

# SOP for Category I (3-5 lac cfs) Floods at Mangla Reservoir

## Below Max. Conservation Level (MCL) 1242 ft SPD

**Table-1**

| Sr. No. | Reservoir Condition   | Maximum Permissible Outflow                                      |
|---------|---|--|
| 1.      | Watch till reservoir rises to EL 1236 ft SPD then Shift Regulation to Reservoir Operator (WAPDA)    | Maximum Power House Discharge or IRSA Indent whichever is higher |
| 2.      | If inflow is rising, increase outflow to 100,000 cfs;<br>watch till elevation rises to El. 1241 ft. | 100,000 cfs  |
| 3.      | If inflow is rising, increase outflow to 150,000 cfs;<br>watch till elevation rises to El. 1242 ft. | 150,000 cfs  |
| 4.      | If inflow is rising, increase outflow to 250,000 cfs;<br>watch till elevation rises to El. 1243 ft. | 250,000 cfs  |
| 5.      | If reservoir level is still rising with:  | Start reducing outflows gradually, as the situation permits.     |
|         | a) Evidence of Flood Recession  |  |
|         | b) Evidence of further flood build up   | 300,000 cfs until evidence of flood recession is received.       |

# SOP for Category II (5-7 lac cfs) & III (> 7 lac cfs) Floods

## Below 1242 ft SPD

(Table-2)

| Sr. No. | Reservoir Condition  | Maximum Permissible Outflow  |
|---------|--|--|
| 1.      | <b>Qualitative Forecast</b><br><b>(24 hrs. in advance of actual precipitation)</b><br><b>Watch till elevation rises at 1236 ft</b>       | <b>Maximum outflows 100,000 cfs</b><br><b>or inflows whichever is minimum</b>  |
| 2.      | <b>If inflow is still rising maintain outflow to 100,000 cfs;</b><br><b>Watch till elevation rises at El 1237 ft.</b>                    | <b>100,000 cfs</b>   |
| 3.      | <b>If inflow is still rising increase outflow to 210,000 cfs;</b><br><b>watch till water level rises to El. 1238 ft.</b>                 | <b>210,000 cfs</b>   |
| 4.      | <b>If inflow still rising increase outflow to 300,000 cfs;</b><br><b>watch till water level rises to El. 1239 ft</b>                     | <b>300,000 cfs</b>   |
| 5.      | <b>If inflow is still rising increase outflow to 350,000 cfs;</b><br><b>watch till water level rises to El. 1240 ft.</b>                 | <b>350,000 cfs</b>   |
| 6.      | <b>If inflow is still rising increase outflow to 400,000 cfs;</b><br><b>watch till water level rises to El. 1241 ft.</b>                 | <b>400,000 cfs</b>   |
| 7.      | <b>If inflow is still rising increase outflow to</b><br><b>450,000 cfs; watch till water level rises to 1242 ft.</b>                     | <b>450,000 cfs</b>   |
| 8.      | <b>If inflow is still rising increase outflow to</b><br><b>500,000 cfs; watch till water level rises to 1243 ft.</b>                     | <b>500,000 cfs</b>   |
| 8.      | <b>If reservoir level is still rising with:</b><br><b>a) Evidence of Flood Recession</b><br><b>b) Evidence of further flood build up</b> | <b>Continue same outflow and then start</b><br><b>reducing gradually as the situation</b><br><b>permits</b><br><b>Operate the main spillway to cater for</b><br><b>inflow/outflow.</b> |

# SOP for Category-I Floods (3 - 5 Lac cfs) at MCL 1242 ft SPD

**Table-3**

| #  | Reservoir Condition   | Maximum Permissible Outflow                                |
|----|---|--|
| 1. | Qualitative Forecast<br>(24 hrs in advance of actual precipitation)<br>Maintain Reservoir at El. 1242 Ft.   | 150,000 cfs  |
| 2. | Quantitative Forecast<br>(12 hrs in advance of actual peak at Mangla)<br>Maintain Reservoir at El. 1242 Ft. | 150,000 cfs  |
| 3. | If inflow still rising increase outflow to 150,000 cfs,<br>watch till water level rises to El. 1242.5 ft.   | 150,000 cfs  |
| 4. | If inflow still rising increase outflow to 250,000 cfs,<br>watch till water level rises to El. 1243 ft.     | 250,000 cfs  |
| 5. | If reservoir level still rising with:   |  |
| a) | Evidence of Flood Recession   | Start reducing outflows gradually as the situation permits |
| b) | Evidence of further flood build up  | 300,000 cfs until evidence of flood recession is received. |

**Note:**

- Data of Flood Warning Stations and forecasts from FFD shall be kept in view during floods.
- Upon inflow hydrograph recession is confirmed the outflows should be reduced gradually for downstream relief.

