

VII - WATER CONTROL PLAN

7-01. General Objectives. Regulation of Saylorville Lake in conjunction with Lake Red Rock provides flood control benefits along both the Des Moines and Mississippi Rivers. Additionally, a permanent conservation pool provides storage for water supply, water quality and fish and wildlife enhancement, and a multitude of recreational opportunities. A final objective provides for a drought contingency regulation which effectively rations water during extended drought periods.

7-02. Constraints. The maximum release at the outlet is controlled by the pool elevation. As can be seen from plate 2-8 the pool must be above elevation 851 feet NGVD to release 16,000 cubic feet per second.

Physical modeling of the outlet and stilling basin has shown that optimum hydraulic efficiency is influenced by the positions of the inlet gates. Plate 7-1 shows the optimum position of the middle gate (number 2) as a function of total discharge and pool elevation. The remaining discharge is divided equally between the other two gates.

The authorized plan of regulation considers several constraints regarding downstream channel capacity, flooding near Des Moines, approximate flood control storage balancing between Lake Red Rock and Saylorville Lake, emergency reservoir level, water supply requirements and minimum low-flow requirements. Regulation of the conservation pool for low-flow augmentation has priority over recreation, and water supply has priority over both recreation and water quality.

7-03. Overall Plan for Water Control. The comprehensive plan of regulation for the Des Moines River includes Saylorville Lake, Lake Red Rock and the City of Des Moines Flood Control Project. Saylorville Lake is regulated with Lake Red Rock providing for tandem regulation for flood control. About 75 percent of the flood damage in the Des Moines River Basin occurs along the river between the mouth and the city of Des Moines, inclusive. Flood control storage at each reservoir is kept approximately at the same percentage with due regard to other operational constraints. A release of 16,000 cfs which is greater than the channel capacity immediately downstream of the dam, necessitated the acquisition of a floodway corridor between the dam and the city of Des Moines.

Other components of the overall plan for water control are Big Creek Remedial Works and the Des Moines Local Flood Protection Works. For conservation storage, the plan of operation is to

provide a minimum low-flow in downstream reaches and furnish water supply to the State of Iowa for consumptive use.

Integrated components of the Saylorville Lake project are as follows:

- (1) Lake Red Rock for flood control.
- (2) Des Moines Local Flood Protection Works for flood control.
- (3) Floodway corridor for flood damage reduction and recreation.
- (4) Big Creek Remedial Works for flood control and recreation.
- (5) Saylorville conservation pool for water supply and low-flow augmentation.

7-04. Standing Instructions to Project Personnel.

These instructions, as listed in Exhibit C of this manual, are furnished to the Operations Manager. They outline the steps to be taken by the Operations Manager for collecting and transmitting hydrologic data and reading and recording of all gages and gate settings on the dam when communication with the District Office is disrupted.

An "emergency" is considered to exist when communication by either email, computer, or telephone cannot be established between the Operations Manager and the Water Control Section during a significant period, and gate changes are necessary. Emergency situations can be minor in nature or of a magnitude demanding immediate action. During such situations, the operation of the reservoir is in accordance with provisions contained in the Standing Instructions listed in Exhibit C of this manual.

7-05. Flood Control. Techniques pertaining to the regulation of storage allocated to flood control in Saylorville Lake may be classified as method C, defined in EM 1110-2-3600. This provides for maximum damage reduction during ordinary flood events until the lower part of the storage is filled and then provides a fixed schedule of releases to assure greater control of larger flood volumes of approximate design magnitude.

The Reservoir Regulation Schedule, Exhibit C, has been prepared to achieve the objectives outlined in paragraph 7-01, insofar as possible. Maximum reduction in discharge at downstream control stations is provided during periods when there is less utilization of flood control storage. As more storage capacity is utilized, the degree of downstream protection is reduced. For reduction of flooding at Des Moines, about 61 percent of the

reservoir flood control capacity is utilized prior to the emergency level of 875 feet NGVD. The reservoir regulation schedule is given in the Standing Instructions in exhibit C of this manual.

