.00000	98CW0137A,B	16.00	TF WHEEL DITCH ID 524
	05/15/1879	10727.00000	98CW0137A,B	14.00	TF UPPER RIVER DITCH ID 519
	06/25/1877	10038.00000	98CW0137A,B	5.00	TF CHAMP DITCH RIGHT ID 517
	06/19/1890	14780.00000	98CW0137A,B	7.00	TF PIONEER DITCH ID 518

As noted above, Aurora owns shared is the water rights under the Rocky Ford Ditch and the Colorado Canal. Consumptive use credits under these ditches have been quantified and changed to include municipal uses. Aurora's Leadville Ranch water rights combine to yield an average of 1,350 acre-feet annually to the City.

Exchange Rights

Table 2 lists decreed exchange water rights operated by Aurora on the Arkansas River. These exchanges allow available water supplies in the lower Arkansas River to be moved to upstream locations for ultimate delivered to the Otero Pump Station. Exchanged water typically includes fully consumable historic use water from changed irrigation water rights deliveries. As

described above, Aurora has significant water right holdings in the lower Arkansas River from the Colorado Canal System and Rocky Ford Ditch water rights. The consumptive use water must be exchanged upstream and made available at the Otero Pump Station. When possible, Aurora partners with other water users in the Arkansas River basin to operate contract exchanges. This involves one entity trading water stored in an upstream reservoir, such as Twin Lakes Reservoir, with a second entity with water in a downstream reservoir such as Meredith Reservoir. This type of trade is common and benefits both parties, as the entity with upstream water does not have to pay transit losses and the entity with downstream supplies does not have to rely on available exchange potential to operate a river exchange.

Aurora operates river exchanges on the mainstem of the Arkansas River to move Rocky Ford I consumptive use water upstream pursuant to Case No. 87CW63. Rocky Ford II consumptive use credits are exchanged upstream pursuant to Case No. 99CW170. These exchanges are outlined in Table 2 below.

In recent years, Aurora has exchanged up to 20,000 acre-feet annually. These include mainstem river exchanges and contract exchanges. Exchanges are an important component of Aurora's operations.

Exchanges into Twin Lakes Reservoir are limited to occur at one-half the rate of native inflow. Aurora, through stipulations with various parties, has agreed to limitations on the exercise of its exchange rights from Pueblo Reservoir to Twin Lakes and Turquoise Reservoir. Aurora is working with Colorado Springs Utilities to rehabilitate the Arkansas River diversion at the Otero Pump Station that can pull water directly from the Arkansas River near Buena Vista. Prior to the 1980s, the Homestake project operated an intake on the river at the Otero Pump Station, but due to excessive sediment problems, an additional intake was added providing the ability to take water directly from Twin Lakes Reservoir. The rehabilitated Arkansas River intake will be designed to better accommodate sediment loading.

Exchanges within the reach of the Arkansas River just below Pueblo Reservoir are frequently limited by the Pueblo Flow Management Program, in which six entities owning senior decreed water rights and senior decreed exchange rights are curtailed in accordance with specific flow rates below Pueblo Reservoir. In addition, the Arkansas River Voluntary Flow Management Flow Program (VFMP) is operated by Colorado Parks and Wildlife to maximize recreation on the Arkansas River upstream of Pueblo Reservoir during the July through August 15 period. The VFMP seeks to maintain 700 cfs at the Wellsville stream gage. Aurora, through stipulations with various parties, have agreed to limitations on the exercise of its exchange rights from Pueblo Reservoir to Twin Lakes and Turquoise Reservoir that would reduce flows below 700 cfs during the VFMP period.

Where to find more information:

- Additional information on the Arkansas River Voluntary Flow Management Program is included in the ArkDSS Fryingpan-Arkansas Facilities and Related Operations memorandum.

Table 2: Principal Exchange Decrees

Name and WDID	Case Nos.	Comments
COLUMBINE DITCH EXCHANGE CREEK/ARKANSAS RIVER CONFLUENCE 1101196	11CW0081	50 CFS CONDITIONAL EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
		100 CFS CONDITIONAL EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
COLUMBINE DITCH EXCHANGE LAKE CREEK/ARKANSAS RIVER CONFLUENCE EXCH 1101195		100 CFS CONDITIONAL EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
		18 CFS ABSOLUTE EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
		82 CFS CONDITIONAL EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
COLUMBINE DITCH EXCHANGE LAKE FORK/ARKANSAS CONFLUENCE EXCH 1101194		10CFS ABSOLUTE EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
		30CFS CONDITIONAL EXCH COLUMBINE DITCH FOR AURORA SERVICE AREA SEE DECREE FOR CONDITIONS AND LIMITATIONS
ROCKY FORD DITCH EXCHANGE CLEAR CREEK RESERVOIR 1103504	87CW0081	CONDITIONAL EX FROM PUEBLO RES OF 83CW18 RFD WATERS 3/16-11/14
ROCKY FORD DITCH EXCHANGE TWIN LAKES RESERVOIR 1103503		CONDITIONAL EX FROM PUEBLO RES OF 83CW18 RFD WATERS 3/16-11/14
ROCKY FORD DITCH EXCHANGE TURQUOISE RESERVOIR 1103500		CONDITIONAL EX FROM PUEBLO RES OF 83CW18 RFD WATERS 3/16-11/14
ROCKY FORD DITCH EXCHANGE OTERO PUMP STATION 1100529		CONDITIONAL EX FROM PUEBLO RES OF 83CW18 RFD WATERS 3/16-11/14

OPERATIONAL INFORMATION

Water Demands

As stated earlier, the Aurora raw water collection system is operated to ensure physical water supplies are available to meet water demands at the Otero Pump Station. Aurora's overall demands will not be represented in the Arkansas model; instead historical or future project demands from Arkansas River and Colorado River supplies will be represented at the Otero Pump Station.

