MODEL SELECTION AND PARAMETERS

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Technical Memorandum

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To: Andrea Parker, URS Corporation, Carlie Ronca, U.S. Bureau of Reclamation

From: Heather Thompson, Ecological Resource Consultants

Project: Green Mountain Reservoir Substitution and Power Interference Agreements EA

Re: Model Selection and Parameters

The following memorandum describes the model selected for the Environmental Assessment (EA) and the model parameters associated with the No Action and Proposed Action alternatives.

1.0 MODEL SELECTION

Alternatives that will be evaluated for the EA will have hydrologic effects due to differences in the manner in which Springs Utilities repays its substitution obligation to Green Mountain Reservoir. These impacts could increase or reduce flows or change reservoir operations and water levels resulting in impacts to water rights, instream flows, and diversions. A tool is needed to evaluate these and other hydrologic effects and assess mitigation measures, if any. Two models were reviewed to assess their suitability for accomplishing the modeling objectives of this EA. These models include the State's Upper Colorado Water Resource Planning Model from the Colorado Decision Support System (CDSS Model) and Denver Water's Platte and Colorado Simulation Model (PACSM). A brief overview of each model is provided below.

CDSS Model Overview

The State of Colorado has invested significantly in the development of the CDSS Model to provide an integrated system of databases and model of the Upper Colorado River that is available to the public. The CDSS Model is widely known and has been used for analysis of historical and future water management policies in the Upper Colorado River basin. It covers the entire Colorado River drainage, except the Gunnison River, from the headwaters to the Colorado-Utah state line. The water supply system is represented as a system of links and nodes, which correspond with features such as diversion structures, reservoirs, instream flow

requirements, demands, or stream gages. In general, the model allocates water to a node based on available flow, water rights, diversion or storage capacity and water demand. The physical system represented in the model is constrained by Colorado's water rights laws and numerous contractual and operating agreements. The model is extremely detailed, containing more than 400 diversions nodes, 30 reservoirs, and 80 USGS gages. The model includes operating rules for all major reservoirs, including complex and unique operations. Physical features, times series inputs, and operating criteria can be directly edited in the CDSS Model input files.

PACSM Overview

PACSM is a water allocation and accounting model that was developed by Denver Water to model the operations of raw water supply systems belonging to Denver Water and others within portions of the Colorado and Platte River basins. Similar to the CDSS Model, the water supply system is represented as a system of linked nodes. The diversion structures, reservoirs, water rights, operations, instream flow requirements, demands and stream gages included in the PACSM model are very similar to the CDSS Model for the Colorado River Basin. In addition, both PACSM and the CDSS Model use direction solution algorithms to assure that water is allocated according to physical, hydrological, and institutional parameters.
The primary difference between PACSM and the CDSS Model is the model study areas. The area modeled in PACSM extends from the headwaters of the Colorado River downstream to the 15-Mile Reach (excluding the Gunnison River) and the headwaters of the South Platte River downstream to the Kersey gage, whereas the CDSS Model does not include the South Platte River basin.

Criteria and Decision

The three basic criteria considered in the selection of the model include:

1. Required functionality: The model must be capable of representing the hydrology and operations to which the Colorado River system is subject.
2. Ease of Modification: The user must be able to customize and modify the model to reflect operations specific to this EA.
3. Accessibility: The model must be readily accessible for use on this EA in a timely manner.

Based on a review of these models it was determined that both models have similar functionality, although PACSM has the slight benefit of including the South Platte River basin. The majority of the EA study area is located in the Upper Colorado River Basin with a small portion in the upper South Platte River Basin. PACSM offers a slight benefit over the CDSS Model because it could be used to evaluate hydrologic effects in the South Platte River basin. Both models can be modified to incorporate the changes needed to model the No Action and Proposed Action alternatives. Regarding accessibility, CDSS is owned by and available to the public whereas because Denver Water owns and operates the PACSM model, its availability for use in the EA is less certain. Therefore, after reviewing the two

potential models, ERC selected the CDSS Model for assessing hydrologic effects in the Colorado River Basin.

While the majority of the study area for the EA is located in the upper Colorado River basin, a small portion is located in the upper South Platte River basin, including Springs Utilities' Montgomery Reservoir, Denver Water's Elevenmile Canyon Reservoir and the Middle Fork South Platte River from the headwaters to Elevenmile Canyon Reservoir. The CDSS model does not include the South Platte River basin, therefore, potential hydrologic effects in that portion of the study area will be based on an assessment of USGS gage data, historical reservoir end-of-month contents for those reservoirs, and data provided by Denver Water from PACSM, which includes the South Platte River basin.

2.0 MODEL PARAMETERS

2.1 Study Period and Time Step

The recommended model study period extends from 1950 through 2005. A study period should be long enough to include a variety of hydrologic conditions, including average, wet and dry years. At the same time, it should not be so long that many streamflows or reservoir contents must be synthesized to fill in missing data. The selected study period contains a balance of dry years (1954, 1966, 1977, 1981, and 2002), wet years (1957, 1983, 1984, 1995, and 1996), and average years. Of particular concern for this EA was the inclusion of several dry years, since hydrologic effects associated with the Proposed Action would occur primarily in substitution years, which typically correspond with dry years. Starting the model a few years prior to the 1950's drought period minimizes the influence of initial conditions, including reservoir contents, on model results for those years. The study period ends in 2005 because the CDSS Model data sets currently available extends through 2005.

The CDSS Model is available in both a daily and monthly time step format. Based on the magnitude and timing of hydrologic effects anticipated under the Proposed Action alternative a monthly time step was determined to be adequate for the purposes of this EA.

2.2 Model Scenarios

The CDSS Model Baseline Data Set was selected as the basis for representing the No Action and Proposed Action alternatives. The Baseline Data Set is used to simulate current conditions and operations imposed on historical hydrology to understand and evaluate the hydrologic effects of the No Action and Proposed Action alternatives.

A detailed description of the entire CDSS Model and the associated datasets is provided in the following reports: Upper Colorado River Basin Information (CWCB 2007a) and Upper Colorado River Basin Water Resources Planning Model User's

Manual (CWCB 2007b). The specific facilities and operations that would be affected under the Proposed Action alternative include Springs Utilities' Continental-Hoosier System and Homestake Project, and Blue River Decree operations, including substitution replacement at Upper Blue Reservoir, Dillon Reservoir, Williams Fork Reservoir and Wolford Mountain Reservoir. The manner in which these facilities and operations are reflected in the CDSS Model is summarized below.