Saylorville Lake will operate with the downstream control point at the SE 6th Street gage at Des Moines (DESI4), keeping the storage in balance with Lake Red Rock, insofar as possible for seasonal conservation pool levels (836/838 feet NGVD), and 860 feet NGVD.

Flood stage at the SE 6th Street gage is 24 feet, which corresponds to a flow of approximately 30,000 cfs. If the lake level is between conservation pool (836/838 feet NGVD, and 875 feet NGVD), regulation will be made to keep the discharge at the control point to below 30,000 cfs. Inflows will be released up to a maximum outflow of 12,000 cfs in the growing season (21 April to 15 December) or a maximum outflow of 16,000 cfs in the non-growing season (16 December to 20 April). Minimum release during flood events will be 2,000 cfs. This corresponds to a downstream channel depth of 2 to 3 feet. In complying with these constraints, the maximum change of daily outflow rates will be limited to 3,000 cfs, except under the emergency operation schedule (elevation 875 feet NGVD).

Normal flood control operation (Exhibit C, Schedule A) is accomplished by regulation of releases through operation of three inlet gates. The basic objective is to release the maximum permissible outflow as limited by the conduit capacity and other constraints outlined above.

The emergency operation schedule takes effect when the pool level is at or forecast to be between elevations 875 and 884 feet NGVD. This is equivalent to the Intermediate Magnitude Flood described in the Regulation Schedule (Exhibit C, Schedule B). Above this level, the Large Magnitude Flood Operation Schedule (Exhibit C, Schedule C) will be followed, and all other constraints will be disregarded.

It is possible that some floods will be experienced in which the flood volume will exceed the flood control capacity of the reservoir at elevation 890 feet NGVD, with release rates limited to the capacity of the outlet conduits. When floods of sufficient volume and magnitude are at or forecast to exceed elevation 884 feet NGVD, pneumatic crest gates along the emergency spillway are raised. The pneumatic crest gates prohibit spillway flow until pool elevation 890 NGVD is exceeded.

a. Reservoir Flood Pool Rising. Emergency flood release rates from 12,000/16,000 cfs at 875 feet to 21,000 cfs at elevation 884 feet NGVD are accomplished by operation of the conduit as specified in the regulation schedule (Exhibit C,

Schedule C). The release rate above 884 feet NGVD is held at 21,000 cfs (fully open conduit) until pool elevation 889 feet NGVD is reached. At 889 feet NGVD, and if the pool is forecast to exceed elevation 890 feet NGVD, the pneumatic crest gates are gradually lowered, as necessary, so that the combined outflow from the fully open conduit and the spillway is 42,000 cfs at elevation 890 feet.

b. Reservoir Flood Pool Falling. Above 890 feet NGVD, no further regulation is attempted. After the reservoir level has crested and the lake level falls below elevation 890.0 feet NGVD, the sluice gates controlling flow through the conduit are adjusted to reduce the combined spillway/conduit discharge from 42,000 cfs at elevation 890.0 feet NGVD to 21,000 cfs at elevation 889.0 feet NGVD. Between elevation 890 and 889 feet, outflow release rates will be no less than the inflow to the reservoir. Between elevation 889.0 feet and 884.0 feet the conduit discharge will be adjusted to maintain a combined spillway/conduit discharge of 21,000 cfs. At the spillway crest elevation 884.0 feet, full conduit flow of 21,000 cfs will be maintained to elevation 875.0 feet NGVD. At elevation 875.0 feet NGVD, release rates revert to normal flood control operation.

7-06. Recreation. Saylorville Lake has many recreational opportunities that are supplied by the Corps of Engineers including boat ramps, swimming beaches, campsites, and trails. The Corps builds, staffs, and maintains these facilities but does not specifically regulate the reservoir for them.

