



WIVENHOE POWER STATION BUSINESS PROCEDURE FOR

WIVENHOE - HIGH RAINFALL, HIGH DAM WATER LEVELS

WIV - OPS - 15

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W_OPS_15.DOC Doc No: WIV-OPS-15 Rev: 1 Rev Date 09.07.01 Page: 1 of 4

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1.0 Purpose

To provide guidance in event of rising levels above normal full supply level (EL 67) in Wivenhoe Dam.

Note: Maximum flood level for Wivenhoe Power Station is EL 77.0, Wivenhoe Dam wall crest is EL 80.0.

2.0 Scope

All Wivenhoe Power Station staff.

3.0 Actions

3.1 Responsibilities

- Wivenhoe Power Station Co-ordinator is responsible for this procedure.
- Wivenhoe Hydro Engineer is responsible for comprehensive engineering guidance on all affected areas of plant.
- Wivenhoe staff shall continually monitor dam level rate of rise and also monitor civil structure and outside works for water ingress or other possible problems.
- Remote operator shall monitor dam levels and notify Wivenhoe staff in event of any unusual rise in dam level or other unusual circumstance.
- Communication shall be maintained with the South East Queensland Water Corporation, (SEQWCO), Wivenhoe Dam Flood Control Centre for updates of flood status & suspected future inflows. (See: Appendix 1 for contact details).
- In relation to Splityard Creek Dam the Splityard Creek – Emergency Action Plan, (T-MISC-149), shall be complied with.

3.2 Civil

3.2.1 Wivenhoe Dam:

Due to revision of Probable Maximum Precipitation (PMP) predictions, three "fuse plug embankments" were installed in the Western end of the Wivenhoe Dam spillway in 2004. These "plugs" are designed to operate at RL75.7, RL76.7 and RL78.25 respectively and are expected to reduce the likelihood of the dam level going over RL78 from a 1 in 18,000 event to a 1 in 46,000 event, however there still exists the possibility that the dam level could reach RL80 which is 2M above the assembly bay at Wivenhoe Power Station.

NOTE: SEQ Water documentation uses "RL" whereas most Wivenhoe PS documents and labels use "EL". For the purpose of this document they should both be considered to be the same.

Advice from SEQ Water is:

- Expected upstream maximum water level is now RL80M AHD
- For the Probable Maximum Flood (PMF) the storage goes above RL78 at 33.3 hours from the commencement of the event (dam water level rising from EL67) and drops back below RL78 at 54.7 hours (total time of 21.4 hours). The PMF has a probability of less than 1 in 142,000.
- For the stage 1 design flood (ie: the 1 in 100,000 Annual Exceedance Probability [AEP] event) the water exceeds RL78 at 36.2 hours from the

commencement of the event (dam water level rising from EL67) and drops below RL78 at 59.5 hours (total time of 23.3 hours). The AEP of this flood event is approximately 1 in 18,000.

- Since the installation of the new spillway, the AEP of the flood that first exceeds RL78 is 1 in 46,000. Prior to installation of the new spillway the same event AEP was 1 in 18,000.

Precautions in event of Wivenhoe Dam level exceeding EL67:

- Monitor weather predictions – BOM site
- Establish close contact with SEQ Water and monitor their dam level change predictions
- Review action plan as follows:
 - Review all items from 3.2.2 to 3.6 of this procedure
 - Set agreed "trigger point" for additional water barriers at EL78
 - Prepare for installation of sandbagging or inflatable water barriers or solid barriers at all doorways and apertures
 - Allow sufficient time for construction and installation of barriers if this option has not been implemented.
 - Develop methods to divert any inflows across assembly bay and other floors away from generators and other electrical components on floors below

ENSURE... PROVIDE SED WATER WITH PLANNED GENERATION & PUMP WATER MOVEMENTS. TAPS OPERATORS PROVIDE TAP DATA, WPS MUST MONITOR TO BE SURE THIS IS BEING DONE.

Precautions in event of prediction of Wivenhoe Dam level exceeding EL75:

If, at any time, it appears likely that the level of Wivenhoe Dam may exceed EL75, this situation must be reported to the EMT for their consideration and possible escalation to the Board.