Continental-Hoosier System Operations

The Continental-Hoosier System diverts water from several tributaries at the headwaters of the Blue River and delivers it through the Continental-Hoosier Tunnel (Hoosier Tunnel) into Montgomery Reservoir in the headwaters of the Middle Fork of the South Platte River. The system has been in operation since 1953.

The Continental-Hoosier System has several direct flow water rights to divert water from East Hoosier Creek, Hoosier Creek, Bemrose Creek, Crystal Creek, Spruce Creek, McCullough Gulch, and Monte Cristo Creek through Hoosier Tunnel. The capacity of the Hoosier Tunnel is 500 cfs. In addition, water can be stored in Upper Blue Reservoir under a storage right. The capacity of Upper Blue Reservoir is approximately 2,100 AF. The water rights associated with the Continental-Hoosier System that are included in the CDSS Model are summarized in **Table 1**.

Table 1. Summary of Continental Hoosier System Absolute Water Rights

Name	Decreed Amount	Appropriation Date
1929 Water Rights		
East Hoosier Creek	40 cfs	Aug 5, 1929
Hoosier Creek	20 cfs	Aug 5, 1929
Bemrose Creek (Silver Ck)	17 cfs	Aug 5, 1929
Subtotal	**77 cfs**	
1948 Water Rights		
Upper Blue Reservoir	2,140 AF	May 13, 1948
East Hoosier Creek	50 cfs	May 13, 1948
Hoosier Creek	40 cfs	May 13, 1948
Bemrose Creek (Silver Ck)	20 cfs	May 13, 1948
Crystal Creek	40 cfs	May 13, 1948
Spruce Creek	60 cfs	May 13, 1948
McCullough Gulch	60 cfs	May 13, 1948
Monte Cristo Creek	200 cfs	May 13, 1948
Interceptor Ditch (to Tunnel)	50 cfs	May 13, 1948
Tunnel Seepage	20 cfs	May 13, 1948
Subtotal[1]	**540 cfs**	

[1] The maximum diversion under the 1948 decrees is limited to 400 cfs.

The 1929 water rights are senior to Green Mountain Reservoir's water rights and Denver Water's rights at Dillon Reservoir and Roberts Tunnel. Therefore, diversions under the 1929 water rights are generally controlled by an administrative call from the Shoshone Power plant water right and the physical water supply at the headgates. The 1948 water rights are junior to the Green Mountain Reservoir senior storage right, therefore, diversions under these water rights are subject to the Blue River Decree, which is explained in the following section on Blue River Decree operations.

The 1929 water rights are decreed for diversion from three relatively small tributaries to the Blue River near the top of the basin. The tributary drainage area available to these rights is about 2 square miles, which is about 14 percent of the total drainage basin tributary to the entire collection system (approximately 14.3 square miles (CWCB, 2007b). Therefore, in the CDSS model, 14 percent of the natural flow is placed above one node that represents all the 1929 rights and the remaining 86 percent is placed above one node that represents all the 1948 water rights and a node for Upper Blue Reservoir.

Historical deliveries through the Hoosier Tunnel are shown in **Table 2**. The average annual flow through the tunnel was approximately 8,540 acre-feet (AF). Deliveries occur from April through October, with the majority in May through September. Diversions from the Blue River and its tributaries through the tunnel and into storage are limited by the water right to the period of May through September. However, flow through the Hoosier Tunnel also includes releases of previously stored water from Upper Blue Reservoir. In accordance with the Blue River Decree, the total diversions at the Continental-Hoosier System "... shall not exceed in any calendar year, ten percent of the natural flow of the Blue River near Dillon below its confluence with the Snake River and Ten Mile Creek." This requirement is generally not a limiting factor with respect to Continental-Hoosier System diversions based on an evaluation of streamflow data and conversations with Springs Utilities staff. Therefore, this requirement is not incorporated in the CDSS Model.

Historical end-of-month (EOM) contents for Upper Blue Reservoir are shown in **Table 3**. Water is stored in Upper Blue Reservoir during runoff and the reservoir generally fills by the end of June. As shown in **Table 3**, Upper Blue Reservoir filled in all but seven years (1977, 1980, 1981, 1985, 1989, 2002, and 2004). Water is typically released from August through October to meet Springs Utilities' substitution obligation or for delivery through Hoosier Tunnel as needed to supplement direct diversions. The reservoir was emptied by the end of October in all years. The operating rules in the CDSS Model for Upper Blue Reservoir reflect these historical operations. End-of-month reservoir targets equal to historical contents were included for the seven years the reservoir did not fill historically since the EOM contents are indicative of the physical supply in those years. The EOM reservoir targets prevent the reservoir from storing above the target but do not force the reservoir to release to those targets.

Since the Continental Hoosier System is a core component of Springs Utilities' water supply system and diversions are typically limited by the physical water supply, the demand placed at the Hoosier Tunnel was set equal to historical tunnel diversions from 1953 through 2005. From 1950 through 1952 the demand at Hoosier Tunnel was estimated as follows. Each of those years was classified as average, wet or dry based on total natural flow from April through September at the USGS gage Colorado River near Kremmling (#09058000). Natural flows are defined as gaged flows plus adjustments for reservoir releases and filling, diversions, gaged inflows, transbasin imports, and irrigation or other returns to the river. It reflects the hydrology that existed prior to the development of water supply systems, or the hydrology that would exist if the effects of water diversions, reservoirs and return flows were removed. The Kremmling gage was used as an indicator gage of hydrologic conditions because it is centrally located in the study area and could be used for multiple locations. Average, wet and dry monthly diversions were developed based on the historical diversion data shown in **Table 2**. Wet diversions were assumed to be the average of the five wettest years, dry diversions the average of the five driest years, and average diversions the average of the remaining years. For example, 1952 which was classified as a wet year, therefore, it was filled with the monthly averages of the five wettest years. Hoosier Tunnel demands may be underestimated in September and October from 1953 through 1966 in average and wet years prior to Upper Blue Reservoir coming on-line in 1967. Since the years in which Green Mountain Reservoir does not fill are typically dry years, this would not affect Springs Utilities' substitution obligation or the manner in which their substitution releases are made. In addition, Upper Blue Reservoir is emptied every year, therefore, potential differences in reservoir EOM contents would not be carried forward from year to year. Because Hoosier Tunnel diversions in average and wet years are not anticipated to cause hydrologic effects under the Proposed Action alternative, September and October diversions attributable to Upper Blue Reservoir releases were not estimated for the period from 1953 through 1966. The modeled demand at the Hoosier Tunnel is shown in **Table 4.** In the CDSS Model, direct diversions and releases from Upper Blue Reservoir are made to meet the total demand at Hoosier Tunnel.