A number of conditions occasionally occur which affect recreational activities at the lake. Long-term drought can leave boat ramps landlocked while reduced outflows can limit fishing in the tailwater area. Conversely, floods may inundate boat ramps, parking lots, picnic areas, and trails. While high velocity outflows can improve fishing downstream of the reservoir it also produces dangerous turbulence in and just downstream of the stilling basin. This can produce a life-threatening situation for fishermen and boaters choosing to ignore warnings and enter the restricted area near the outlet structure.

7-07. Water Quality. Water quality releases are intended to be met at least 90 percent of the time as defined in the Post Authorization Report. Water quality objectives are part of the authorized project purposes contained in the document (S/D 9/85/1). The objectives are met by maintaining a minimum flow of 200 cfs from the dam to the confluence with the Raccoon River, 270 cfs from the confluence to the sewage treatment plant (Des Moines river mile 199), and 300 cfs below that point. The flows are measured at the Runnels, Iowa gage. This gage is funded by the State of Iowa. The Water Supply contract requires that the

Board of Water Works Trustees of the City of Des Moines and Iowa Southern Utilities reimburse the State of Iowa for gage operation.

7-08. Fish and Wildlife. The pool is normally maintained at elevation 836 feet NGVD. At the written request of the Iowa Department of Natural Resources (IDNR) the pool may be raised gradually to elevation 838 feet NGVD in the fall. The request by IDNR should be sent to the Chief, CEMVR-ED-H by September 1 each year. Raising the fall conservation pool benefits waterfowl by enhancing their vegetative habitat. The timing of raising the lake elevation can greatly enhance the waterfowl food supply on the shoreline of the pool. In addition, large numbers of shore birds are use the upper portion of the conservation pool. The pool can be held at the 838.0 NGVD level until 1 March when it is lowered to the normal 836.0 NGVD level after the ice is lost.

7-09. Water Supply. Water Supply objectives are to augment Des Moines River flows during all periods with 99 percent reliability while maintaining a steady pool at 836 feet NGVD in the summer and 838 feet NGVD in the fall, if requested by the IDNR.

This amounts to 12.57% of the storage space (estimated at 9930 acre-feet) after reduction for sediment deposits allocated to Board of Water Trustees for the City Des Moines. In addition, 6.29% (estimated at 4970 acre-feet) after sediment deposits are allocated to Iowa Southern Utilities. The 18.86% or 14,900 acre-feet of storage after 25 years of sediment deposits is between elevations 812 and 836 feet NGVD. The storage space allocated has been estimated sufficient to provide a continuous flow of 75 cfs with a reliability of 99%. This estimate is based on water supply having priority over other water uses below elevation 823.5 NGVD.

The conservation pool of 836 feet NGVD is 3 feet higher than the original conservation pool was authorized in order to supply the State of Iowa with water for consumptive use for a 25-year period. The average water supply release of 75 cfs is made throughout the year, but the monthly release is varied according to requirements. Monthly consumptive water supply releases are shown in Exhibit C page E-C-7. The normal minimum release at Saylorville Lake is 200 cfs plus water supply demand. More than 200 cfs will be released if necessary so as to keep a flow of 270 cfs at SE 6th Street in Des Moines and maintain a flow of 300 cfs at Ottumwa. These minimum releases will be met until the pool falls to elevation 827.0 feet NGVD, at which time rationing will begin for water quality releases. This release schedule is shown in Exhibit C Schedule D.

7-10. Drought Contingency. During low-flow periods, the reservoir will attempt to maintain flows for water quality and water supply in accordance with the schedule shown in Exhibit C. This regulation schedule was developed by simulating reservoir operation over the period of record. Although the selected regulation plan proved to be effective for historic droughts, it does not guarantee that it will be the most effective plan for future droughts. Therefore, this plan of operation will be followed unless some unforeseen circumstance indicates that a different regulation procedure would serve the region better.

