

Table G-10 - Regulation Schedule - Sandy Lake Dam and Reservoir

| Regulation Schedule | Condition | Reservoir Elev./Stage in ft. | Operation |
|--------------------------------------|--------------------|------------------------------------|--|
| <u>1. Routine Operation</u> | | | |
| After Labor Day to spring breakup | Winter drawdown | 1216.56 to 1214.31 9.25± to 7.0 | <p>The Reservoir Regulating Section shall compute the discharge required to lower the pool to minimum operating limit, elev. 1214.31 ft. (7.0 ft. stage), before the beginning of the spring breakup, usually about 1 April. Periodic checks of inflow shall be made and outflow adjusted as necessary. If the drawdown is completed before the breakup begins, discharge inflow until spring runoff starts.</p> <p>* The State of Minnesota's plan of operation requires the discharge to be 10 cfs if the elevation is below 1214.31 ft. (7.0 ft. stage).</p> |
| Spring breakup | Storing | 1214.31 to 1221.31 7.0 to 14.0 | <p>The discharges from Sandy Lake and Pokegama Reservoirs shall be regulated so that the ultimate elevations at these two reservoirs and at Aitkin shall result in elevations that correspond to the guide curve for spring floods (see Plate 13). Should Sandy Reservoir exceed elevation 1221.31 ft. (14.0 ft. stage), the dam must be completely opened, and open river conditions will exist until the pool drops below elevation 1221.31 ft., maximum and ordinary operating limit. At this elev., operation should again be based on the guide curve, if possible.</p> |

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| <u>Routine Operation</u> (Cont.) | | | *The State of Minnesota's plan of operation limits the maximum discharge to 3,800 cfs if the reservoir is above the desired maximum elev. of 1218.31 (11.0 ft. stage). |
| End of spring breakup to about 15 May | Bringing reservoir to desired summer range | 1221.31 to (1216.06 - 1216.56) 14.0 to 8.75 - 9.25 | On the recession of the inflow, the elevation in Sandy and Pokegama Reservoirs shall be governed by the guide curve, if possible, until the pool has dropped to the desired summer elevation. (There have been only a few times since operation started that Sandy Reservoir has not filled to above the desired summer elevation.) |
| About 15 May to Labor Day | Normal summer operation | 1216.06 - 1216.56 8.75 to 9.25 | Regulate the outflow through the lift gates and sluiceways, if necessary, to maintain pool at the desired summer range, if possible, until winter drawdown begins. *The State of Minnesota's plan of operation requires the discharge to be 20 cfs if the elevation is below 1216.31 ft. (9.0 ft. stage). |
| <u>2. Flood Control</u> | | | |
| Summer | Large runoff from intense | 1216.06 - 1221.31 8.75 - 14.0 | The operation is the same as that for storing the spring runoff during the spring breakup period; except, if during the summer months, use the guide curve for summer months (see Plate 14). |
| Fall | or prolonged rainfall or | 1214.31 - 1221.31 7.0 - 14.0 | |
| Winter | winter thaw | 1214.31 - 1221.31 7.0 - 14.0 | |

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| <u>3. Water Supply And Conservation</u> | | | |
| Drought | Very low inflows | 1216.56 to 1214.31 (9.25 to 7.0) or lower if necessary | <p>If inflows become so low that the reservoir must be lowered below the desired elev., so far as practicable, the reservoir shall be maintained above an elev. of 1214.31 ft. (7.0 ft. stage). The flow shall be governed by the Secretary of War's regulation that the average annual discharge shall not be reduced below 80 cfs. If the reservoir is at or below the minimum elev. of 1214.31 ft. (6.0 ft. stage), no discharge other than the minimum specified above shall be permitted except such increased discharge as may specifically be directed by the Chief of Engineers.</p> <p>*The State of Minnesota's plan of operation requires the discharge to be 10 cfs if the elev. is below 1214.31 ft. (7.0 ft. stage) minimum elev.; and 20 cfs if the elev. is between 1214.31 ft. and 1216.31 ft. (7.0 and 9.0 ft. stage). When larger flows are required at the minimum elevation, the discharge may be increased if authorized by the Commissioner of Conservation, and the maximum shall be 200 cfs.</p> |