Homestake Project Operations

The Homestake Project is a transmountain diversion project that diverts water from the Eagle River basin for municipal use by Springs Utilities and Aurora. The Homestake Project has facilities located in both the Eagle and Arkansas River basins, however, this section describes the facilities in the Eagle River Basin since they are the focus of the EA. Facilities in the Eagle River basin include the Missouri Tunnel, Homestake Reservoir, and the Homestake Tunnel.

The Homestake Project has several direct flow water rights to divert water from the East Fork and Middle Fork of Homestake Creek, French Creek, Fancy Creek, Missouri Creek and Sopris Creek. Water diverted from French Creek, Fancy Creek, Missouri Creek and Sopris Creek is conveyed through the Missouri Tunnel

to Homestake Reservoir. The capacity of Homestake Reservoir is approximately 43,000 AF. All flows diverted into Homestake Reservoir, which is located on the Middle Fork of Homestake Creek, can be stored under a storage right. From Homestake Reservoir, water is delivered via Homestake Tunnel under the Continental Divide to Turquoise Lake, which is located in the Arkansas River Basin. The capacity of Homestake Tunnel is 300 cfs. The water rights associated with the Homestake Project that are included in the CDSS Model are summarized in **Table 5**.

Table 5. Summary of Homestake Project (Eagle River Basin) Absolute Water Rights

Name	Decreed Amount	Appropriation Date
East Fork Homestake Creek	70.8	Sep 22, 1952
French Creek	60.1	Sep 22, 1952
Fancy Creek	38.6	Sep 22, 1952
Missouri Creek	39.8	Sep 22, 1952
Sopris Creek	41.3	Sep 22, 1952
Subtotal	**250.6**	**Sep 22, 1952**
Missouri Tunnel	179.8	Sep 22, 1952
Homestake Project Tunnel[1]	300.0	Sep 22, 1952
Homestake Reservoir	43504.7 AF	Sep 22, 1952

[1] Absolute decree amount of 300 cfs for Homestake Project Tunnel may include storable inflows from Middle Fork Homestake Creek in addition to the 250.6 cfs from the collection system.

Historical diversions through the Homestake Tunnel are shown in **Table 6**. The average annual diversion was approximately 23,970 AF. Based on more recent operations (since approximately 1992), deliveries through Homestake Tunnel typically occur from March through August with occasional releases in September, October and November. Deliveries through the tunnel are greatest in March and April as water is released from Homestake Reservoir to make space available to store water during runoff.

Historical EOM contents for Homestake Reservoir are shown in **Table 7**. Water is stored in Homestake Reservoir during runoff and the reservoir generally fills by the end of June in average and wet years. Water is released to Homestake Tunnel primarily in March and April and in summer months to a lesser degree to supplement direct diversions. The operating rules in the CDSS Model for Homestake Reservoir reflect these historical operations.

Since the Homestake Project is a core component of Springs Utilities' water supply system, the demand placed at Homestake Tunnel was assumed to equal historical diversions from 1992 through 2005. Prior to 1992, operations were clearly different with diversions through Homestake Tunnel occurring throughout the year. From 1950 through 1991 the demand at Homestake Tunnel was estimated as follows. Each of those years was classified as average, wet or dry based on total natural flow from April through September at the USGS gage Colorado River near

Kremmling (#09058000). Average, wet and dry monthly diversions were developed based on historical diversion data from 1992 through 2007. Wet diversions were assumed to be the average of the five wettest years, dry diversions the average of the five driest years, and average diversions the average of the remaining years. Therefore, 1952 which was classified as a wet year was filled with the monthly averages of the five wettest years. The modeled demand at the Homestake Tunnel is shown in **Table 8.** In the CDSS Model, direct diversions and releases from Homestake Reservoir are made to meet the total demand at Homestake Tunnel.

Blue River Decree Operations

In the Blue River Decree (Consolidated Case Nos. 2782, 5016, and 5017), the relative priorities of the storage and hydroelectric rights for Green Mountain Reservoir and the upstream rights at Dillon Reservoir and the Continental-Hoosier System were specified as follows:

Continental-Hoosier System	77 cfs	August 5, 1929
Green Mountain Reservoir	154,645 AF	August 1, 1935
Green Mountain Hydro	1726 cfs	August 1, 1935
Green Mountain Senior Refill	6,315 AF	August 1, 1935
Roberts Tunnel	788 cfs	June 24, 1946
Dillon Reservoir	252,578 AF	June 24, 1946
Continental-Hoosier System[1]	400 cfs	May 13, 1948
Upper Blue Reservoir	2,140 AF	May 13, 1848

[1] The maximum diversion under the 1948 decrees is limited to 400 cfs.
Source: (CWCB, 2007b).

Under the Blue River Decree, Springs Utilities and Denver Water can divert and store water at their facilities which are upstream of Green Mountain Reservoir, on an out-of-priority basis against Green Mountain Reservoir's senior first fill storage right. The Blue River Decree also provides for replacement of power to mitigate impacts to Reclamation's operations resulting from Springs Utilities' exercising their 1948 water rights. The representation of Green Mountain Reservoir power and fill operations in the CDSS Model per the Blue River Decree is discussed below.

Green Mountain Reservoir Power Operations

Hydropower diversions at Green Mountain Reservoir are made under the direct flow hydropower right. The CDSS model also reflects Elliot Creek Feeder Canal diversions to demands at Green Mountain Reservoir for power generation. Baseline power demands are based on average use from 1975 through 1991. There would be no difference in hydropower diversions at Green Mountain Reservoir between the No Action and Proposed Action alternatives. Springs Utilities has historically provided replacement power year-to-year by mutual agreement with the Western Area Power Authority (WAPA) at a time and location

requested by WAPA. The only difference in power interference substitution would be the formalization of a long-term Power Interference Agreement with Reclamation and WAPA.