During a severe drought, it is important to develop an operating scheme for levels below the full conservation pool level, which attempt to minimize deficits in demand as much as possible. One means of systematizing an operating scheme is by using a hedging rule. In the case of this study, a hedging rule involves a system of rationing based on pool levels. The philosophy behind the rule is that small deficits should be encouraged during the early months of a drought to avoid severe deficits later.

In assessing the effects of a worsening drought the Rock Island District assembles the views of State agencies, local governments, and large industrial users of water. Possible changes to Exhibit C, Schedule D, might be to advance or delay the point where rationing begins or to change water supply releases from a monthly to a weekly schedule. A more detailed discussion concerning drought contingency can be found in Appendix C, Master Reservoir Regulation Manual, Drought Contingency Plan-October 1992, Lake Red Rock and Saylorville Lake.

7-11. Flood Emergency Action Plans. The U.S. Army Corps of Engineers last published an Emergency Action Plan that addresses extremely rare flow events from Saylorville Dam in April 1995. The included notification chart is updated on an annual basis. Copies of the Emergency Action Plan are available at the U.S. Army Corps of Engineers, Rock Island District Office in the following offices: Water Control, Emergency Management, and the Engineering Division. The Emergency Action Plan is also available at the Administration Office located at the Saylorville Dam.

7-12. Other. At times the reservoir may have to be regulated for health or safety reasons or to aid construction efforts upstream or downstream of the dam. Deviations are discussed in the following paragraphs. If emergency drawdown is warranted, the basic guidelines for such operations will be in accordance with ER 1110-2-50, dated 7 August 1972. Drawdown time requirements for various average inflow rates are shown on plate 7-2.

Periodically it is necessary to keep local interests affected by reservoir operation informed of forecasted water levels. Downstream areas are affected by major changes in release rates. The Public Affairs Office for the District is responsible for issuing informational bulletins to area news media for public dissemination. The Water Control Section furnishes basic information for the releases. Under certain emergency conditions, as described under flood warnings in the Standing Instructions listed in Exhibit C of this manual, the Operations Manager will keep the public informed of changes in reservoir outflow rates.

7-13. Deviation from Normal Regulation. The District Commander is occasionally requested to deviate from normal regulation of the reservoir. Prior approval is required from the Division Commander except as noted in subparagraph "a" below. Depending on the time frame, formal request for a deviation from normal regulation should be sent to the Division Engineer by letter or electronic mail. The communication should tell what the desired deviation is, why it is needed, and how long it will last. In the case of a dire emergency, notification of the deviation should be sent to the Division Engineer as soon as possible before, during, or after the deviation has taken place.

a. Emergencies. Some emergencies such as drowning, accidents, chemical spills or other temporary pollution problems require water control actions be taken immediately unless such actions would create equal or worse conditions. The Division Commander must be informed of the nature of the deviation as soon as practicable. A written description of the deviation, how long it was or will be in effect, and the reason it was needed should be sent to the Division Water Control Manager.

b. Unplanned Minor Deviations. Unplanned instances create a temporary need for minor deviations from the normal regulation plan, although they are not considered emergencies. Construction accounts for the major portion of these incidents. Typical examples include utility stream crossings, bridgework, and major construction contracts. Deviations are sometimes necessary to carry out maintenance and inspection of facilities. Requests for changes in release rates involve periods ranging from a few hours to a few days. Each request is analyzed on its own merits. In evaluation of the proposed deviation, consideration must be given to upstream watershed conditions, potential flood threat, condition of the lake, and alternative measures that can be taken. In the interest of maintaining good public relations, requests generally are complied with providing there are no adverse effects on the overall regulation of the reservoir for authorized purposes. Approval of these minor deviations normally will be obtained from the division office by telephone. A

written explanation of the deviation and its cause will be furnished by letter or electronic mail to the Division Water Control Manager.

c. Planned Deviations. Each condition should be analyzed on its merits. Sufficient data on flood potential, lake and watershed conditions, possible alternative measures, benefits to be expected, and probable effects on other authorized and useful purposes, together with the district recommendation, will be presented by letter or electronic mail to the division for review and approval.