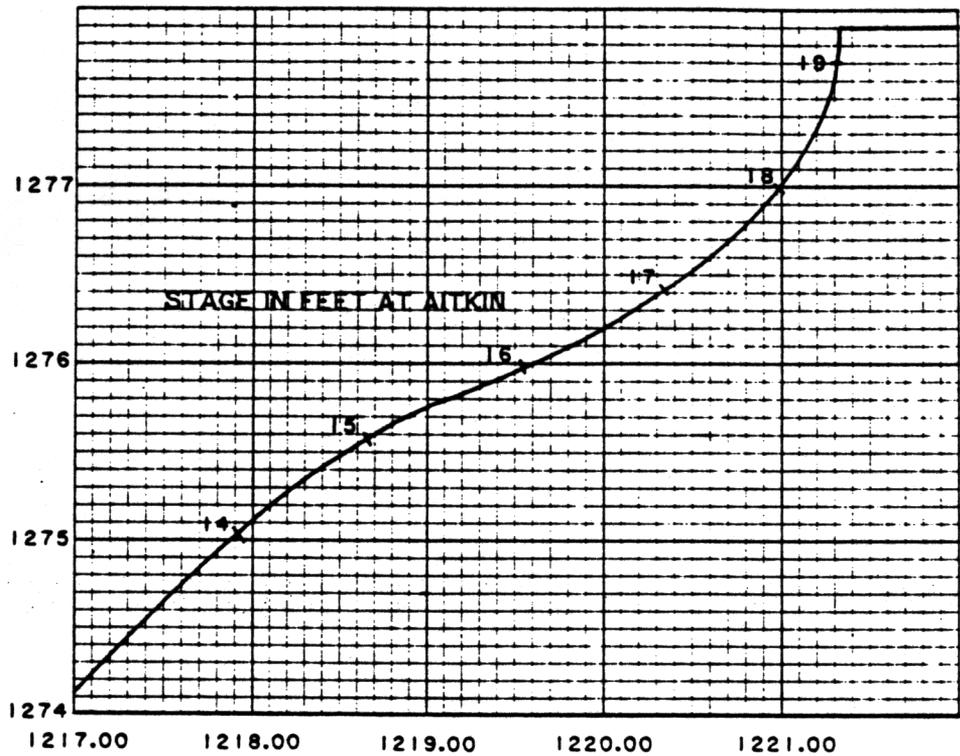
* The State of Minnesota's plan of operation shall be effective only when the reservoirs are not functioning for the primary purpose of navigation and flood control.

MINNESOTA DEPARTMENT OF CONSERVATION
REGULATION OF SANDY LAKE RESERVOIR

| Elev. in feet | Maximum Discharge in cfs if Authorized By The Commissioner of Conservation |
|------------------|---|
| 1207.31 | 10 |
| 1208.31 | 20 |
| 1209.31 | 40 |
| 1210.31 | 60 |
| 1211.31 | 80 |
| 1212.31 | 100 |
| 1213.31 | 150 |
| 1214.31 | 200 |
| 1215.31 | 400 |
| 1216.31** | 1400 |
| 1217.31 | 2400 |
| 1218.31 | 3800 |
| over 1218.31 | 3800 |

** Most desirable elevation for recreation purposes.

POKEGAMA LAKE RESERVOIR
ELEVATION 1929 ADJ.
3 DAYS TRAVEL TIME TO AITKIN



SANDY LAKE RESERVOIR
ELEVATION 1929 ADJ.

NOTE:

Curve shows relation between maximum reservoir stages and corresponding peak flood stage on the Mississippi River at Aitkin which, under operating procedures now in effect, will result (on the average) in the minimum total flood damages to affected interests in the three principal damage areas.