Green Mountain Reservoir Fill Operations

The CDSS Model is configured to represent the Interim Policy, which was adopted by the State Engineer and is the current administration of the Blue River Decree. The Blue River Decree has been administered under the Interim Policy since 2003. The State Engineer does not intend that the Interim Policy create any precedent binding on the U.S. Bureau of Reclamation or any other water user in the future. The U.S. Bureau of Reclamation does not endorse the administrative and accounting principles included in the Interim Policy.

The Interim Policy defines the administrative and accounting principles concerning Green Mountain Reservoir and specifically outlines the paper fill of Green Mountain Reservoir under its senior storage right. The paper fill is met when 154,645 acre-feet is equal to the sum of:

- Initial storage in Green Mountain Reservoir at the beginning of the administrative year, which is April 1st for modeling purposes,
- Stored water in Green Mountain Reservoir after the beginning of the administrative year,
- Bypassed water in excess of 60 cfs or the demand of a downstream call senior to August 1, 1935,
- Out-of-priority depletions from Historic User's Pool and Green Mountain Reservoir contract beneficiaries upstream of Green Mountain Reservoir, (this in not explicitly modeled in the CDSS Model because it is minor), and
- Out-of-priority diversions and storage made by Denver Water and Springs Utilities.

After the paper fill has been met Green Mountain's 1935 storage right is satisfied and can no longer place a call. Green Mountain Reservoir can continue to store under an October 5, 1955 priority date up to the amount of water stored and diverted out-of-priority to its 1935 right by Denver Water and Springs Utilities. When the amount stored under the October 5, 1955 priority date equals the out-of-priority diversions/storage by both entities, there is no substitution required.

The CDSS Model tracks Springs Utilities' direct diversions through the Hoosier Tunnel and water stored in Upper Blue Reservoir, which is out-of-priority to Green Mountain's senior storage right. As water is stored in Green Mountain Reservoir under the October 5, 1955 priority date, the out-of-priority obligation owed by Springs Utilities and Denver Water is reduced proportional to their out-of-priority diversions/storage. On August 1, the remaining out-of-priority obligation owed by Springs Utilities equals their substitution bill. Denver Water's substitution bill is calculated in a similar manner. The date of August 1st is assumed for modeling

purposes, and represents a proxy for the date that the senior Shoshone water right calls out Green Mountain Reservoir, thus ending its fill season and allowing for calculation of any fill deficit.

The only difference between the No Action and Proposed Action alternatives is the manner in which Springs Utilities substitution obligation is paid back. The model assumptions related to substitution payback that are specific to each alternative are summarized in Chapter 2 of the Environmental Assessment.

3.0 REFERENCES

Colorado Water Conservation Board. 2007a. Upper Colorado River Basin Information

Colorado Water Conservation Board, 2007b. Upper Colorado River Basin Water Resources Planning Model User's Manuel

Table 2
Historical Continental-Hoosier Tunnel Diversions (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1953	0	0	0	0	294	2,315	1,496	646	85	0	0	0	4,835
1954	0	0	0	0	1,060	1,404	1,048	42	0	0	0	0	3,554
1955	0	0	0	0	688	1,777	2,110	1,870	1,113	0	0	0	7,559
1956	0	0	0	0	2,205	4,760	1,843	492	0	0	0	0	9,300
1957	0	0	0	0	374	4,657	2,080	0	0	0	0	0	7,111
1958	0	0	0	0	3,042	2,126	1,249	0	0	0	0	0	6,417
1959	0	0	0	0	489	5,040	2,471	496	0	0	0	0	8,496
1960	0	0	0	0	901	4,608	2,386	315	0	0	0	0	8,210
1961	0	0	0	0	1,180	3,836	428	0	751	432	41	0	6,669
1962	0	0	0	0	1,524	4,998	3,087	1,393	87	0	0	0	11,088
1963	0	0	0	49	2,293	3,257	98	2,983	1,257	311	0	0	10,246
1964	0	0	0	0	1,839	3,452	2,542	1,429	0	0	0	0	9,263
1965	0	0	0	0	651	4,891	615	1,053	842	325	38	0	8,415
1966	0	0	0	0	1,311	2,404	2,732	1,009	0	0	0	0	7,456
1967	0	0	0	100	1,074	3,265	3,457	1,224	968	0	0	0	10,087
1968	0	0	0	0	644	5,099	2,473	898	1,148	1,108	0	0	11,369
1969	0	0	0	73	2,590	735	1,396	609	1,470	688	0	0	7,562
1970	0	0	0	0	1,542	743	131	1,584	1,433	1,880	0	0	7,313
1971	0	0	0	0	780	4,906	1,856	1,936	1,729	1,495	0	0	12,703
1972	0	0	0	0	1,422	3,448	1,626	1,609	973	0	0	0	9,079
1973	0	0	0	0	370	1,581	849	1,083	1,846	472	0	0	6,201
1974	0	0	0	0	1,202	4,033	2,074	1,222	1,855	0	0	0	10,386
1975	0	0	0	0	378	3,133	2,092	1,296	1,584	491	0	0	8,974
1976	0	0	0	0	1,013	4,566	1,993	1,598	1,282	0	0	0	10,452
1977	0	0	0	27	158	1,915	410	0	18	0	0	0	2,527
1978	0	0	0	49	684	4,762	1,088	1,241	1,822	0	0	0	9,646
1979	0	0	0	0	1,064	3,863	1,653	1,510	1,782	202	0	0	10,074
1980	0	0	0	0	188	1,678	1,595	2,068	0	0	0	0	5,528
1981	0	0	0	38	757	3,135	734	785	258	0	0	0	5,707
1982	0	0	0	0	603	4,236	3,370	1,263	1,230	892	0	0	11,593
1983	0	0	0	0	274	3,238	414	874	538	1,874	0	0	7,212
1984	0	0	0	0	968	1,763	741	739	1,373	1,065	0	0	6,650
1985	0	0	0	0	865	2,279	1,141	970	1,227	61	0	0	6,544
1986	0	0	0	0	989	5,625	2,541	1,809	1,818	1,059	0	0	13,842
1987	0	0	0	167	2,404	2,098	720	1,450	979	0	0	0	7,819
1988	0	0	0	14	1,212	5,470	1,691	761	1,205	0	0	0	10,353
1989	0	0	0	80	1,807	3,516	3,973	1,320	0	0	130	0	10,825
1990	0	0	0	7	996	5,148	2,851	2,102	26	0	0	0	11,130
1991	0	0	0	0	1,299	4,559	3,353	1,768	1,158	12	0	0	12,150
1992	0	0	0	86	2,318	3,627	3,425	1,958	156	0	0	0	11,571
1993	0	0	0	0	1,386	4,814	2,599	1,965	422	1,758	0	0	12,944
1994	0	0	0	103	1,652	4,272	148	15	1,241	831	0	0	8,262
1995	0	0	0	0	0	2,643	26	704	329	1,265	864	0	5,831
1996	0	0	0	0	462	5,823	1,422	1,004	1,382	333	0	0	10,426
1997	0	0	0	0	631	4,082	791	412	1,016	1,311	0	0	8,242
1998	0	0	0	0	676	1,489	3,570	775	1,898	295	0	0	8,703
1999	0	0	0	3	950	3,610	1,727	1,745	1,687	1,077	0	0	10,800
2000	0	0	0	0	2,232	3,693	1,686	1,451	0	0	0	0	9,062
2001	0	0	0	5	2,122	1,403	207	147	1,020	1,039	0	0	5,944
2002	0	0	0	49	756	1,549	0	0	0	0	0	0	2,354
2003	0	0	0	23	2,068	3,126	812	79	978	935	108	0	8,129
2004	0	0	0	119	1,334	2,525	1,180	48	19	0	0	0	5,224
2005	0	0	0	107	1,661	3,669	2,641	1,148	719	1,208	0	0	11,152
2006	0	0	0	235	2,213	4,696	2,781	1,447	652	4	95	0	12,125
2007	0	0	0	187	2,048	1,227	1,944	395	131	0	0	0	5,931
Average	**0**	**0**	**0**	**28**	**1,193**	**3,392**	**1,698**	**1,032**	**791**	**408**	**23**	**0**	**8,564**
Min	**0**	**0**	**0**	**0**	**0**	**735**	**0**	**0**	**0**	**0**	**0**	**0**	**2,354**
Max	**0**	**0**	**0**	**235**	**3,042**	**5,823**	**3,973**	**2,983**	**1,898**	**1,880**	**864**	**0**	**13,842**