7-14 Rate of Release Change. Daily rate of release changes at Saylorville Reservoir are limited to a maximum of 3,000 cfs per day for both increases and decreases in outflow when the pool level is between elevation 836.0 feet and 875.0 feet NGVD. When the pool level exceeds elevation 875 feet NGVD, the rate of release constraint is relaxed and the release rates specified in parts B and C of the regulation schedule are followed.

SAYLORVILLE LAKE REGULATION

<p style="text-align: center;">SCHEDULE A</p> <p>Normal Flood Control Operation</p> <p>Pool Elevation: between 836 and 875 ft NGVD</p> <p>Max. daily change in outflow: 3,000 cfs.</p>	<p style="text-align: center;">Reservoir</p> <p>Pool: steady, rising, or falling</p> <p>Forecast: Peak below elevation 875 ft NGVD</p>
---	---

Condition	Operation
<p style="text-align: center;">A-I</p> <p>16 Dec. thru 20 Apr.</p>	<p>Maintain permanent pool level 836 ft NGVD by releasing inflow up to 16,000 cfs. Outflow is limited by the conduit capacity.</p> <p>Balance the storage in accord with Lake Red Rock, releasing not less than 2,000 cfs, except as limited by A-II.</p>
<p style="text-align: center;">A-II</p> <p>16 Dec thru 20 Apr stage at SE 6th St. in Des Moines above or forecast to exceed 24 ft. corresponding to a discharge of 30,000 cfs</p>	<p>Release not less than 2,000 cfs to control stage at SE 6th Street insofar as possible below 24 feet.</p> <p>Balance the storage in accord with Lake Red Rock, if Saylorville pool level is below 860 feet NGVD.</p>
<p style="text-align: center;">A-III</p> <p>21 Apr thru 15 Dec</p>	<p>Maintain permanent pool level 836 ft NGVD by releasing inflow up to 12,000 cfs when Lake Red Rock pool level is above 758 ft NGVD or 16,000 cfs when Lake Red Rock pool level is below 758 ft NGVD. Balance the storage in accord with Lake Red Rock if pool level is below 860 ft NGVD releasing not less than 2,000 cfs, except as limited by A-IV.</p>
<p style="text-align: center;">A-IV</p> <p>21 Apr. thru 15 Dec. stage at SE 6th St. in Des Moines above or forecast to exceed 24 ft discharge of 30,000 cfs</p>	<p>Release not less than 2,000 cfs to control stage at SE 6th Street insofar as possible below 24 feet.</p> <p>Balance the storage in accord with Lake Red Rock if Saylorville pool level is below 860.0 feet NGVD.</p>
<p style="text-align: center;">A-V</p> <p>Any date Beaver Cr. Flow is above or forecast to exceed 10,000 cfs</p>	<p>Release inflow to reservoir to not less than 2,000 cfs.</p>

SAYLORVILLE LAKE REGULATION

<p>SCHEDULE B Intermediate Magnitude Flood Operation</p> <p>Pool Elevation: above 875 below 884 ft NGVD</p>	<p>Reservoir Pool: steady, rising, or falling</p> <p>Forecast: Peak below elevation 884 ft NGVD</p>
---	---