3.2.2 Splityard Creek Dam:

It is a requirement, that the following be observed and acted upon.

Substantially high rainfall is defined as greater than 100mm of rain in one day or continued regular rain at a rate of approximately 20 to 30mm per day for a period of five days to a week.

In the event of substantial rainfall the following recommendations shall apply:

Refer also to the Splityard Creek Dam – Emergency Action Plan T-MISC-149

- V-notch weirs must be monitored as soon as practicable and regularly until after the event is over.
- Weir W-4 must be paid particular attention.
- If a V-notch weir is found to be submerged (water over the V-plate), that weir must be monitored at least every four hours on a 24 hour basis until the level has dropped below the V-plate. In this instance, Department of Environment and Resource Management must be notified immediately.
Contact: Sunwater Asset Solutions– Senior Engineer Headworks Assessment Infrastructure Management. See table "appendix 1" for contact details
- Known seepage areas at Splityard are to be inspected weekly for evidence of increased seepage, with inspections increasing to daily if relevant V-notch weirs increase noticeably. General observation is to be carried out weekly for evidence of soil slippage.

- Areas to be monitored are:
 - Left hand and right hand abutments
 - Saddle dam
 - Spillway
- Within one week of the rainfall event, all boreholes, plumb bobs and inclinometers must be read.

3.3 Precautions on rising level:

3.3.1 Oil Boom

The Oil Boom anchor points shall be checked and adjusted if necessary according to best estimate of final dam level provided by the South East Queensland Water Corporation, (SEQWCO).

3.3.2 Cooling Water Intakes

- Note current intakes in use (refer: drawing 1783 - H6377), calculate optimal intakes for best estimate of final dam level.
- In the event that intakes need to be adjusted, arrange a suitable date and diver to conduct the task. This may not need to be done for some weeks after the initial flood event.

3.3.3 Drainage Pumps

- Monitor normal drainage pump hours run on a daily basis (minimum). If run time seems excessive, investigate possible causes (leaks, etc.).
- Check configuration and availability of all Normal drainage pumps for service. Test run if possible.
- Check configuration and availability of all Emergency drainage pumps for service. Test run if possible.

3.3.4 Floors Not Normally Below Water Level

Prior to dam level reaching any floor level, check for any possible or probable leaks through floor protrusions, pipes etc.

- **Cable Floor EL 67.92**
 - Regularly monitor leakage at outer edge of silo/floor junction. Pay particular attention to CW intake pipe support sections.
- **Control Room Floor EL 70.26**

In event that water is filling silos and could flood the station to the control room floor level:

- Remove all records from the archive room
- Remove all drawing tracings, drawing microfilm, videos and spares from the control room
- **Services Room Floor EL 73.32**

In event that water is filling silos and could flood the station to the services floor level:

- Remove all computers and loose equipment from the communications room

- **Dewatering Air Compressor Floor EL 71.52**
 - Check floor protrusions and monitor for possible leaks.
 - In event of water level rising above EL 71.52, it may become necessary to review the air conditioning system water discharge, as this discharges directly into the tailbay below the floor at EL 71.52.
 - **Workshop Fans on western wall at EL 75.52:** If level rises above fans, Check and monitor leakage around fan exhaust shrouds.
 - **Domestic Water Room EL 75.25**
 - If it is estimated that the dam level may rise above EL 75.25, the following actions shall be conducted:
 - Isolate all power to the room IE: 415V supply to domestic water pump, 240V power to power points (GPO's) and Lights. Power to CSB will automatically trip at EL73.32 but will need dry out & test before restoration.
 - Check, isolate if necessary diesel system to prevent fuel oil leakage.
 - Check status of domestic water tank; if not full or near full there may be a danger of it floating.
- **Assembly Bay EL 78.00**
 - If it is estimated that the dam level may rise above EL 75 (See: 3.2.1 – "Precautions in event of prediction of Wivenhoe Dam level exceeding EL75"), the following actions shall be considered:
 - Installation of sandbags around the assembly bay area to minimise water ingress
 - Alternative power supplies for lighting and water pumping, should station supplies fail
 - Alternative pumping systems IE: Diesel or petrol fuelled
 - Oil leaks from station oil systems: Governor, Discharge Valve, Bearings.
 - "Making Safe" all power supplies (See: "Station Flooded Trips" below):
 - High Voltage AC power supplies (275kV, 13.8kV, 11kV, 3.3kV)
 - Low voltage AC power supplies (240V, 110V, 24V) IE: Cubicle and generator heaters, light and power circuits.
 - DC power supplies: 110V, 24V (+) and (-), station batteries