Source: Data provided by Colorado Springs Utilities.

Table 3
Upper Blue Reservoir Historical End-of-Month Contents (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	172	1,334	2,219	1,018	0	0	0	0
1968	0	0	0	0	0	1,783	2,282	2,282	1,268	0	0	0
1969	0	0	0	77	776	1,857	2,282	2,282	786	0	0	0
1970	0	0	0	0	414	2,062	2,119	2,119	1,818	0	0	0
1971	0	0	0	0	0	1,496	2,119	2,119	1,414	0	0	0
1972	0	0	0	0	0	1,621	2,119	1,001	0	0	0	0
1973	0	0	0	0	0	1,374	2,119	2,006	575	0	0	0
1974	0	0	0	0	0	1,931	2,119	1,850	0	0	0	0
1975	0	0	0	0	0	788	2,119	2,119	572	0	0	0
1976	0	0	0	0	0	910	2,119	1,496	0	0	0	0
1977	0	0	0	0	246	1,042	614	614	0	0	0	0
1978	0	0	0	0	162	1,840	2,119	1,796	0	0	0	0
1979	0	0	0	0	332	1,664	2,119	1,978	295	0	0	0
1980	0	0	0	0	0	1,751	1,621	0	0	0	0	0
1981	0	0	0	26	176	573	870	219	0	0	0	0
1982	0	0	0	0	0	1,253	2,119	2,119	946	0	0	0
1983	0	0	0	0	0	1,111	2,119	2,119	2,073	0	0	0
1984	0	0	0	0	0	1,376	2,119	2,119	1,281	0	0	0
1985	0	0	0	0	0	1,432	1,377	1,076	111	0	0	0
1986	0	0	0	0	80	1,990	2,119	2,095	1,178	0	0	0
1987	0	0	0	0	200	1,623	2,013	1,292	0	0	0	0
1988	0	0	0	0	0	2,119	2,119	1,596	330	0	0	0
1989	0	0	0	36	508	1,638	974	0	0	0	0	0
1990	0	0	0	0	298	2,095	2,119	144	0	0	0	0
1991	0	0	0	0	325	1,751	2,119	1,176	95	0	0	0
1992	0	0	0	0	614	1,734	2,119	310	0	0	0	0
1993	0	0	0	0	69	1,251	2,119	2,119	1,824	0	0	0
1994	0	0	0	0	480	2,119	2,119	2,119	958	0	0	0
1995	0	0	0	0	0	1,324	2,119	2,119	2,119	968	0	0
1996	0	0	0	0	109	2,119	2,119	1,725	523	0	0	0
1997	0	0	0	0	130	1,886	2,119	2,119	1,416	0	0	0
1998	0	0	0	0	212	1,158	2,119	2,119	404	0	0	0
1999	0	0	0	0	121	1,973	2,119	2,119	1,195	0	0	0
2000	0	0	0	0	551	2,010	1,621	0	0	0	0	0
2001	0	0	0	0	488	2,001	2,119	2,119	1,221	146	0	0
2002	0	0	0	22	321	961	961	961	961	508	0	0
2003	0	0	0	0	577	2,124	2,124	2,124	1,194	304	0	0
2004	0	0	0	70	422	1,457	1,891	1,891	1,875	557	0	0
2005	0	0	0	27	526	1,701	2,124	2,124	1,443	216	0	0
2006	0	0	0	0	557	2,124	2,122	1,233	326	292	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0
Average	**0**	**0**	**0**	**5**	**189**	**1,369**	**1,661**	**1,316**	**600**	**64**	**0**	**0**
Min	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Max	**0**	**0**	**0**	**77**	**776**	**2,124**	**2,282**	**2,282**	**2,119**	**968**	**0**	**0**

Source: Data provided by Colorado Springs Utilities. Data were not available from 1962 through 1966.