Condition	Operation																																							
<p>B-I</p> <p>Any date reservoir is rising and forecast to exceed 875 feet NGVD</p>	<p>When predictions indicate that anticipated runoff will produce a peak reservoir elevation between 875 feet and 884 feet NGVD if operated under Schedule A, the schedule listed below will be adapted with the purpose of minimizing releases.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">21 Apr-15 Dec</td> <td style="text-align: center;">16 Dec-20 Apr</td> </tr> <tr> <td style="text-align: center;">Pool</td> <td style="text-align: center;">Outflow</td> <td style="text-align: center;">Outflow</td> </tr> <tr> <td style="text-align: center;">Elev</td> <td style="text-align: center;">(Ft3/S)</td> <td style="text-align: center;">(Ft3/S)</td> </tr> <tr> <td style="text-align: center;">875</td> <td style="text-align: center;">12,000</td> <td></td> </tr> <tr> <td style="text-align: center;">876</td> <td style="text-align: center;">12,000-13,000</td> <td style="text-align: center;">16,000</td> </tr> <tr> <td style="text-align: center;">877</td> <td style="text-align: center;">12,000-14,000</td> <td style="text-align: center;">16,000</td> </tr> <tr> <td style="text-align: center;">878</td> <td style="text-align: center;">12,000-15,000</td> <td style="text-align: center;">16,000</td> </tr> <tr> <td style="text-align: center;">879</td> <td style="text-align: center;">12,000-16,000</td> <td style="text-align: center;">16,000</td> </tr> <tr> <td style="text-align: center;">880</td> <td style="text-align: center;">12,000-17,000</td> <td style="text-align: center;">16,000-17,000</td> </tr> <tr> <td style="text-align: center;">881</td> <td style="text-align: center;">12,000-18,000</td> <td style="text-align: center;">16,000-18,000</td> </tr> <tr> <td style="text-align: center;">882</td> <td style="text-align: center;">12,000-19,000</td> <td style="text-align: center;">16,000-19,000</td> </tr> <tr> <td style="text-align: center;">883</td> <td style="text-align: center;">12,000-20,000</td> <td style="text-align: center;">16,000-20,000</td> </tr> <tr> <td style="text-align: center;">884</td> <td style="text-align: center;">12,000-21,000</td> <td style="text-align: center;">16,000-21,000</td> </tr> </table> <p>Shift to Schedule C when predictions indicate runoff will cause pool elevation to exceed elevation 884 feet NGVD when operated under the above schedule B-I.</p>		21 Apr-15 Dec	16 Dec-20 Apr	Pool	Outflow	Outflow	Elev	(Ft3/S)	(Ft3/S)	875	12,000		876	12,000-13,000	16,000	877	12,000-14,000	16,000	878	12,000-15,000	16,000	879	12,000-16,000	16,000	880	12,000-17,000	16,000-17,000	881	12,000-18,000	16,000-18,000	882	12,000-19,000	16,000-19,000	883	12,000-20,000	16,000-20,000	884	12,000-21,000	16,000-21,000
	21 Apr-15 Dec	16 Dec-20 Apr																																						
Pool	Outflow	Outflow																																						
Elev	(Ft3/S)	(Ft3/S)																																						
875	12,000																																							
876	12,000-13,000	16,000																																						
877	12,000-14,000	16,000																																						
878	12,000-15,000	16,000																																						
879	12,000-16,000	16,000																																						
880	12,000-17,000	16,000-17,000																																						
881	12,000-18,000	16,000-18,000																																						
882	12,000-19,000	16,000-19,000																																						
883	12,000-20,000	16,000-20,000																																						
884	12,000-21,000	16,000-21,000																																						
<p>B-II</p> <p>Any date Reservoir has peaked and is falling. Pool is between elevation 884 feet and 875 feet NGVD</p>	<p>Hold outflow to the maximum rate reached in B-I (above) until elevation 875 feet NGVD is reached; then follow Schedule A.</p>																																							

SAYLORVILLE LAKE REGULATION

<p>SCHEDULE C Large Magnitude Flood Operation Pool Elevation: above 875 ft NGVD</p>	<p>Reservoir Pool: steady, rising, or falling Forecast: Peak above elevation 884 feet NGVD</p>
--	---