AITKIN GAGE ZERO = 1182.41
POKEGAMA GAGE ZERO = 1264.42
SANDY GAGE ZERO = 1207.31

1 DAY TRAVEL TIME TO AITKIN
FROM SANDY LAKE

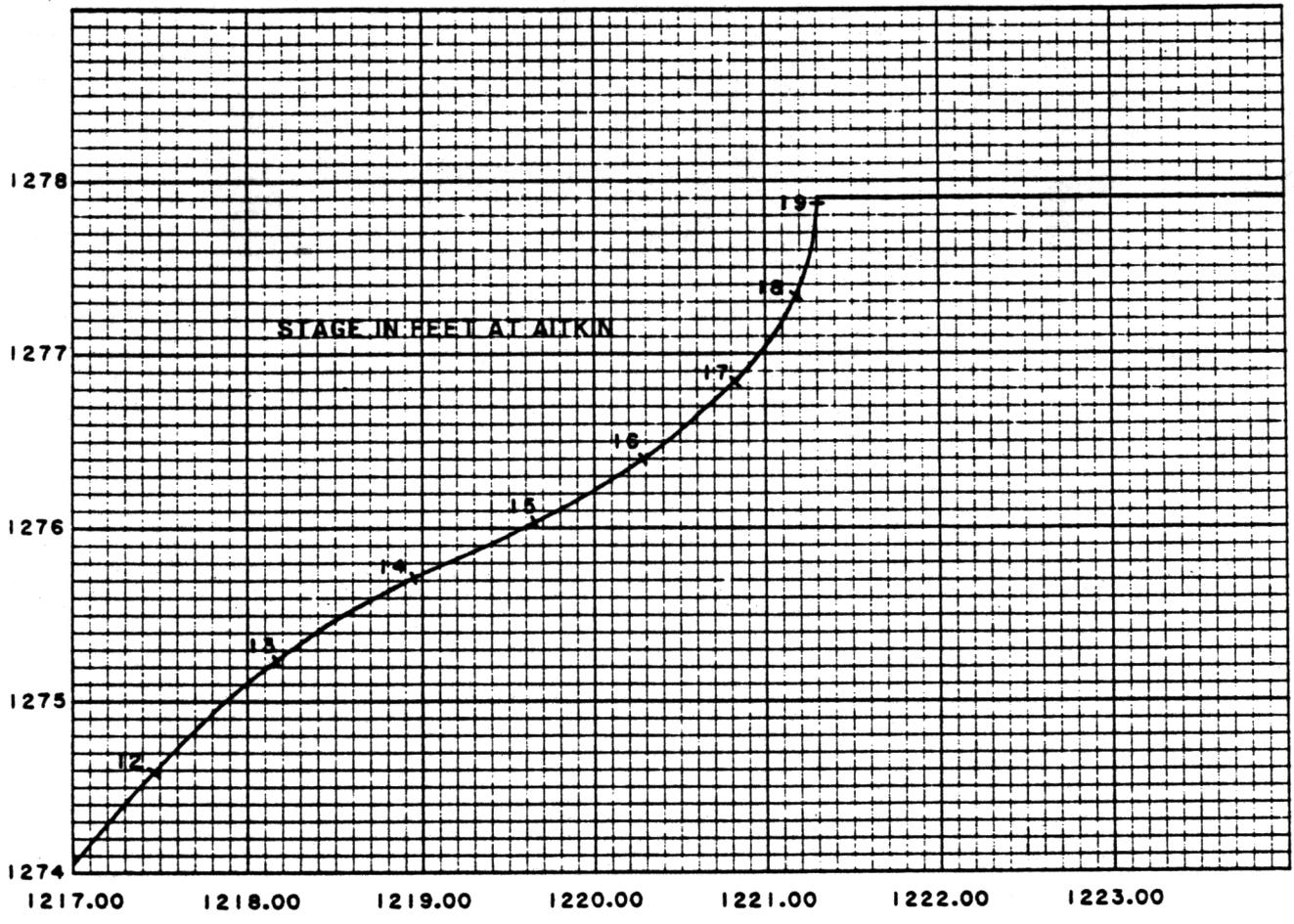
3 DAYS TRAVEL TIME TO AITKIN
FROM POKEGAMA RESERVOIR

MISSISSIPPI RIVER HEADWATERS
NAVIGATION AND FLOOD CONTROL PROJECT
RESERVOIR REGULATION MANUAL

**SPRING FLOOD GUIDE CURVE
(MARCH-15 MAY)**

CORPS OF ENGINEERS, U.S. ARMY
ST. PAUL ENGINEERING DISTRICT
ST. PAUL, MINNESOTA

POKEGAMA LAKE RESERVOIR
ELEVATION 1929 ADJ.



SANDY LAKE RESERVOIR
ELEVATION 1929 ADJ.

NOTE:

Curve shows relation between maximum reservoir stages and corresponding peak flood stage on the Mississippi River at Aitkin which, under operating procedures now in effect, will result (on the average) in the minimum total flood damages to affected interests in the three principal damage areas.

AITKIN GAGE ZERO = 1182.41
POKEGAMA GAGE ZERO = 1264.42
SANDY GAGE ZERO = 1207.31

1 DAY TRAVEL TIME TO AITKIN
FROM SANDY LAKE

3 DAYS TRAVEL TIME TO AITKIN
FROM POKEGAMA RESERVOIR

MISSISSIPPI RIVER HEADWATERS
NAVIGATION AND FLOOD CONTROL PROJECT
RESERVOIR REGULATION MANUAL

SUMMER FLOOD GUIDE CURVE
(15 MAY-SEPT)

CORPS OF ENGINEERS, U.S. ARMY
ST. PAUL ENGINEERING DISTRICT
ST. PAUL, MINNESOTA