Table 4
Hoosier Tunnel Demands (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Yr Type
1950	0	0	0	24	1,231	3,383	1,691	1,046	1,017	516	0	0	8,525	Avg
1951	0	0	0	24	1,231	3,383	1,691	1,046	1,017	516	0	0	8,525	Avg
1952	0	0	0	47	1,334	4,920	2,626	1,785	1,156	866	0	0	12,753	Wet
1953	0	0	0	0	294	2,315	1,496	646	85	0	0	0	4,835	
1954	0	0	0	0	1,060	1,404	1,048	42	0	0	0	0	3,554	
1955	0	0	0	0	688	1,777	2,110	1,870	1,113	0	0	0	6,446	
1956	0	0	0	0	2,205	4,760	1,843	492	0	0	0	0	9,300	
1957	0	0	0	0	374	4,657	2,080	0	0	0	0	0	7,111	
1958	0	0	0	0	3,042	2,126	1,249	0	0	0	0	0	6,417	
1959	0	0	0	0	489	5,040	2,471	496	0	0	0	0	8,496	
1960	0	0	0	0	901	4,608	2,386	315	0	0	0	0	8,210	
1961	0	0	0	0	1,180	3,836	428	0	751	432	41	0	6,685	
1962	0	0	0	0	1,524	4,998	3,087	1,393	87	0	0	0	11,088	
1963	0	0	0	49	2,293	3,257	98	2,983	1,257	311	0	0	10,246	
1964	0	0	0	0	1,839	3,452	2,542	1,429	0	0	0	0	9,263	
1965	0	0	0	0	651	4,891	615	1,053	842	325	38	0	8,415	
1966	0	0	0	0	1,311	2,404	2,732	1,009	0	0	0	0	7,456	
1967	0	0	0	100	1,074	3,265	3,457	1,224	968	0	0	0	10,087	
1968	0	0	0	0	644	5,099	2,473	898	1,148	1,108	0	0	11,369	
1969	0	0	0	73	2,590	735	1,396	609	1,470	688	0	0	7,562	
1970	0	0	0	0	1,542	743	131	1,584	1,433	1,880	0	0	7,313	
1971	0	0	0	0	780	4,906	1,856	1,936	1,729	1,495	0	0	12,703	
1972	0	0	0	0	1,422	3,448	1,626	1,609	973	0	0	0	9,079	
1973	0	0	0	0	370	1,581	849	1,083	1,846	472	0	0	6,201	
1974	0	0	0	0	1,202	4,033	2,074	1,222	1,855	0	0	0	10,386	
1975	0	0	0	0	378	3,133	2,092	1,296	1,584	491	0	0	8,974	
1976	0	0	0	0	1,013	4,566	1,993	1,598	1,282	0	0	0	10,452	
1977	0	0	0	27	158	1,915	410	0	18	0	0	0	2,527	
1978	0	0	0	49	684	4,762	1,088	1,241	1,822	0	0	0	9,646	
1979	0	0	0	0	1,064	3,863	1,653	1,510	1,782	202	0	0	10,074	
1980	0	0	0	0	188	1,678	1,595	2,068	0	0	0	0	5,528	
1981	0	0	0	38	757	3,135	734	785	258	0	0	0	5,707	
1982	0	0	0	0	603	4,236	3,370	1,263	1,230	892	0	0	11,593	
1983	0	0	0	0	274	3,238	414	874	538	1,874	0	0	7,212	
1984	0	0	0	0	968	1,763	741	739	1,373	1,065	0	0	6,650	
1985	0	0	0	0	865	2,279	1,141	970	1,227	61	0	0	6,544	
1986	0	0	0	0	989	5,625	2,541	1,809	1,818	1,059	0	0	13,842	
1987	0	0	0	167	2,404	2,098	720	1,450	979	0	0	0	7,819	
1988	0	0	0	14	1,212	5,470	1,691	761	1,205	0	0	0	10,353	
1989	0	0	0	80	1,807	3,516	3,973	1,320	0	0	130	0	10,825	
1990	0	0	0	7	996	5,148	2,851	2,102	26	0	0	0	11,130	
1991	0	0	0	0	1,299	4,559	3,353	1,768	1,158	12	0	0	12,150	
1992	0	0	0	86	2,318	3,627	3,425	1,958	156	0	0	0	11,571	
1993	0	0	0	0	1,386	4,814	2,599	1,965	422	1,758	0	0	12,944	
1994	0	0	0	103	1,652	4,272	148	15	1,241	831	0	0	8,262	
1995	0	0	0	0	0	2,643	26	704	329	1,265	864	0	5,831	
1996	0	0	0	0	462	5,823	1,422	1,004	1,382	333	0	0	10,426	
1997	0	0	0	0	631	4,082	791	412	1,016	1,311	0	0	8,242	
1998	0	0	0	0	676	1,489	3,570	775	1,898	295	0	0	8,703	
1999	0	0	0	3	950	3,610	1,727	1,745	1,687	1,077	0	0	10,800	
2000	0	0	0	0	2,232	3,693	1,686	1,451	0	0	0	0	9,062	
2001	0	0	0	5	2,122	1,403	207	147	1,020	1,039	0	0	5,944	
2002	0	0	0	49	756	1,549	0	0	0	0	0	0	2,354	
2003	0	0	0	23	2,068	3,126	812	79	978	935	108	0	8,129	
2004	0	0	0	119	1,334	2,525	1,180	48	19	0	0	0	5,224	
2005	0	0	0	107	1,661	3,669	2,641	1,148	719	1,208	0	0	11,152	
Average	**0**	**0**	**0**	**21**	**1,164**	**3,434**	**1,690**	**1,050**	**820**	**434**	**21**	**0**	**8,602**	

Notes:
Values from 1950 through 1952 were estimated because the Continental-Hoosier System did not come on-line until 1953.