Condition	Operation																																																						
<p>C-I Any date reservoir is rising and pool is forecast to peak between elevation 884 and 890 feet NGVD</p>	<p>Raise the top of the pneumatic crest gates to elevation 890 feet NGVD. Fully inflated bladders require a pressure of 27 psi. Release rates through the conduit are made according to following schedule:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">21 Apr-15 Dec</td> <td style="text-align: center;">16 Dec-20 Apr</td> </tr> <tr> <td>Pool Elev</td> <td style="text-align: center;">Outflow (Ft³/S)</td> <td style="text-align: center;">Outflow (Ft³/S)</td> </tr> <tr><td>875</td><td style="text-align: center;">12,000</td><td style="text-align: center;">16,000</td></tr> <tr><td>876</td><td style="text-align: center;">13,000</td><td style="text-align: center;">16,000</td></tr> <tr><td>877</td><td style="text-align: center;">14,000</td><td style="text-align: center;">16,000</td></tr> <tr><td>878</td><td style="text-align: center;">15,000</td><td style="text-align: center;">16,000</td></tr> <tr><td>879</td><td style="text-align: center;">16,000</td><td style="text-align: center;">16,000</td></tr> <tr><td>880</td><td style="text-align: center;">17,000</td><td style="text-align: center;">17,000</td></tr> <tr><td>881</td><td style="text-align: center;">18,000</td><td style="text-align: center;">18,000</td></tr> <tr><td>882</td><td style="text-align: center;">19,000</td><td style="text-align: center;">19,000</td></tr> <tr><td>883</td><td style="text-align: center;">20,000</td><td style="text-align: center;">20,000</td></tr> <tr><td>884</td><td style="text-align: center;">21,000</td><td style="text-align: center;">21,000</td></tr> <tr><td>885</td><td style="text-align: center;">21,000</td><td style="text-align: center;">21,000</td></tr> <tr><td>886</td><td style="text-align: center;">21,000</td><td style="text-align: center;">21,000</td></tr> <tr><td>887</td><td style="text-align: center;">21,000</td><td style="text-align: center;">21,000</td></tr> <tr><td>888</td><td style="text-align: center;">21,000</td><td style="text-align: center;">21,000</td></tr> <tr><td>889</td><td style="text-align: center;">fully open</td><td style="text-align: center;">fully open</td></tr> <tr><td>890</td><td style="text-align: center;">fully open</td><td style="text-align: center;">fully open</td></tr> </table>		21 Apr-15 Dec	16 Dec-20 Apr	Pool Elev	Outflow (Ft ³ /S)	Outflow (Ft ³ /S)	875	12,000	16,000	876	13,000	16,000	877	14,000	16,000	878	15,000	16,000	879	16,000	16,000	880	17,000	17,000	881	18,000	18,000	882	19,000	19,000	883	20,000	20,000	884	21,000	21,000	885	21,000	21,000	886	21,000	21,000	887	21,000	21,000	888	21,000	21,000	889	fully open	fully open	890	fully open	fully open
	21 Apr-15 Dec	16 Dec-20 Apr																																																					
Pool Elev	Outflow (Ft ³ /S)	Outflow (Ft ³ /S)																																																					
875	12,000	16,000																																																					
876	13,000	16,000																																																					
877	14,000	16,000																																																					
878	15,000	16,000																																																					
879	16,000	16,000																																																					
880	17,000	17,000																																																					
881	18,000	18,000																																																					
882	19,000	19,000																																																					
883	20,000	20,000																																																					
884	21,000	21,000																																																					
885	21,000	21,000																																																					
886	21,000	21,000																																																					
887	21,000	21,000																																																					
888	21,000	21,000																																																					
889	fully open	fully open																																																					
890	fully open	fully open																																																					
<p>C-II Any date reservoir is rising and pool is forecast to exceed elevation 890 feet NGVD</p>	<p>As necessary, deflate bladders of the pneumatic crest gates gradually according to the schedule shown on page E-C-6 to achieve a combined uncontrolled spillway and conduit discharge of 42,000 cfs at pool elevation 890 feet NGVD. Allow the pool to rise with uncontrolled spillway and conduit discharge above 890 feet NGVD.</p>																																																						
<p>C-III. Any date reservoir has crested and pool is between elevation 890-884 ft NGVD</p>	<p>Maintain uncontrolled spillway and conduit flow to elevation 884 feet (spillway crest elevation)</p>																																																						
<p>C-IV. Any date reservoir has crested and pool is between elevation 884-875 ft NGVD</p>	<p>Maintain fully open conduit discharge of 21,000 cfs. Upon reaching elevation 875 feet NGVD, follow Schedule A.</p>																																																						