3.4 Uncontrollable Water Ingress into Silos:

Station Flooded Trips

- **Station flooded to Discharge Valve Floor EL 16 (71DLF) >>**
 - Hydraulic fault shutdown both units
 - Alarm: "Discharge Valve floor flooded"
 - **Power Supply Status:** All available
 - Consider removal of all DC supplies which may become submerged as the silos fill.
- **Station flooded to Control Room Floor EL70.26 (71YFLB) >>**
Switch located at approx. EL69.5 in silo 2 cable floor below Control floor
 - 3.3kV MSB bus section & station transformers 1 & 2 - 3.3kV CB's trip

- Electrical fault shutdown 86U1/86U2 on both units
 - 13.8kV GCB's at H28 trip
 - 275kV CB's at H12 Mt.England trip
- Alarm: "Station flooded to Control Room level"
- **Power Supply Status:**
Both Main and both Station transformers de-energised,
3.3kV MSB de-energised,
415V fed from local supply or Standby Generator
- **Station Flooded to Services Floor EL73.32 (71FLA) >>**
Switch located at EL72 in NDP room approx. 1M below
Com.Serv.Board
- Local Supply transformer – 415V CB trip
- Common Services transformers 1 & 2 - 415V CB's trip
- Standby Generator 415V CB trip and Standby Generator shutdown
- CSB Bus-section – 415V CB trip
- Alarm: "Station flooded to Services floor"
- **Power Supply Status:**
3.3kV MSB de-energised, 415 CSB de-energised, Standby Generator
shutdown
- **Consider water supply & toilets** – it will not be possible to use toilets
without power for water & sewage pumps.
- **Consider remaining time available for station batteries and
emergency lighting** – Load will have changed from "normal" as the
silos fill & different circuits are disconnected.

3.5 Past History

- 4/4/89 - Wivenhoe Dam level rose to EL 69.8
- 10/2/99 - Wivenhoe Dam level rose to EL 70.44

4.0 Definitions

Not Applicable.

5.0 Reference Documentation

CORP-MAN-034 Crisis Communication Plan

CORP-MAN-033 Corporate Crisis Management and Business Continuity Plan

WIV-MAN-13 Emergency Response and Business Continuity Plan for
Wivenhoe Power Station

WIV-ENV-01 Remedial Actions in Case of Oil Spill Contamination

T-MISC-149 Emergency Action Plan – Splityard Creek Dam

Schematic Diagrams: D2021 - Machine hall EL78, D2023 - Assembly bay EL78 &
EL71.52, D2024 - Plan on Transformer Bays EL78, D2026 - EL70.26, D2081 -
Domestic Water Supply, D2082 - Domestic Water Supply.

File all information on file FAC50 "Facilities Management – Inspection Reports –
Wivenhoe Dam – Inspection of Dams/Structures/Roadways and Batters"

SEE: Appendix 1 for contact details of all agencies which may be required in a
flood situation .