Table 6
Historical Homestake Tunnel Diversions (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1967	0	0	0	0	0	0	0	1,035	756	52	0	0	1,842
1968	0	0	0	2,801	7,841	0	0	0	1,171	2,647	2,570	2,412	19,441
1969	4,511	4,764	5,677	4,298	0	0	0	2,365	1,850	163	1,490	3,017	28,135
1970	1,555	1,372	3,073	3,159	0	0	856	3,202	2,592	4,659	4,357	1,220	26,044
1971	772	3,996	4,957	4,630	0	0	0	4,042	2,277	3,171	2,905	965	27,714
1972	899	2,567	3,870	3,615	0	0	0	290	261	143	1,094	2,731	15,470
1973	3,858	3,034	2,038	4,803	5,460	2,359	1,483	0	0	0	0	906	23,941
1974	955	3,092	6,683	5,185	4,987	2,726	767	0	0	0	0	0	24,394
1975	0	0	0	7,460	14,417	7,712	8,108	12,770	9,963	0	0	0	60,430
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	2,594	10,891	6,194	6,046	5,594	0	0	0	0	0	31,318
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	17,634	13,381	0	0	0	0	0	0	0	4,536	35,550
1980	7,281	7,896	2,361	6,157	5,877	0	0	0	0	430	0	300	30,303
1981	6,634	6,166	10,141	155	0	0	0	0	0	0	45	3,883	27,024
1982	4,711	4,209	4,617	2,247	0	0	0	0	0	0	0	0	15,784
1983	6,522	6,960	7,663	1,605	0	0	0	0	0	0	776	0	23,526
1984	0	0	2,729	0	1,678	3,132	4,229	12,684	2,533	0	0	1,246	28,232
1985	0	0	2,426	887	0	1,310	2,343	1,793	148	0	0	0	8,907
1986	0	0	0	0	7,714	4,348	3,011	1,732	95	0	0	3,468	20,368
1987	3,558	3,291	3,546	6,667	0	0	0	0	0	0	0	0	17,063
1988	7,689	7,666	0	0	0	0	0	2,482	4,896	5,442	4,737	0	32,913
1989	0	0	0	1,700	3,820	1,484	2,648	3,701	3,538	1,206	0	0	18,097
1990	0	0	0	0	0	0	5,394	5,513	15,065	203	0	0	26,176
1991	0	0	0	0	0	0	119	152	38	2,753	4,293	0	7,354
1992	0	0	5,056	5,326	0	0	0	2,339	5,596	303	0	0	18,620
1993	0	0	9,024	7,616	0	2,114	8,190	1,048	22	0	0	0	28,014
1994	0	0	8,535	10,462	0	2,928	0	0	2,331	11,390	0	0	35,645
1995	0	0	312	15,250	0	1	4,414	3,687	0	0	0	0	23,664
1996	0	0	7,255	14,852	1,730	7,237	6,372	1,131	0	0	0	0	38,577
1997	0	0	9,795	14,712	0	4,146	5,981	2,612	0	409	0	0	37,655
1998	0	0	8,146	725	951	6,702	6,897	1,084	0	0	0	0	24,505
1999	0	0	8,445	14,760	3,302	0	3,218	1,304	275	0	0	0	31,303
2000	0	0	4,453	9,510	0	7,530	780	382	392	0	0	0	23,048
2001	0	0	8,933	16,977	8,997	0	0	509	0	1,093	3,735	0	40,244
2002	0	0	5,312	10,584	0	0	0	3,006	2,589	0	0	0	21,491
2003	0	0	0	0	0	9,843	0	0	0	14,010	0	0	23,853
2004	0	0	212	8,713	0	0	0	0	0	0	0	0	8,925
2005	0	0	8,036	14,926	431	0	0	0	0	0	0	0	23,394
2006	0	9,031	9,309	6,208	7,607	0	0	0	10	0	0	0	32,163
2007	0	0	9,677	2,564	8,552	0	0	4	0	0	851	0	21,648
Average	**1,194**	**1,562**	**4,451**	**5,679**	**2,184**	**1,698**	**1,717**	**1,680**	**1,375**	**1,173**	**655**	**602**	**23,970**
Min	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Max	**7,689**	**9,031**	**17,634**	**16,977**	**14,417**	**9,843**	**8,190**	**12,770**	**15,065**	**14,010**	**4,737**	**4,536**	**60,430**

Source: Data provided by Colorado Springs Utilities.