# SOP for Category-II Floods (5 - 7 Lac cfs) at MCL 1242 ft SPD

**Table-4**

| #  | Reservoir Condition  | Maximum Permissible Outflow   |
|----|--|---|
| 1. | <b>Qualitative Forecast<br/>(24-36 hrs in advance of actual precipitation)</b>                                 | <b>Deplete with maximum Outflow 210,000 cfs<br/>@ 4 Ft/day upto El. 1238 Ft.</b>                                  |
| 2. | <b>Quantitative Forecast<br/>(12 hrs in advance of actual peak at Mangla)</b>                                  | <b>Adjust outflow with maximum limit of<br/>300,000 cfs and drawdown to Reservoir<br/>Level upto El. 1237 Ft.</b> |
| 3. | <b>If inflow still rising increase outflow to 300,000<br/>cfs watch till water level rises to El. 1238 ft.</b> | <b>300,000 cfs</b>  |
| 4. | <b>If inflow still rising increase outflow to 350,000<br/>cfs watch till water level rises to El. 1239 ft.</b> | <b>350,000 cfs</b>  |
| 5. | <b>If inflow still rising increase outflow to 400,000<br/>cfs watch till water level rises to El. 1240 ft.</b> | <b>400,000 cfs</b>  |
| 6. | <b>If inflow still rising increase outflow to 450,000<br/>cfs watch till water level rises to El. 1241 ft.</b> | <b>450,000 cfs</b>  |
| 7. | <b>If inflow still rising increase outflow to 500,000<br/>cfs watch till water level rises to El. 1243 ft.</b> | <b>500,000 cfs</b>  |

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# SOP for (Category-II Floods – 5 to 7 Lac cfs) at MCL 1242 ft SPD

**Table-4 Contd...**

|           |  |  |
|-----------|--|--|
| <b>8</b>  | <b>If reservoir level still rising with:</b> |  |
| <b>a)</b> | <b>Evidence of Flood Recession</b>           | <b>Continue same outflow &amp; then start reducing gradually as the situation permits.</b> |
| <b>b)</b> | <b>Evidence of further flood build up</b>    | <b>Operate the Main Spillway to cater for inflow/ outflow.</b>                             |

**Note:**

- i. If reservoir is below conservation level, pre-releases on receipt of forecasts shall be reduced accordingly by Flood Management Committee, Mangla.***
- ii. Data of Flood Warning Stations and forecasts from Flood Forecasting Division (FFD) shall be kept in view all the time during floods. As soon as inflow hydrograph recession is confirmed the outflows should be reduced gradually for downstream relief, subject to the safety of the project***
- iii. Efforts shall be made to restrict the outflows so that combined peak at Trimmu of (Mangla and Marala)  $\times 0.55 \leq 650,000$  cfs, if possible, without jeopardizing the safety of the Mangla Dam Project, which is of paramount importance.***
- iv. Under PMF like conditions if reservoir level rises above 1250 ft. SPD, the outflows shall be reduced only when the reservoir level starts depleting.***

# SOP for (Category-III Floods – Above 7 Lac cfs) at MCL1242 ft SPD

**Table-5**

| #  | Reservoir Condition   | Maximum Permissible Outflow   |
|----|---|---|
| 1. | <b>Qualitative Forecast<br/>(24 hrs in advance of actual precipitation)</b>                                 | <b>Deplete with maximum Outflow 210,000 cfs @ 4 Ft/day upto El. 1238 Ft.</b>                              |
| 2. | <b>Quantitative Forecast<br/>(12 hrs in advance of actual peak at Mangla)</b>                               | <b>Adjust outflow with maximum limit of 300,000 cfs and drawdown to Reservoir Level upto El. 1237 Ft.</b> |
| 3. | <b>If inflow still rising increase outflow to 400,000 cfs, watch till water level rises to El. 1238 ft.</b> | <b>400,000 cfs</b>  |
| 4. | <b>If inflow still rising increase outflow to 425,000 cfs, watch till water level rises to El. 1239 ft.</b> | <b>425,000 cfs</b>  |
| 5. | <b>If inflow still rising increase outflow to 450,000 cfs, watch till water level rises to El. 1240 ft.</b> | <b>450,000 cfs</b>  |
| 6. | <b>If inflow still rising increase outflow to 475,000 cfs, watch till water level rises to El. 1241 ft.</b> | <b>475,000 cfs</b>  |
| 7. | <b>If inflow still rising increase outflow to 500,000 cfs, watch till water level rises to El. 1243 ft.</b> | <b>500,000 cfs</b>  |

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# SOP for (Category-III Floods – above 7 Lac cfs) at 1242 ft SPD

**Table-5 Contd...**

|    |                                       |   |
|----|---------------------------------------|---|
| 8  | If reservoir level still rising with: |   |
| a) | Evidence of Flood Recession           | Continue same outflow & then start reducing gradually as the situation permits. |
| b) | Evidence of further flood build up    | Operate the Main Spillway to cater for inflow/ outflow.                         |

**Note:**

- i. If reservoir is below conservation level, pre-releases on receipt of forecasts shall be reduced accordingly by Flood Management Committee, Mangla.*
- ii. Data of Flood Warning Stations and forecasts from Flood Forecasting Division (FFD) shall be kept in view all the time during floods. As soon as inflow hydrograph recession is confirmed the outflows should be reduced gradually for downstream relief, subject to the safety of the project*
- iii. Efforts shall be made to restrict the outflows so that combined peak at Trimmu of (Mangla and Marala)  $\times 0.55 \leq 650,000$  cfs, if possible, without jeopardizing the safety of the Mangla Dam Project, which is of paramount importance.*
- iv. Under PMF like conditions if reservoir level rises above 1250 ft. SPD, the outflows shall be reduced only when the reservoir level starts depleting.*