Water Supply

Aurora operates their Colorado River and Arkansas River water rights and associated supplies to ensure demands of the citizens of Aurora are met and to allow operational flexibility to address various infrastructure needs, repairs, and down time. Although complexities of a system this

large require constant monitoring, Aurora generally attempts to exchange their Arkansas River water rights to the Otero Pump Station, or for storage in Twin Lakes Reservoir and Turquoise Reservoir. When exchange potential exists, and raw water is needed, Aurora will also move their water stored in Colorado Canal reservoirs and Pueblo reservoir accounts to the upper reservoirs for direct delivery through the Otero Pump Station. Specific operational criteria for each key system are described below.

Homestake Project

Water from the Homestake Project is typically stored in Homestake Reservoir then brought through the Homestake tunnel to Turquoise Reservoir in February and March. This is done so Homestake Reservoir can capture available runoff flows in May and June. Occasionally, water is delivered through the tunnel in the fall if there is available space in east slope reservoirs. Water is delivered to Spinney Reservoir in the South Platte River basin via the Otero Pump Station and Homestake Pipeline.

Twin Lakes System

The Twin Lakes water system does not have significant storage on the west slope. Therefore, water is diverted to the Arkansas River basin via the Twin Lakes Tunnel as it becomes physically and legally available. Water diverted through the Twin Lakes Tunnel is stored in Twin Lakes Reservoir before being conveyed to the Otero Pump Station. Water is delivered to Spinney Reservoir via the Otero Pump and Homestake Pipeline. Twin Lakes' water is delivered year-round when in priority. In recent years, the Otero Pump and Homestake Pipeline have been removed from operations during about four weeks in September.

Busk-Ivanhoe Project

Busk-Ivanhoe Project has limited storage on the west slope and therefore, water has historically been diverted through the tunnel as it becomes physically and legally available. Water diverted through the Ivanhoe Reservoir Tunnel is stored in Turquoise Reservoir before being conveyed to the Otero Pump Station.

Columbine Ditch

Columbine Ditch has no storage on the west slope and therefore, water is diverted by the ditch as it becomes physically and legally available. Water diverted through the ditch flows down the Arkansas River and is typically exchanged into Turquoise Reservoir or Twin Lakes Reservoir before being conveyed to the Otero Pump Station.

Colorado Canal System

Water rights owned by Aurora in the Colorado Canal System are delivered into Lake Meredith and Lake Henry. This water has been converted to fully consumable use and the return flows

are returned back to the Arkansas River through the Lake Meredith outlet. If sufficient exchange potential exists, a decreed river exchange is used to move this water from Lake Henry and Lake Meredith. Contract exchanges are also used between Aurora and other water users in the basin, moving Colorado Canal water to Pueblo, Twin Lakes, and Turquoise reservoirs where Aurora can convey the water to the Otero Pump Station.

Rocky Ford Ditch

Rocky Ford Ditch fully consumable water is initially diverted into Pueblo Reservoir. To facilitate this, Aurora leases 10,000 acre-feet of excess capacity in Pueblo Reservoir from Reclamation. The diversion season for the Rocky Ford ditch rights begins on March 15 and extends to October 31. From Pueblo Reservoir, the water is exchanged upstream for eventual conveyance through the Otero Pump Station.

Upper Arkansas Water Rights

Aurora has changed these original irrigation water rights to municipal water rights in water court. This consumptive use water flows down the Arkansas River from Leadville and are typically exchanged into storage in Turquoise Reservoir or Twin Lakes Reservoir.

Modeling Considerations

The following descriptions provide a framework for how the individual water systems will be prioritized and operated within the ArkDSS.

Demand

The Aurora water supply system in the Arkansas River basin will be modeled with one key municipal demand at the Otero Pump Station. For the calibration model, the demand will be set to historical deliveries through the Otero Pump Station. Delivery will occur via the Otero Pipeline at Twin Lakes; however, flexibility will be included to allow for alternate operations that deliver water as a direct diversion from the Arkansas River to the Otero Pump Station for future model scenarios. Water deliveries will be constrained by physical and legal water availability, system capacities, and exchange opportunities to move lower Arkansas River supplies to upstream locations. Aurora water supplies will be delivered to Otero Pump station in the following order of priority:

1. Exchange available lower Arkansas River water supplies upstream
    - Exchange Colorado Canal and Rocky Ford Ditch fully consumable water to Pueblo Reservoir, Turquoise Reservoir, Twin Lakes Reservoir, or Clear Creek Reservoir.
    - Exchange Colorado Canal and Rocky Ford Ditch fully consumable water from Pueblo Reservoir to Turquoise Reservoir, Twin Lakes Reservoir, or Clear Creek Reservoir.
2. Exchange upper Arkansas River water supplies into Turquoise Reservoir or Twin Lakes Reservoir.

- Columbine Ditch
- Leadville Ranch Water Rights

3. Deliver water stored in Turquoise Reservoir and Twin Lakes Reservoir to Otero Pump Station.
   - Homestake, TLRCC, and Busk Ivanhoe previously stored water supplies.

Where to find more information:

- The final model representation of Aurora's facilities and associated operations will be documented in the Arkansas River Surface Water Model User's Manual.

REFERENCES

1) Aurora Water Supply Fact Book, https://www.auroragov.org/UserFiles/Servers/Server_1881137/File/Residents/Water/Water%20System/Aurora%20Water%20Facts/001772.pdf
2) Water Supply Fact Book, Aurora Water, 2010-2011
3) Colorado Springs Utilities 2016 Water Tour Handout