Operation Schedule for Lowering Pneumatic Crest Gates
Pool Levels 889.0 - 890.0

Pool Elev	# of Control Section					Discharge in cfs
	1 Gate Position	2 Elev	3 Bladder	4 Pressure	5 in P.S.I	
889.0	890.0 27.0	890.0 27.0	890.0 27.0	890.0 27.0	890.0 27.0	0
889.1	890.0 27.0	890.0 27.0	885.3 6.0	890.0 27.0	890.0 27.0	2000
889.2	890.0 27.0	888.1 11.0	884.0 2.0	888.1 11.0	890.0 27.0	4000
889.3	890.0 27.0	886.6 9.0	884.0 2.0	886.6 9.0	890.0 27.0	6000
889.4	890.0 27.0	885.3 6.0	884.0 2.0	885.3 6.0	890.0 27.0	8000
889.5	890.0 27.0	884.3 4.0	884.0 2.0	884.3 4.0	890.0 27.0	10000
889.6	888.0 11.0	884.0 2.0	884.0 2.0	884.0 2.0	888.0 11.0	12000
889.7	886.7 9.0	884.0 2.0	884.0 2.0	884.0 2.0	886.7 9.0	14000
889.8	885.4 7.0	884.0 2.0	884.0 2.0	884.0 2.0	885.4 7.0	16000
889.9	884.4 4.0	884.0 2.0	884.0 2.0	884.0 2.0	884.4 4.0	18000
890.0	884.0 2.0	884.0 2.0	884.0 2.0	884.0 2.0	884.0 2.0	20000

SAYLORVILLE LAKE REGULATION

<p style="text-align: center;">SCHEDULE D</p> <p>Drought Operation For Water Supply and Water Quality</p> <p>Pool Elevation: below 836 ft NGVD</p> <p>Max daily change in outflow does not apply.</p>	<p>Reservoir: steady or rising or falling</p>
---	--

Condition	Operation
Pool is above elevation 827 ft NGVD	Release all water supply and water quality demands.
Pool is between elevation 827 and 826 ft NGVD	Release 100 percent of water supply. Maintain 175 cfs at dam and 245 cfs at SE 6th Street.
Pool is between elevation 826 and 825 ft NGVD	Release 100 percent of water supply. Maintain 150 cfs at dam and 220 cfs at SE 6th Street.
Pool is between elevation 825 and 824 ft NGVD	Release 100 percent of water supply. Maintain 125 cfs at dam and 195 cfs at SE 6th Street.
Pool is between elevation 824 and 823.5 ft NGVD	Release 100 percent of water supply. And maintain 100 cfs at dam, and 170 cfs at SE 6 th Street.
Pool is between elevation 823.5 and 819 ft NGVD	Release 100 percent of water supply. Make no water quality release.
Pool is between elevation 819 and 816 ft NGVD	Release 75 percent of water supply. Make no water quality release.
Pool is below elevation 816 ft NGVD	Release 50 percent of water supply. Make no water quality release.

Saylorville Consumptive Release for Water Supply

Month	Water Supply Release (Ft ³ /S)	Month	Water Supply Release (Ft ³ /S)
January	30	July	115
February	35	August	110
March	55	September	100
April	75	October	80
May	95	November	60
June	105	December	40