*CURRENT RAINFALL & WATER LEVEL
DATA <http://www.dam.gov.au/>
QLD/FLOOD/SENSE. HTML.
MAP OF WIV CATCHMENT:
----- .au/hydro/flood/QLD/
PROCURES/RAISE
UPPER/map.shtm.*

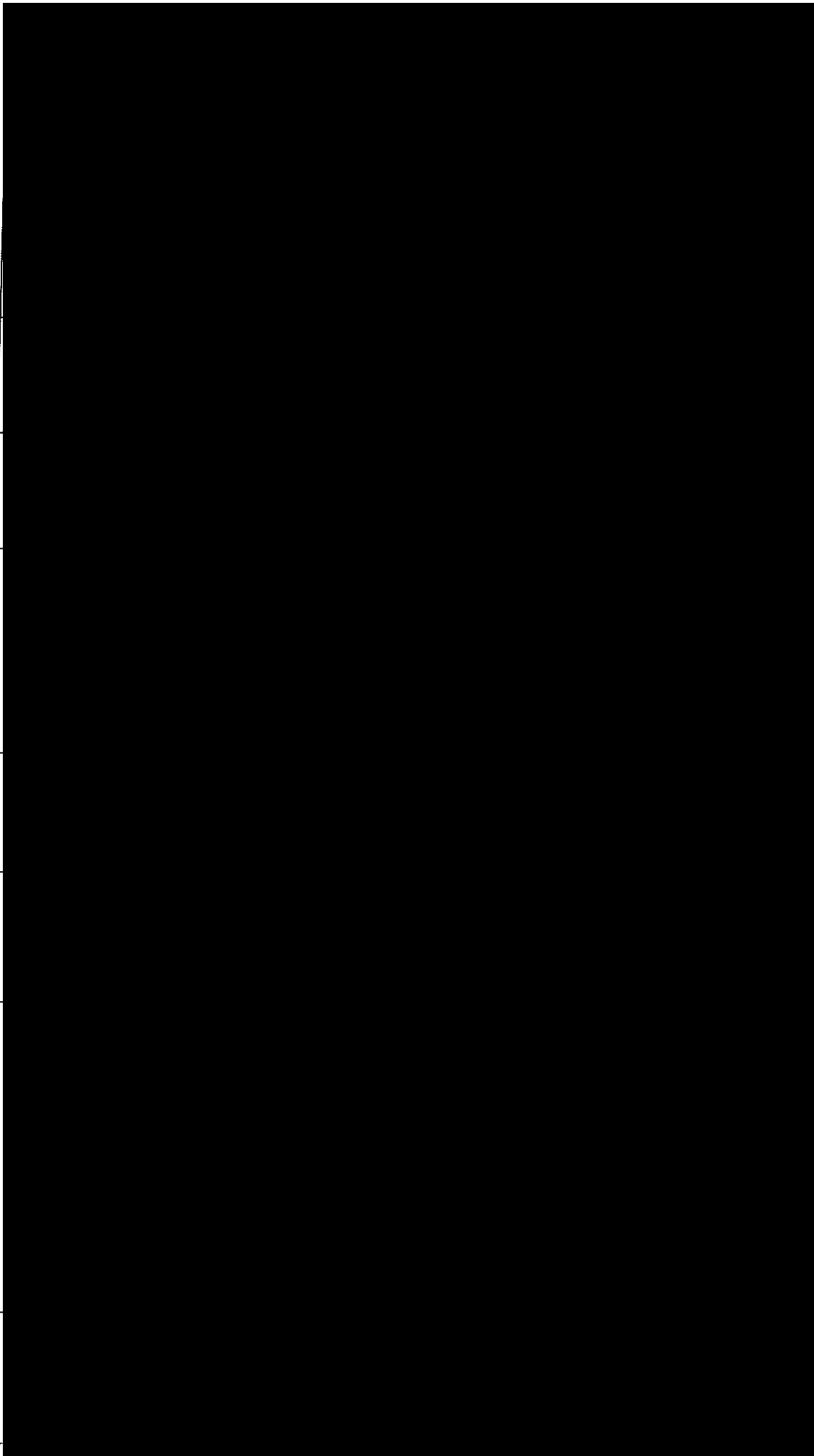
6.0 Revision History

Rev. No.	Rev. Date	Revision Description	Author	Approv. By
0	21/10/98	New Procedure	T.Lush	T.Lush
1	09.07.01	Procedure emended to reflect current requirements.	T Lush	T Lush

Appendix 1:

Agency	Position	Working Hours priority	Out of Hours priority	Name	Work Phone	Fax	Mobile	After Hours
[Redacted Content]								

Management



Emergency

Regional Director Brisbane District