Table 7
Homestake Historical End-of-Month Contents (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1966	0	0	0	0	0	0	0	1,259	1,259	1,078	1,069	1,069
1967	1,069	1,069	1,069	1,069	9,493	22,020	26,038	25,003	24,247	24,196	24,196	24,196
1968	24,196	24,196	24,196	21,395	13,554	28,529	31,782	34,825	33,654	31,008	28,438	26,027
1969	21,515	16,751	11,075	6,776	16,710	27,643	32,175	29,811	27,961	27,798	26,308	23,291
1970	21,736	20,363	17,291	14,132	24,218	42,145	41,289	38,087	35,495	30,836	26,480	25,260
1971	24,488	20,492	15,536	10,906	13,985	23,176	26,890	22,848	20,571	17,400	14,495	13,530
1972	12,631	10,064	6,194	2,579	6,709	25,480	29,465	29,175	28,914	28,771	27,677	24,946
1973	20,948	17,651	15,452	10,817	8,095	22,432	32,407	33,489	33,303	32,906	32,664	31,567
1974	30,605	27,708	20,875	15,591	19,766	32,591	35,244	35,274	34,705	34,445	34,127	33,788
1975	33,414	33,022	32,694	25,555	13,201	18,293	24,353	11,811	76	76	76	76
1976	76	76	76	76	7,968	19,574	23,387	23,429	23,132	23,122	22,832	22,822
1977	22,822	22,822	20,628	9,701	6,305	6,324	76	76	76	76	76	76
1978	76	76	76	194	5,625	25,741	38,345	39,059	38,842	38,609	38,355	38,347
1979	38,347	38,347	21,314	7,332	13,167	27,296	38,678	39,255	39,255	39,003	38,994	34,653
1980	27,411	19,281	16,594	10,953	7,640	25,799	32,139	32,288	32,288	31,858	31,843	31,743
1981	25,134	18,965	9,025	8,585	13,270	23,863	24,379	24,379	24,379	24,379	24,379	20,602
1982	15,892	11,681	7,062	4,667	7,409	24,612	35,458	37,093	37,093	37,093	37,093	37,093
1983	30,822	23,852	16,193	14,343	15,296	32,402	43,368	43,334	43,334	43,334	42,557	42,557
1984	42,557	42,557	39,828	39,828	39,828	42,652	40,307	29,245	26,214	26,214	26,166	24,822
1985	24,822	24,822	22,474	21,509	33,764	42,683	43,647	42,007	41,799	41,799	41,799	41,799
1986	41,799	41,799	41,799	41,799	34,379	43,539	43,539	39,472	39,232	39,232	39,232	35,880
1987	32,326	29,031	25,483	19,139	28,823	38,499	39,459	39,009	38,615	38,297	38,003	37,993
1988	30,582	22,637	14,632	14,632	17,973	33,717	35,176	32,736	28,730	23,735	17,182	16,964
1989	16,964	16,964	16,964	15,160	19,323	27,013	25,268	21,100	17,247	15,681	15,681	15,681
1990	15,681	15,681	15,681	15,786	21,003	35,643	31,872	25,772	9,943	9,112	9,112	9,112
1991	9,113	9,113	9,113	9,113	16,605	31,761	35,893	35,912	35,795	32,989	28,600	28,600
1992	28,560	28,560	22,927	18,228	29,180	38,785	41,852	39,273	33,625	33,511	33,502	33,491
1993	33,491	33,491	24,427	16,785	24,980	39,557	42,547	42,557	42,480	42,447	42,447	42,447
1994	42,447	42,447	33,885	23,534	32,933	42,824	42,734	42,641	40,281	28,875	28,875	28,875
1995	28,875	28,875	28,563	13,309	15,328	33,288	42,881	42,681	42,881	42,881	42,881	42,881
1996	42,881	42,881	35,624	20,772	28,986	41,782	41,915	40,893	40,893	40,893	40,893	40,893
1997	40,893	40,581	30,784	16,071	24,862	42,314	42,814	42,614	42,814	42,471	42,471	42,471
1998	42,471	42,186	34,025	33,300	39,816	42,881	41,650	41,617	41,617	41,617	41,617	41,538
1999	41,247	41,214	32,769	18,009	21,278	39,041	42,280	42,447	42,172	42,172	42,172	42,172
2000	42,172	42,172	37,394	28,210	40,893	42,180	42,903	42,521	42,129	42,129	42,129	42,129
2001	42,129	42,129	33,196	16,219	19,400	31,443	32,928	32,419	32,419	31,326	27,591	27,403
2002	27,185	27,185	21,873	11,289	19,288	22,987	22,987	19,643	17,054	17,055	17,055	17,055
2003	17,055	17,055	17,055	17,322	27,699	33,169	35,986	35,986	35,978	21,811	21,811	21,814
2004	21,911	21,959	21,599	13,549	23,284	32,844	34,989	34,989	34,989	34,928	34,989	34,848
2005	34,763	35,034	26,998	12,337	20,171	34,035	38,721	39,202	39,106	39,589	39,589	39,460
2006	39,686	30,688	21,436	16,396	20,772	35,862	40,909	41,122	41,254	41,188	41,254	41,024
2007	40,958	41,057	31,412	29,737	32,227	42,747	42,848	42,548	42,414	42,747	41,948	41,948
Average	**26,946**	**25,394**	**20,840**	**15,398**	**19,886**	**31,409**	**34,323**	**33,069**	**31,625**	**30,445**	**29,730**	**29,118**
Min	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**76**	**76**	**76**	**76**	**76**
Max	**42,881**	**42,881**	**41,799**	**41,799**	**40,893**	**43,539**	**43,647**	**43,334**	**43,334**	**43,334**	**42,881**	**42,881**

Source: Data provided by Colorado Springs Utilities.

Table 8
Homestake Tunnel Demands (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Yr Type
1950	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1951	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1952	0	1,806	8,765	12,642	3,667	2,862	2,471	850	468	2,578	747	0	36,857	Wet
1953	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1954	0	0	4,942	7,339	1,710	1,506	156	1,146	1,715	61	170	0	18,746	Dry
1955	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1956	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1957	0	1,806	8,765	12,642	3,667	2,862	2,471	850	468	2,578	747	0	36,857	Wet
1958	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1959	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1960	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1961	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1962	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1963	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1964	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1965	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1966	0	0	4,942	7,339	1,710	1,506	156	1,146	1,715	61	170	0	18,746	Dry
1967	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1968	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1969	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1970	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1971	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1972	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1973	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1974	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1975	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1976	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1977	0	0	4,942	7,339	1,710	1,506	156	1,146	1,715	61	170	0	18,746	Dry
1978	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1979	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1980	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1981	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1982	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1983	0	1,806	8,765	12,642	3,667	2,862	2,471	850	468	2,578	747	0	36,857	Wet
1984	0	1,806	8,765	12,642	3,667	2,862	2,471	850	468	2,578	747	0	36,857	Wet
1985	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1986	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1987	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1988	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1989	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1990	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg
1991	0	0	5,661	8,880	781	3,110	3,786	1,187	49	2,335	0	0	25,789	Avg

Table 8
Homestake Tunnel Demands (AF)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Yr Type
1992	0	0	5,056	5,326	0	0	0	2,339	5,596	303	0	0	18,620	
1993	0	0	9,024	7,616	0	2,114	8,190	1,048	22	0	0	0	28,014	
1994	0	0	8,535	10,462	0	2,928	0	0	2,331	11,390	0	0	35,645	
1995	0	0	312	15,250	0	1	4,414	3,687	0	0	0	0	23,664	
1996	0	0	7,255	14,852	1,730	7,237	6,372	1,131	0	0	0	0	38,577	
1997	0	0	9,795	14,712	0	4,146	5,981	2,612	0	409	0	0	37,655	
1998	0	0	8,146	725	951	6,702	6,897	1,084	0	0	0	0	24,505	
1999	0	0	8,445	14,760	3,302	0	3,218	1,304	275	0	0	0	31,303	
2000	0	0	4,453	9,510	0	7,530	780	382	392	0	0	0	23,048	
2001	0	0	8,933	16,977	8,997	0	0	509	0	1,093	3,735	0	40,244	
2002	0	0	5,312	10,584	0	0	0	3,006	2,589	0	0	0	21,491	
2003	0	0	0	0	0	9,843	0	0	0	14,010	0	0	23,853	
2004	0	0	212	8,713	0	0	0	0	0	0	0	0	8,925	
2005	0	0	8,036	14,926	431	0	0	0	0	0	0	0	23,394	
Average	**0**	**129**	**5,920**	**9,425**	**1,117**	**2,952**	**3,191**	**1,170**	**356**	**2,133**	**129**	**0**	**26,522**	

Notes:
Values from 1950 through 1991 were estimated because operations of the Homestake Project prior to 1992 were different than current operations.